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SOCIAL DIMENSIONS OF BIODIVERSITY CONSERVATION ON PRIVATE LAND

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in March 2011
for the degree of Doctor of Philosophy
in the School of Earth and Environmental Sciences
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STATEMENT ON THE CONTRIBUTION OF OTHERS

RESEARCH FUNDING

School of Earth and Environmental Sciences, James Cook University, Research Grant $3,000
School of Earth and Environmental Sciences, James Cook University, Travel Grant $500

THESIS COMMITTEE

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STATISTICAL AND ANALYTICAL SUPPORT

Dr. Johnathan Kool

EDITORIAL SUPPORT

Prof. Chris Cocklin
Dr. Nadine Marshall
Assoc. Prof. Peter Valentine
Dru Marsh
Tom Brewer

HUMAN ETHICS

All research procedures reported in the thesis received the approval of the relevant Ethics/Safety Committees (see Appendix 2).

ACKNOWLEDGEMENTS

First, my supervisors. Chris, just one simple sentence, uttered back in 2006, "If you feel like a tropical sea change, come to James Cook and start a PhD" changed the course of my future. Of all the pros and cons that I weighed up before returning to university, having you as my primary supervisor was never one of them. You provided sufficient freedom for me to explore my thoughts and interests, but gently steered me off unknown or risky paths. This approach, combined with your extreme efficiency in providing comments and advice on my written work, has allowed me to achieve my goal of completing my PhD within three years. Importantly, when I reached that futile point of wanting to give up, you were waiting there for me with a cold beer and some positive and uplifting advice. Chris, you have been a truly supportive supervisor, a wise mentor and a good friend. I thank you sincerely for making this PhD such an enriching, rewarding and enlightening experience. I couldn't have asked for more in a supervisor. Thank you also for providing the necessary research funds for me to undertake my research.

Nadine, I haven't forgotten that energetic conversation that we had in mid-2008 when I was a budding social scientist with big dreams but few skills to realise them. Thank you for equipping me with those skills, for encouraging me to get the best out of myself, forcing deadlines so I could meet my goals and for giving me the confidence to publish my research.

Peter, the sage research advice you have provided me with on this journey will continue with me long into the future, and I thank you for that. Your profound knowledge of north Queensland, and of social and environmental issues more broadly, gave me much fodder to ponder, and added a new level of depth to my research.

Dru, I could write an entire chapter on how indebted I am to you. Throughout my entire academic journey you have held my hand, shone light into the dark, laughed with me, cried with me, but most importantly, have believed in me when I didn't believe in myself. Thank you for your unwavering support, incredible dedication and attention to providing insightful and speedy comments on my draft chapters and papers.

Tom, thank your for your eternal love and support, for listening to and helping me with my woes, for challenging me when I needed it, for sharing bottles of bubbles to celebrate my

achievements, for the enjoying fish and chips and relaxing on the beach, for making me laugh, and for the countless hours you put into critically reviewing my work and final manuscript. You're amazing, I don't know what I'd do without you.

Mum and Dad, thank you for all the outdoor adventures that instilled in me a deep respect for the environment. Thank you for allowing me to follow my own dreams, for supporting me throughout my education, and for all of your love.

Sarah, Claire and Elsie, life would be so dull without you. The emotional support, advice and sunshine you provide me makes this life worth living! I love you so much. Thanks also to my beautiful friends Lou, Nikki, Cam, Gen, Lachie, Dani, Darryl, Steph, Fraser, Duan, Piero, Liz, Milena, Johnathan, Craig and Mel. Thank you to Ken Sellick, Simon Burgess, and Tim O'Riordan for your wise counsel. Marjorie, thanks so much for proof-reading over the final manuscript.

Thank you to all the administration and IT support at JCU, in particular Glen Connolly, Beth Moore, Clive Grant, and Rob Scott, and to the students at the School of Earth and Environmental Sciences and the ARC Centre for Excellence for Coral Reef Studies.

Finally, thank you to all the landholders and program administrators who participated in my research: without your time and valuable insights, there would be no dissertation. I would particularly like to thank Phil Bourke, Keith Smith, Mark Gordon, Andrea Lingard, Rob Cameron, Lisa Baynes and Ron Gordon.

ABSTRACT

The prevalence of private property in most western countries places the responsibility for biodiversity conservation in the hands of hundreds of millions of individuals. To preserve the remaining biodiversity on private land, many conservation policies and programs have been deployed. These policies and programs, however, have largely failed, due to a lack of understanding landholders' social characteristics, which influence their capacity and willingness to participate in conservation programs and adopt conservation practices.

Innovation-adoption theory explains how, why and at what rate innovations are adopted. I used this theory to conceptualise landholder participation in conservation programs because it offers an approach to increase our understanding of the motivations and barriers to participation. Advancements in our knowledge of landholder behaviour can improve the design of conservation programs through more informed choices of policy instruments that assist government and non-government agencies in achieving their conservation policy goals. Currently, our knowledge of the linkages between landholders' social characteristics and their preferences for policy instruments remains inconclusive.

The overall aim of this research was to contribute to our understanding of how the social characteristics of landholders influence their conservation behaviour, in support of the improved use of policy instruments. Specifically, the objectives of this research were to understand: 1) how social characteristics differed between landholders who had participated in one of three conservation programs; 2) what motivated and limited the involvement of participants; 3) how the social characteristics of conservation program participants and non-participants differed; 4) why some landholders chose not to participate in conservation programs; and 5) how conservation programs could be designed to enlist landholders who may otherwise not participate. To satisfy these research objectives, I designed a revealed preference study to examine landholders' 'actual' preferences for policy instruments. Three north Queensland conservation programs were selected that each employed different policy instruments: the voluntary Queensland Government Nature Refuge Program; the direct-payment Cassowary Coast Rate Deferral Scheme; and the market-based Desert Uplands Landscape Linkages Program. Each program required participants to enter into a conservation agreement or covenant.

Invitations were sent to 58 participants in the three programs. In total, 45 conservation program participants were interviewed between February and June 2009. Twenty-nine landholders who had not participated in one of these programs (non-participants), but who may otherwise have qualified for the program, were recruited, using snowball sampling, and interviewed. Semi-structured interviews were used to administer a survey that comprised both closed and open response questions. Chi-square and randomization tests were used to analyse quantitative data; the discourse analysis methods of grounded theory were used to analyse qualitative data.

The results revealed that landholders' dominant land use (production or non-production) influenced their preference for policy instruments. Production landholders used the land to derive an income from production-related activities, worked longer hours on their properties and experienced higher levels of stress related to their lifestyle. They were more likely to participate in short-term programs that offered large financial incentives, and conserved less than 25% of their property. Non-production landholders, who did not derive an income from production-related activities, demonstrated stronger personal norms and environmental attitudes regarding their role in conservation, and were more likely to participate in long-term programs that were voluntary or offered small financial incentives, and conserved more than 75% of their property.

I used qualitative data to understand landholders' relative commitment to biodiversity conservation. Overall, landholders were motivated to participate in conservation programs by conservation, production, financial and experimentally-based imperatives. Production landholders represented all four motivations, while non-production landholders were only motivated by conservation or financial imperatives. These motivations, along with landholders' perspectives of the landscape (i.e., whether the land could be used for only production or conservation [uni-functional] or both [multifunctional]), influenced how they selected *what land* they would allocate to conservation. In some instances, these choices resulted in no additional gain beyond what would have occurred from 'business as usual', or actually represented a threat to biodiversity.

Comparisons between program participants and non-participants revealed that non-participants had significantly lower levels of human and social capital than participants, in

four of the eight dimensions assessed: lifestyle and wellbeing, information and knowledge, environmental attitudes, and trust. Significant differences were not observed for four other dimensions that were measured. Higher levels of pre-existing capital increased the likelihood of landholder participation in conservation programs; lower levels of human capital reduced the likelihood of participation.

Qualitative data were used to understand context-specific reasons for non-participation. Two major barriers to participation existed. First, non-participants believed that the programs did not fit with their personal needs or align with their land management goals and obligations, and were not sufficiently practical or flexible. They feared participation would have directly or indirectly infringed upon their property rights and compromised the economic value of their property. Second, non-participants harboured a deep mistrust of previous and current governments, which represented an impermeable barrier to participation. For some respondents, participation was conditional on the fit between their property goals and both the characteristics of the program and the mandate of the program administrator (i.e., conditional non-participants). For other respondents, these barriers completely inhibited their willingness to participate (resistant non-participants). Non-participants believed that program administrators' commitment to political goals, implicit in program design, confounded the relevance of conservation programs to their personal needs and property conditions.

These findings make an important contribution to private land conservation policy. Landholders presented as a heterogeneous group of individuals whose participation in conservation programs was defined largely by their reliance on the land for income, landscape perspective, human and social capital, trust in the program administrator, and the politico-historical context. These factors influenced landholders' capacity and willingness to participate in conservation programs, their preference for policy instruments, and how they selected land to conserve, which suggest that it is no longer necessary to understand adoption of innovation as occurring along a continuum based only on socio-psychological factors. These findings should be used to improve the use of policy instruments in conservation program design so they can genuinely preserve biodiversity on the private land to which they are targeted.

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CHAPTER 1
INTRODUCTION

> "We end, I think, at what might be called the standard paradox of the twentieth century: our tools are better than we are, and grow better faster than we do. They suffice to crack the atom, to command the tides. But they do not suffice for the oldest task in human history: to live on a piece of land without spoiling it."
>
> Aldo Leopold (1991, p. 254)

1.1 BIODIVERSITY CONSERVATION ON PRIVATE LAND

The hegemony of private property regimes in most western countries means that much of the Earth's biodiversity[1] is found on private land (Knight 1999), which places the responsibility for biodiversity conservation in the hands of hundreds of millions of individuals. Safeguarding the biodiversity that persists on privately managed land is essential to supplement national parks (Langholz and Krug 2004) and to provide life-supporting ecosystem services, which can be costly to replace with human-engineered solutions (Daily and Ellison 2002). There is a rich history of conservation policies and programs[2] that have been deployed with an aim to conserve biodiversity on public land, and increasingly on private land. Yet, despite these efforts and the widespread attention that biodiversity has received, there is no evidence that the rate of global biodiversity loss is slowing (Secretariat of the Convention on Biological Diversity 2010; Stokstad 2010). Efforts to conserve biodiversity and to maintain or enhance ecosystem quality have largely failed (Hamblin 2009).

This failure has been attributed not to limits on our understanding of biology and ecological processes, but to a lack of understanding "people and the choices they make" (Cowling 2005; Balmford and Cowling 2006, p. 692). Conservation is rarely treated as a credible corpus of cultural and political thought that challenges the fundamental elements of human culture, including values, individual autonomy, religious traditions

[1] Biodiversity (biological diversity) is defined here as the totality and variability among living organisms, including diversity within and between genes, species and ecosystems, and the ecological and evolutionary processes that sustain this diversity.

[2] Conservation programs are defined here as those programs that aim to protect or improve the condition of ecosystems, habitat and native vegetation, particularly through changed land management practices and the application of permanent conservation covenants.

and private property rights (Freyfogle 2006). Therefore, conservation is not simply about declaring a national park or promoting the use of a new technology: it is about what motivates and limits people in undertaking certain actions and how they can be supported to make decisions that provide an ongoing contribution to preserving biodiversity. The social dimensions of landholders (freeholders and leaseholders) are the primary determinants of the success or failure of any conservation effort on private land (Mascia, Brosius *et al.* 2003).

Landholder willingness to adopt conservation programs may be broadly conceptualised within innovation-adoption theory (also referred to as adoption-diffusion theory), which explains how, why and at what rate innovations[1] (in this case, conservation practices) spread through society (Rogers 1962; Jones 1963; Abadi Ghadim and Pannell 1999). While the initial surge of innovation-adoption theory in the 1940s focused on the characteristics of technological innovations, the 1960s saw the inclusion of social-psychological models to explain the characteristics of landholders who adopt or do not adopt agricultural innovations (Clearfield and Osgood 1986; Rogers 2003).

The diffusion and adoption of an innovation, according to the theory, is influenced by both social and individual factors. Innovation is communicated through various pathways among members of a social system over time, through a process of diffusion. Diffusion of knowledge, technology and culture therefore represents a form of social change, in which there is an alteration to the structure and function of a social system (Rogers 1995; Ruttan 1996). In addition to processes of social change that influence adoption, an individual must have the capacity and willingness to adopt the innovation. An individual's capacity to adopt will depend on their personal circumstances (i.e., social variables [e.g., financial situation, education, time]) and their willingness to adopt will depend on their attitude towards the innovation (i.e., psychological variables, including norms and values). That is, the choice to adopt conservation practices is an individual one, but is influenced by social processes (the 'socio-psychological context'). Social processes are typically explained through social learning theory or social capital theory, while individual choices are typically explained through behaviour theory or rational choice theory (Figure 1.1). Since the focus of this research is on individual

[1] An innovation is an "idea, practice, or object that is perceived as new by an individual" (Rogers 1995, p. 11).

choice, I draw more from behaviour theory, but will necessarily rely on theories of social practice to assist more broadly in understanding the drivers of participation in private land conservation.

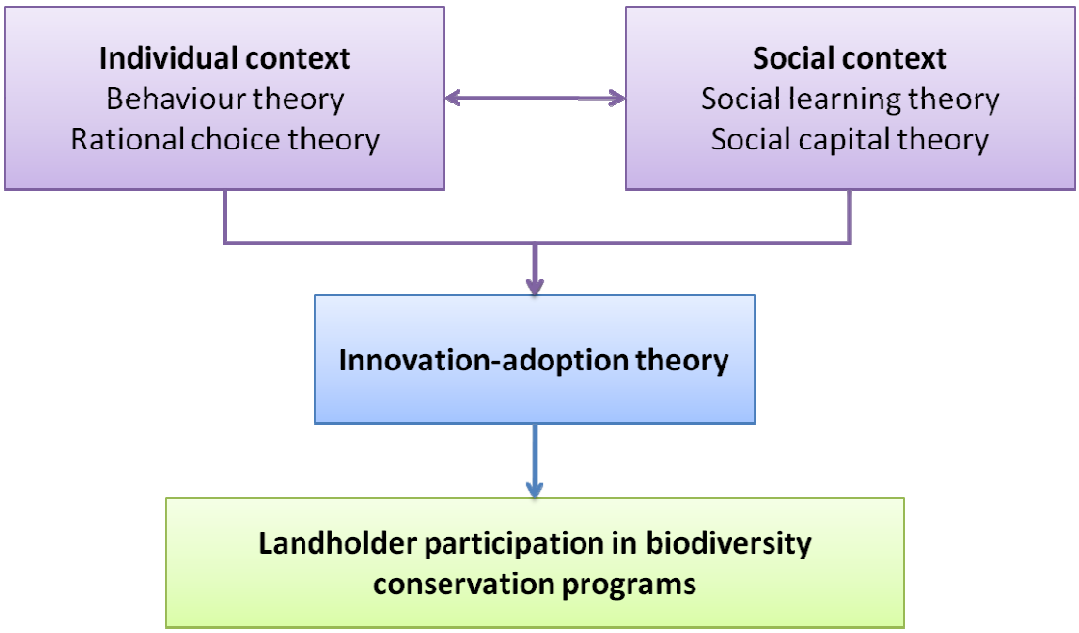


Figure 1.1 Theories that inform landholder participation in biodiversity conservation programs

Box 1.1: Broad descriptions of theories relevant to the research

Behaviour theory
A field that encompasses many theoretical approaches to understand human behaviour, and which commonly use socio-psychological variables to do so (e.g., Theory of Planned Behaviour, Value-Belief-Norm Theory) (e.g., Ajzen 1991; Stern, Dietz *et al.* 1999).

Rational choice theory
Rational choice theory assumes individual action is based on subjective-expected utility; that is, individuals desire more rather than less of a good, and will typically try to obtain those goods in the most cost-effective way (e.g., Hechter and Kanazawa 1997).

Social learning theory
The theory emphasises the dominant roles played by explicit, symbolic and self-regulatory processes in psychological functioning, and recognises that human thought, affect and behaviour can be strongly influenced by direct experience and observation (e.g., Bandura 1977).

Social capital theory
Social capital theory posits that elements of a social system can become resources for action (Coleman 1988). These factors include relations of trust; reciprocity and exchanges; common rules, norms and sanctions; connectedness, and networks and groups (e.g., Pretty and Ward 2001).

Behaviour theory attempts to explain human behaviour. Common methods employed to explain behaviour include demographic assessments and socio-psychological analyses. Demographic assessments use variables such as age, income, and education as predictors of behaviour (Creswell 2009) and can be used to make generalisations about landholders' willingness to adopt conservation practices. For example, landholders with low or uncertain income may prefer short-term, low-risk conservation programs (Petrzelka, Korsching *et al.* 1996). Formal education usually increases landholders' capacity to derive off-property income and thereby reduce the financial risk of innovation adoption (Cary, Webb *et al.* 2002). Health and family considerations, such as care of ill family members and other social obligations, can reduce the relative importance of conservation practices and result in non-adoption or non-participation (Pannell, Marshall *et al.* 2006).

Socio-psychological analyses assess an individual's worldview; that is, how they interpret the world and create a social reality that guides their expectations of society and themselves (Pirages and Ehrlich 1974), commonly through an examination of norms, and attitudes. Norms are beliefs about how an individual is expected to behave (Ajzen and Fishbein 1970), according to either perceived societal expectations (social norms) or their own personal beliefs (personal norms). Social norms can explain behaviour when there is community pressure for landholders to participate in conservation activities (Ajzen and Fishbein 1970) or when an individual perceives they will benefit from collective social action (Ellickson 1991). When social norms are internalised they become personal norms; "[p]eople comply with social norms either to maximise socially mediated external reinforcements or, if the norms have been internalized, to maintain or enhance self-evaluation" (Schwartz 1977, 268). Personal norms influence behaviour when landholders believe their actions represent a threat to something they value (i.e., they are aware of the consequences of their actions) and perceive they have the ability to reduce that threat (i.e., they ascribe responsibility for those consequences to themselves) (Stern 2000). Attitudes are expressed in a person's evaluation of whether something is favoured or disfavoured (Eagly and Chaiken 1993). Attitudes can explain landholders' willingness to adopt conservation practices in general (Beedell and Rehman 2000) or their commitment to, for example, protection of a particular species or vegetation type (Winter, Prozesky *et al.* 2007). Landholders' attitudes are "crucial to the political feasibility of any conservation strategy" because

hostile attitudes can decrease the effectiveness of the strategy and increase the cost of enforcement (Doremus 2003, p. 229).

Socio-psychological variables are often used in combination to develop models that explain behaviour. Examples include the theory of planned behaviour (Ajzen 1991; Ajzen and Fishbein 2005), and the value[1]-belief[2]-norm theory (Stern 2000), that incorporates personal values theory (Rokeach 1973; Schwartz 1994); and the norm activation theory (Schwartz 1977). Such models have been extensively used within the literature to understand behaviour (e.g., Sheeran and Orbell 1999; Armitage and Conner 2001; Fielding, Terry *et al.* 2005; Kaiser, Hubner *et al.* 2005).

Based on demographic variables and socio-psychological characteristics, Rogers (1962) that characterised individuals' willingness to adopt an innovation (i.e., laggards, late majority, early majority, early adopters and innovators). Typologies are developed by grouping together similar types of landholders to create a profile that represents the characteristics of the group through the use of a set of 'archetypal' individuals (Emtage, Herbohn *et al.* 2007). Examples of other typologies that relate to the adoption of conservation and agricultural practices include farm typology (Daskalopoulou and Petrou 2002; Tavernier and Tolomeo 2004); dairy farm family classifications (Maseda, Díaz *et al.* 2004); farming styles in viticulture (Mesiti and Vanclay 2006); and typologies of adopters (Rogers 1962; Rogers 2003), participants and non-participants (Morris and Potter 1995), farming subcultures (Vanclay 1998), non-industrial landholders (Jennings and van Putten 2006) and graziers (Bohnet, Roberts *et al.* 2011).

Within innovation-adoption theory, landholder typologies are often considered alongside property structural variables (e.g., land size, tenure, production income), ecological variables (e.g., biodiversity, erosion) and institutional variables (e.g., policies, markets, infrastructure) (Clearfield and Osgood 1986). For instance,

[1] Values are prescriptive or proscriptive beliefs in which an individual acts by preference (Allport 1961). Values can have behavioural components; affective components that involve feelings for approval and disapproval (emotion); and cognitive components that assume an individual identifies correct behaviours and end-states (intelligence) (Rokeach 1973).

[2] Beliefs are determinants of an individual's intentions to perform a particular behaviour. They can be about objects, actions, means or ends and may be capable of being true or false (descriptive or existential beliefs); be considered good or bad (evaluative beliefs); or judged as desirable or undesirable (prescriptive or proscriptive beliefs) (Rokeach 1973).

landholders can be categorised according to their land management practices, the biophysical characteristics of their property, their socio-economic characteristics (Bohnet, Roberts *et al.* 2011), land tenure, farm mechanisation, the use of hired labour and reliance on off-farm employment (Daskalopoulou and Petrou 2002), the objective of ownership and source and type of information received by the landholder (Jennings and van Putten 2006), family structure, land structure, infrastructure and livestock (Maseda, Díaz *et al.* 2004), farm size (Tavernier and Tolomeo 2004), and self descriptions and comparisons with neighbours' farming strategies (Mesiti and Vanclay 2006). Typology development has been promoted by researchers to help shape policies and programs to avoid a blanket approaches that do not account for differences in the personal characteristics of landholders and their properties (Boon, Meilby *et al.* 2004; Cody 2004; Greiner and Lankester 2005; Vanclay 2005; Van Herzele and Van Gossum 2008; Bohnet, Roberts *et al.* 2011).

Inevitably, there are limitations to the various methods employed to understand landholder behaviour. Demographic variables, for instance, cannot be relied on alone as a measure of landholder willingness to adopt conservation practices and participate in conservation programs. They are limited in their use because of the inconsistency with which the variables explain participation. For example, age or land use experience can be a strong predictor of behaviour in some instances but not others (see Olmstead and McCurdy 1989; Drost, Long *et al.* 1996; Fransson and Gärling 1999; Peterson and Coppock 2001; Cary, Webb *et al.* 2002; Cottrell 2003; Langpap 2004; Kabii and Horwitz 2006; Seabrook, McAlpine *et al.* 2008). That is, while demographics provide important contextual information, which can be quickly and cheaply collected, they do not consistently provide a reliable measure of behaviour, or landholder willingness to participate in conservation programs. Similarly, the use of socio-psychological variables and associated models on their own can be insufficient to describe or predict behaviour in a consistent manner, and so are often examined in combination with other variables, such as property characteristics and demographics (Lynne, Shonkwiler *et al.* 1988; Cheung, Chan *et al.* 1999; Kaiser and Shimoda 1999; Dietz, Dan *et al.* 2007). For example, Finnish foresters' choice between natural reforestation and replanting depended on soil condition (property characteristics) and past experience, more so than attitude, social norms or perceived behavioural control (Karppinen 2005). Likewise, adoption and investment in conservation technology was found to be best explained by

the financial capability (demographics) of Florida strawberry farmers, rather than perceived behavioural control (Lynne, Franklin Casey *et al.* 1995). A further limitation of typologies is that they are often derived from a subset of the population. For example, Ha *et al.* (2002) only characterised landholders who had participated in the market-based Bushtender program; these results cannot be immediately compared, for instance, with landholders who may have had a preference for voluntary programs. Similarly, when typologies are derived from desk-based reviews (e.g., Daskalopoulou and Petrou 2002) characterisations can only be made on the basis of pre-existing data sets and therefore their use can be limited.

Nevertheless, innovation-adoption and related theories are essential foundations in understanding landholder behaviour, and thereby for increasing the extent of formal biodiversity conservation on private land. Importantly, advancements in our knowledge of landholder adoption of conservation practices can inform policy instrument choice in conservation program design. Policy instruments are mechanisms that assist government and non-government agencies in achieving their conservation policy goals, often for the lowest possible cost (Richards 2000). Common examples include regulatory (e.g., legislation, taxes), voluntary (e.g., voluntary programs, management agreements), educational (e.g., eco-labels, brochures, workshops) and economic instruments (e.g., subsidies, tradable permits, tender schemes) (Young, Gunningham *et al.* 1996). To engage landholders in conservation activities requires a careful pairing of policy instruments to landholders (Cocklin, Mautner *et al.* 2007). To be effective, these instruments should be selected on the basis of the characteristics of the landholding group to which the policy or program applies. Programs that are designed on the basis of inappropriate policy instrument choice can hamper participation (Morris and Potter 1995; Lobley and Potter 1998), and generate a range of perverse outcomes, such as low additionality[1] (Carey, Short *et al.* 2003; Sierra and Russman 2006; Sanchez-Azofeifa, Pfaff *et al.* 2007), slippage[2] (Wu 2000) and inappropriate tradeoffs (Babcock, Lakshminarayan *et al.* 1996).

[1] Additionality is the extra benefit that is gained from the implementation of the program, in terms of improved environmental management, reduced or halted environmental damage and the generation of a public benefit.

[2] Slippage is movement away from the desired goals and objectives of the policy or program.

Despite extensive and increased research in this arena, our knowledge on the linkages between landholders' social dimensions and their preference for policy instrument choice remains inconclusive. In fact, it remains difficult to find explicit examples where the social dimensions of landholders have influenced policy instrument choice in the design, delivery and assessment of conservation practices, policies and programs (Emtage, Herbohn *et al.* 2007).

1.2 RESEARCH OBJECTIVES

The overall aim of this research was to contribute to our understanding of how the social characteristics of landholders influence their conservation behaviour, in support of improved use of policy instruments. I designed a revealed preference study that involved "observations of people acting in real-world settings where people must live with the consequences of their choices" (Freeman 2003, p. 23). Revealed preference studies deliver operationally meaningful foundations of behaviour (Samuelson 1948). Specifically, the objectives of this research were to understand[1]:

1. How the social characteristics of landholders, who had participated in one of three conservation programs, differed;
2. What motivated and limited the involvement of participants;
3. How the social characteristics of conservation program participants and non-participants differed;
4. Why some landholders chose not to participate in conservation programs; and
5. How conservation programs could be designed to enlist landholders who may otherwise be non-participants.

To satisfy these research objectives, three north Queensland conservation programs were selected that employed voluntary (Queensland Government Nature Refuge Program), direct-payment (Cassowary Coast Rate Deferral Scheme) and market-based (Desert Uplands Landscape Linkages Program) policy instruments. The programs had

[1] See section 1.3 for more detailed descriptions of each of these objectives and how they fill a gap in our current understanding of landholder willingness and capacity to participate in formal conservation programs.

each been implemented for at least two years, which allowed participants to have had some experience of participation. The programs were chosen to allow for a comparative analysis between the social dimensions of participating landholders. To that end, selected programs were administered by different agencies (local government, state government, non-government organisation); covered different bioregions (Wet Tropics, Desert Uplands, Einasleigh Uplands); and varied in their spatial (e.g., local government jurisdiction to multiple bioregions) and temporal (e.g., two years to in-perpetuity) extent (Table 3.5). Each program required participants to enter into a conservation agreement or covenant[1]. Landholders who owned property within the case study regions but whom had not participated in one of the three programs were also interviewed to allow for a comparative analysis of their social dimensions with those of the program participants.

1.3 OVERVIEW OF RESEARCH METHODS

During February to June of 2009, invitations were sent at the discretion of the program administrators to 58 participants in the three programs. In total, 45 conservation program participants (20 women, 19 men, 6 couples) were interviewed, a response rate of 78%. Twenty-nine landholders (10 women, 15 men, 4 couples) who had not participated in one of these programs (non-participants), but who may otherwise have qualified for the program, were recruited using snowball sampling (Bryman 2008), and interviewed. Most of the interviews were conducted in person (n=56; 76%), the remaining interview were conducted over the telephone. The average length was one hour, six minutes.

Semi-structured interviews were used to administer a survey that comprised both closed and open response questions (Creswell 2009). A four-point Likert scale was applied to most of the closed response survey items (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree) (Babbie 1990). A neutral mid-point (e.g., 'unsure', 'undecided') was not offered. This approach minimized the occurrence of false negatives and false positives (Gilljam and Granberg 1993). Some closed response survey questions offered

[1] Covenants are applied to the land title so that subsequent owners must comply with the covenant conditions; an agreement does not apply to the land title so future landholders are not bound to comply with the management conditions.

respondents different alternatives that related to their specific land management practices and personal circumstances or only yes/no response categories. The survey was tested for validity and reliability through a pilot study.

To analyse quantitative data, chi-square and randomization tests were applied, using SPSS (version 16.0, IBM, Somers, New York) and MATLAB (version R2010b, Mathworks, Natick, Massachusetts) software. Given the small sample size, statistical analyses in this research are not used to describe the population, but to identify differences between the respondents involved in this research.

To analyse qualitative data, the discourse analysis methods of grounded theory were used, namely memos and coding data (Glaser and Strauss 1965). Memos were used to extract major concepts from the transcribed interview data, which were then developed in terms of their dimensions and properties (Corbin and Strauss 2008). Codes were created to detect the expression of the major concepts in each response to each qualitative question, which were then categorised according to the most applicable major concept. The qualitative software program NVivo (Version 8, QSR International) was used to assist with data analysis.

Refer to Chapter 3 for full details of the methods used in this research.

1.4 THESIS STRUCTURE & CHAPTER OVERVIEW

> "No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that our philosophy and religion have not yet heard of it. In an attempt to make conservation easy, we have made it trivial."
>
> (Leopold 1949, p. 209)

This thesis is presented as a series of chapters that have been written in a style that has allowed for data chapters (Chapters 4 – 8) to be submitted to peer-reviewed journals.

Chapter 2 presents a history of private property rights and land use policy in Australia to demonstrate how they contributed to the nation's widespread environmental degradation, and shaped landholders' attitudes towards government policies and programs. The chapter also provides commentary on the use of different policy instruments, including their respective strengths and weaknesses.

Chapter 3 presents the methods adopted in this research. It begins with a discussion of quantitative and qualitative social science methodologies and then provides a justification for the choice of research strategy. The chapter explains the five research phases and the selection and characteristics of the case studies.

Chapter 4 explores the quantitative differences between conservation program participants (Objective 1). Often, landholders' preferences for policy instruments, and thereby conservation programs, are determined on the basis of stated preference studies (e.g., Dibden, Maunter *et al.* 2005). While useful, these studies do not actually reveal whether or not landholders would in fact participate in one of their 'preferred' programs. Therefore, in meeting this objective, I uncovered how the social characteristics landholders, who have participated in one of three case study conservation programs that each employed a different policy instrument, influenced their 'actual' preference for policy instruments. Quantitative data were used to develop the profiles, including their personal circumstances (financial security, education and knowledge, lifestyle and wellbeing) and worldview (norms, attitudes).

Chapter 5 presents a qualitative analysis of the motivations and barriers to conservation program participation (Objective 2). When theories are built on the collection and analysis of quantitative data alone, they restrict access to areas not amenable to quantitative research. Moreover, they can fail to deliver qualitative descriptions of individual experiences, which is a prerequisite of good quantitative research, particularly for topics that have not been well researched (Pope and Mays 1995). In meeting Objective 2, I explored why landholders participated in formal conservation programs, how they selected land to conserve and what limited the amount of land they conserved. Qualitative data were used to undertake an in-depth analysis of landholders' decision-making processes and the associated ecological consequences.

Chapter 6 compares the quantitative differences between conservation program participants and non-participants (Objective 3). Commonly, studies that examine the uptake of conservation programs only examine the characteristics and preferences of program participants who have participated in a specific program (e.g., Kurzejeski, Burger *et al.* 1992; Hagan 1996; Langholz, Lassoie *et al.* 2000). Landholders who chose not to participate have seldom been included in this research. Objective 3, therefore, was developed to characterise and compare landholders who had participated in one of the case study conservation programs with landholders who had not participated in any of the three programs. Quantitative data were used to explore differences in personal circumstances, or human capital (financial security, knowledge and information, lifestyle and wellbeing) and social capital (common norms, trust, reciprocity) of participants and non-participants. Quantitative data were also used to explore whether capital is the cause or result of participation.

Chapter 7 provides a qualitative examination of non-participants' barriers to participation (Objective 4). Qualitative data are essential in understanding the reasons behind non-participation, particularly because many barriers will be context- and site-specific (e.g., Morris and Potter 1995), and may not be fully captured in quantitative assessment. Qualitative data were used to examine landholders' reasons for non-participation and to determine whether these landholders were conditional (i.e., may engage in conservation programs that account for their needs, expectations and circumstances) or resistant (i.e., unwilling to participate in conservation programs irrespective of program design and incentives) non-participants. Such typologies may be useful in directing conservation funding.

Chapter 8 explores how conservation programs may be designed to enlist non-participants, through a qualitative analysis of the differences between what is offered to landholders through participation in conservation programs and what non-participant landholders expect to be offered (Objective 5). Although some studies have explored what incentive and program conditions landholders expect from conservation programs (e.g., Cocklin, Mautner *et al.* 2007), few, if any, have considered solely the expectations of landholders who have not participated in conservation agreement programs. Objective 5, therefore, was developed to understand how conservation programs could be improved to enlist non-participant landholders. Qualitative data were used to reveal

the respondents' expectations of program objectives, design criteria and incentives to support the conservation of biodiversity on their property, as well as the influence of the socio-political context on their willingness to participate.

Chapter 9 summarises the findings of the research and the contribution made to the innovation-adoption and behaviour theory literature. Also presented are some reflections on the research and how the findings fit within the broader literature.

Authorship of the submitted manuscripts presented in Chapters 4 and 5 is shared with Chris Cocklin, a member of my thesis supervisory committee. Chris Cocklin contributed to the development of the research method, survey development, training, funding and the preparation of chapters and manuscripts for publication.

CHAPTER 2
PRIVATE PROPERTY & THE NEED FOR BIODIVERSITY CONSERVATION

2.1 INTRODUCTION

> "Action and reaction are equal and opposite: in the social laws of physics the ability to destroy produces a desire to conserve."
>
> (O'Riordan 1971)

In this chapter, I examine several themes that, taken together, construct a history of property rights and land management in Australia, which is essential to consider in the pursuit of effective public policy to redress land degradation and improve biodiversity conservation. First, property rights are examined because they are a mainstay of the agricultural and rural policy discourse. Policymakers who search for methods to induce land management practice change without questioning underlying property rights are more likely to fail (Bromley and Hodge 1990), and without knowledge of the legal history of property will find it difficult to consider current land management problems in the broader context (Freyfogle 2007). Second, historical and contemporary land use policy is examined to demonstrate that property rights represent the "socially sanctioned control of a benefit stream" that is not absolute and is instead flexible to changing societal demands (Bromley 1992a, p. 8). The previous government policies that have shaped both the rural landscape and the landholder attitudes towards government are also presented to provide the context for this research that will assist in understanding landholders' motivations and barriers to biodiversity conservation. Third, the usefulness and applicability of different policy instruments is discussed to demonstrate the need for thoughtful and educated policy and program design, and further to argue that no "magic mechanism" exists to provide landscape-wide conservation outcomes. This chapter begins with an exploration of the state of Australia's biodiversity.

Australia presents an interesting case study to explore private land biodiversity conservation. Australia has been described as "one of the few developed countries that remains a leading contributor to the current human-induced global mass extinction event" (Mackey, Watson *et al.* 2008, p. 11). Almost half of all mammal extinctions of

the last 200 years have occurred in Australia (Johnson 2006), and up to 45% of all vertebrate species in Australia face serious decline (Mackey, Watson *et al.* 2008).

2.1.1 STATE OF AUSTRALIA'S BIODIVERSITY

> "The fault [of environmental crises] was attributed to man's inability to control Nature rather than his mismanagement and limited vision."
>
> (O'Riordan 1971, p. 23)

Australia has been identified as one of 17 'megadiverse' countries that are characterised by high levels of endemism (Mittermeier, Gil *et al.* 1997). These megadiverse countries cover less than 10% of Earth's surface, yet support more than 70% of known life forms (Mittermeier, Gil *et al.* 1997). Approximately 90% of plants and arthropods in Australia are endemic, one of the highest recorded degrees of endemism in the world (Raven and Yeates 2007). Furthermore, 93% of amphibia, 90% of fish, vascular plants and fungi, 89% of reptiles, 83% of mammals, and 45% of bird species found in Australia are endemic (Cork, Sattler *et al.* 2006). Endemic species (i.e., species not naturally found anywhere else on Earth) are vulnerable to extinction because they are commonly represented by small populations and only exist in a few locations which limits conservation intervention activity (Gaston 1998; Lamoreux, Morrison *et al.* 2006; Leroux and Schmiegelow 2007). The high levels of endemism in Australia are attributed to the unique features of the Australian landscape. Australia is a large country that is isolated from ecosystems in other nations and exhibits a naturally fragmented landscape (Beeton, Buckley *et al.* 2006). The long-term climatic variability of the continent (Beeton, Buckley *et al.* 2006) has resulted in resilient and highly diverse ecology that has evolved and persisted in the face of fluctuating environmental conditions (Soulé, Mackey *et al.* 2004).

Extensive biodiversity loss and ecosystem degradation continues to occur in Australia. In some regions, up to 93% of native vegetation has been removed (Saunders, Hobbs *et al.* 1991). Approximately 34% of all eucalypt woodlands have been removed, and since 1973, an estimated 69,000 km^2 of vegetation has been cleared (Beeton, Buckley *et al.* 2006). This land clearing has largely occurred on privately managed land, which has been converted to agricultural production. In some productive bioregions, 95% of ecosystems have been destroyed or modified (National Land and Water Resources Audit 2001; Mackey, Watson *et al.* 2008). Less than 2% of Australia's native grasses

remain in grassy woodland communities, which are instead dominated by introduced grass species, mainly for grazing activities and different agricultural improvement strategies (Beeton, Buckley *et al.* 2006). Twenty-seven per cent of wetlands of national importance have threatened water regimes, largely as a result of their draining for alternative land uses; between 1983 and 2004, the number of water birds has declined by up to 83% (Kingsford and Porter 2006), and 14% of frog species are threatened and 4 are now extinct (Beeton, Buckley *et al.* 2006).

Ecosystem and biodiversity decline on private land has resulted from five dominant threats: 1) habitat loss, fragmentation and degradation; 2) invasive species; 3) overexploitation of natural resources; 4) inappropriate fire regimes, changes to water flows and the aquatic environment; and 5) climatic change (National Biodiversity Strategy Review Task Group 2009). For instance, approximately 1,700 weed species have been established within the Australian landscape, many of the most aggressive species have been purposefully introduced for agricultural purposes, a land use which occupies approximately 60% of the continent (Raven and Yeates 2007). Approximately half of the state of Victoria is moderately affected by dryland salinity; in Western Australia, the area affected by dryland salinity will increase by 36,000km^2 of land by 2050, due largely to the effects of land clearing (National Land and Water Resources Audit 2001). Moreover, without a strong commitment to rehabilitate the Murray Darling Basin, it is estimated that by 2050, a third of basin (340,000 km^2 of the 1.06 million km^2) will be adversely affected by salt (Murray Darling Basin Commission 2001). The Basin currently produces approximately 40% of Australia's agricultural output.

This widespread ecological degradation has taken place within a regime that favours private property rights, with 63% of the Australian land mass held as freehold or leasehold land (Geoscience Australia 2010).

2.2 PRIVATE PROPERTY RIGHTS

Private property rights "constitute the foundation of democracy, individual freedom, and a bounteous market" that have traditionally provided exclusive rights over land, plants and animals, and continue to form the basis of contemporary land use policy

(Bromley and Hodge 1990, p.198). This section recollects the evolution of private property rights and demonstrates their social nature and thereby their flexibility to changing social needs and expectations. A Western perspective of property rights will be adopted in this review, primarily because Australia's property rights regime has been influenced by European notions of property.

2.2.1 EVOLUTION OF PRIVATE PROPERTY RIGHTS

> "Let us consider what should be our arrangements about property: should the citizens of the perfect state have their possessions in common or not?"
>
> Aristotle, Politics, II 5 (cited in Schlatter 1951, p. 9)

The debate over the merits of private property began more than 2,000 years ago. Plato (c. 428-348 BC) advocated communal ownership because he surmised that it prevented two evils (Schlatter 1951). The first evil was the desire for wealth, which he believed could eclipse the desire for virtue as the primary human goal; and the second was the social conflict that could intensify when individuals owned private shares in unequal amounts. Communal ownership would therefore promote the common pursuit of the common good (Waldron 2008), and consequently protect individuals from the destruction caused through the accumulation of property and wealth (Grunebaum 1987).

Aristotle (384-322 BC), however, promoted the ideal of private ownership. He stated that "property should be in a certain sense common, but, as a general rule, private; for, when everyone has a distinct interest, men will not complain of one another, and they will make more progress, because every one will be attending to his own business" (Aristotle 1996, p. 36) This statement became a chief justification of private ownership (Schlatter 1951). Ownership, according to Aristotle, was not about the "unfettered right of title to exchange goods" to become wealthy, but to "have the material prerequisites of a virtuous life" (Grunebaum 1987, p. 43). He believed that private property promoted responsibility and prudence (Waldron 2008) and he disagreed with his teacher Plato that the equalisation of wealth and ownership removes the conflict that arises from inequality. Instead, he advocated that it was natural for inequality to exist because humans are unequal and have different desires, needs and skills (Grunebaum 1987).

The most historically relevant rationale of private ownership, first appropriation, emerged in the 17th century. John Locke (1632-1704) provided the most complete

discussion of first appropriation in *The Second Treatise* where he argued for appropriated personal property rights in accordance with labour effort. Those efforts that extended from "the work of his hands," such that "he hath mixed his labour with, and joined to it something that is his own," made the resource a person's property (Locke cited in Judge 2002, p. 331). Locke believed that labour effort was sufficient to appropriate property (Grunebaum 1987).

Yet, philosophers Thomas Hobbes (1588-1679) and David Hume (1711-1776) recommended that property rights be institutionalised within a legal framework. They believed that ownership assigned according to a social contract or within the authoritative and legislative framework of civil society, was preferable to secure property than was an individual's labours in a state of nature (Grunebaum 1987). Indeed, "rights only have content when they are accompanied by duties on those who would interfere with us. And those duties can only come from a state that agrees to compel civil behaviour on the part of its citizens" (Bromley 1996, p. 14). Hume supported the ownership of those things that individuals produced or improved via their own industry and that encouraged "useful habits and accomplishments", which he believed contributed to the common interest (Grunebaum 1987, p. 102). The benefit of private property then, was to promote human wellbeing or the 'greatest good' for humanity (Hepburn 2008).

The breakdown of feudalism (i.e., the political and military customs that ascribed property rights that began in Europe in the 10th century) in the mid-18th century saw the property rights system change from land ownership as a privilege of sovereign lords, to a market society that allowed wealthy individuals to purchase land. Less wealthy individuals worked the land for wages that were less than the real value of the objects they produced; the surplus accumulated to provide wealth to the landowner. This system created a class struggle and subsequently gave rise to socialism in the mid-19th century, which called for a radical rethink on property ownership. Both Marx (1818-1883) and Engels (1820-1895), recommended that the institution of private property be abolished because it had become an extension of the capitalist framework and contributed to class oppression (Marx and Engels 1967). Private property, they argued, had become individualist and therefore did not provide benefits to society at large, which was the original justification for the institutionalisation of private property rights.

Despite their concerns, private property rights remain a dominant property regime, and today serve three main functions: to promote economic enterprise, to foster personal development and privacy, and to provide stability for civil society (Bromley and Hodge 1990; Demsetz 2002; Freyfogle 2007).

2.2.2 CONTEMPORARY PROPERTY RIGHTS REGIMES IN AUSTRALIA

> "We must understand that property is not an object, but is instead a value. When one buys a piece of land, one acquires not some physical object, but rather control over a benefit stream arising from that setting and circumstance which runs into the future."
>
> (Bromley 2003, p. 14)

Feudalism is fundamental to Australian land law (Boge 2000). The English common law was inherited by Australia, and part of that law contained remnants of the feudal system (Hepburn 2008): the doctrine of tenure, where a landholder holds land as a tenant rather than as an owner (e.g., leasehold land); and the doctrine of estates, where the landholder holds both title and possession of the land (e.g., freehold estates[1]: fee simple and life estate). The unique physical character of the Australian landscape, however, necessitated an additional tenurial system which would free the government of the burden of regulating and managing the vast landscape. Statutory land grants were offered by the Crown in the late 19th century, typically 50 acre freehold estates, that assisted the Australian colonists in their desire to acquire land ownership rights, and to irrigate, cultivate and develop the land to establish a pastoral and agricultural industry (Hepburn 2005).

Land that had not been granted by the Crown was considered 'waste land'. The management of these waste lands was taken up in the New South Wales *Sale of Wastelands Act 1846* that granted up to 14-year leases to individuals to use the land for pastoral purposes (Productivity Commission 2002). Pastoral leases were developed "as an expedient instrument for asserting ongoing Crown ownership of land in the face of rapid, uncontrolled, pre-emptive pastoral occupation" (Holmes 2000, p. 213). Yet, government attempts to intensify the use of pastoral lands was inhibited by the variable

[1] Fee simple is the most absolute estate that exists: it can be inherited freely and endure indefinitely. The word 'fee' is a relic from the feudal system and simply means that the estate is inheritable. The word 'simple' indicates that the inheritable status is unrestricted. In contrast, life estate endures for only the duration of the freeholder's life.

climate and low productive capacity of the land. To overcome these problems, the government offered longer lease terms and larger holdings (Holmes and Knight 1994).

Today, there are more than 70 different types of pastoral lease in Queensland alone, which are unique to Australian land law (Productivity Commission 2002). Pastoral leasehold tenure restricts lessees to only those activities that are associated with pastoralism (e.g., developing pastoral infrastructure, raising livestock, grazing) (Productivity Commission 2002). In South Australia and Western Australia, minimum stocking rates are set and the pastoral board has the power to enforce these provisions to guarantee a commercially viable pastoral enterprise (Productivity Commission 2001; Productivity Commission 2002). Approximately 44% or 338 million km^2 of land in Australia is held under pastoral leases (Productivity Commission 2002). The rational for these tenurial arrangements was to support an agricultural economy that would provide both food and economic security for Australia.

Before moving on, I would like to mention briefly Australian Aboriginal occupation of the land. Europeans settled[1] Australia by claiming it was terra nullius, land belonging to no one. Yet, for tens of thousands of years prior to European colonisation, Australia "was home to several hundred different Aboriginal language groupings, perhaps totalling as many as 750,000 persons, successfully occupying and utilizing all parts of the island continent, together with Tasmania and other neighbouring islands, and traversing the entire region via an extensive and well-used network of trading routes" (Mercer 1993, p. 300). Therefore, in the Australian context, the concept of terra nullius "takes on the appearance of a cruel and deliberate fiction" (Mercer 1993, p. 300).

Following settlement, Aboriginals had no legal land rights. In fact, Aboriginals were not even considered as people and instead were classified under the Flora and Fauna Act, constitutionally denying them the right to own land. It was not until the referendum to vote on the Constitution Alteration (Aboriginal People) 1967 that Aboriginals were legally considered as people and allow the right to vote and to own land (Peterson 1981).

[1] Land can be settled by conquest, cessation or discovery and occupation of terra nullius.

The *Aboriginal Land Rights (Northern Territory) Act (1976)* assigned legitimate tenure rights to people once classed as forages or hunter-gathers, the first of its kind anywhere (Wilmsen 1989). Today, there are three Aboriginal land tenure categories Aboriginal freehold - national park (i.e., national parks under the control of Aboriginal groups); Aboriginal Reserve (i.e., Crown lands reserved for Aborigines but under the control of state/territory government Aboriginal affairs authorities) and Aboriginal Freehold and Leasehold (i.e., land is land held by designated Aboriginal communities, with special conditions attached to the titles) (Geoscience Australia 2010). Aboriginals can also privately hold freehold or Crown leasehold land. There is a rich literature on indigenous land use and perceptions of 'ownership'; however, this research focuses on biodiversity conservation on freehold or Crown leasehold land, and so Aboriginal land tenure will not be further discussed.

2.3 GOVERNMENT LAND MANAGEMENT POLICY IN AUSTRALIA

> "Bluntly, there is no evidence that we are serious about being well informed, yet we presume to make good policy."
>
> (Dovers 1995, p. 146)

The combination of Australia's private property regime and government policies has had a profound effect on the Australian landscape and her rural communities, resulting in ecological and social consequences, namely widespread environmental degradation and landholder distrust of government.

2.3.1 HISTORICAL ANTECEDENTS

> "The climate and the soils, the people, the markets and the technology continue to mix together to form the stream of the story, with new twists to old plots at every turn, not without paradox."
>
> (Dovers 1992, p. 15)

Australia's irrigation history began with the hopeful assumption that the settlers of the rural Australian landscape would evolve towards the European pattern, with "a mixture of villages, market towns, provincial cities and coastal towns" (Davison 2005, p. 41). In the 1830s, the settlers recognised that the thin soils and dry climate of Australia made it unsuitable for intensive agriculture and that "inland Australia was destined to become a

country of large flocks and small, widely scattered towns" (Davison 2005, p. 43). Nevertheless, during the latter part of the 19th century, the government supplied infrastructure, railways, irrigation and education to allow rural enterprises to flourish and generated a rural sector that was heavily subsidised. The European settlement believed that human ingenuity could turn the drylands in productive lands:

> "if Victoria is to continue to progress in the settlement of her people upon the lands and the multiplication of her resources by the conquest of those areas hitherto regarded as worthless; if she is to utilise her abundant natural advantages, bring her productivness to the highest point, and secure to the agricultural population of her arid districts a permanent prosperity, it must be by means of irrigation".

(Royal Commission on Water Supply 1885p. 779, quoted in La Nauze 1965, p. 85-86)

A year later, legislation was enacted in Victoria that sponsored an irrigation system (La Nauze 1965). But in 1890, an extensive inland drought led to questions on the viability of irrigation in Australia. The new inhabitants "were required to participate in a new era of Western progress [i.e., irrigation] long before there had been time to achieve more than a rudimentary grasp of the continent's most crucial ecological characteristics" to which the "traditional frames of reference no longer seemed to operate" (Powell 1976, p. 3). Despite the uncertainty of the environmental effects of irrigation, this agricultural practice was implemented across Victoria and the neighbouring states.

Early in the next century, Soldier Settlement Schemes were developed by the Australian Government. These schemes were implemented after WWI, and then later WWII, to fill the "empty spaces" of the continent with "the increasing numbers of unemployed 'diggers' conspicuous in the city streets" and to "help the soldiers to become stout yeomen" (McLachlan 1922, Lake 1987, p. 24). The 1917 scheme involved the establishment of a legislative framework that outlined the process of subdividing marginal land to be distributed amongst soldiers' families (Keneley 2004). These schemes promoted decentralisation and intensification of rural land use and in many areas, and also required the new landholders to clear their entire property for full production of the land, for which tax concessions were provided (Beale and Fray 1990; Dovers 1992). The government legislated that all trees had to be cleared (Reeve 1988;

Australian Greenhouse Office 2000) and supported effective methods to clear trees as quickly as possible (Bureau of Agricultural Economics 1963, p.2).

But in the 1930s, drought and depression hinted at the dire state of rural Australia's environment. Dust storms experienced in the city "swept from the parched and depleted farmlands of the inland, [and] gave warning that all was not well in the Bush" (Davison 2005, p. 50). Nonetheless, the policy position of the Australian Government defined its role as a producer of food and fibre in the growing post-war global economy, which drove land degradation to such an extent that by the early 1980s, 51% of rural Australia was deemed to require treatment for land degradation (Woods 1984). Amongst the range of recommended rehabilitation works were land use change, erosion control, pasture improvement, destocking, contour cultivation, and tree planting (Woods 1984). But at that time, it "would have been a brave government that would have placed fetters" on growth in the agricultural sector (Lawrence, Richards *et al.* 2004, p. 260), and by extension, modify private property rights.

European agricultural and pastoral land uses, that are unsuited to the old, fragile and shallow soils of Australia, continue to drive land degradation on private property across the nation. Land clearing for broad acre cropping and grazing has modified ecosystem structure and complexity; affected ground water levels; increased soil erosion, soil acidity and soil salinity; and reduced terrestrial carbon stores (Beeton, Buckley *et al.* 2006). Altered fire regimes and introduced pasture species have also had detrimental effects, such as changes in the intensity and variability of natural disturbance regimes that can affect individual species and their life stages (Soulé, Mackey *et al.* 2004). Land has been regarded as an input into agricultural production, rather than "an economic activity that produces a rural milieu and a rural economy of a particular character" and which could sustain ecosystem processes other than those required solely for agricultural production (Bromley and Hodge 1990, p. 201).

2.3.2 AUSTRALIA'S CURRENT POLICY POSITION

> "Every social problem […] seems to have the same characteristics as every other social problem, namely, the crux of the problem is to find some way of avoiding the undesirable consequences of your established laws, institutions, and social practices, without changing those established laws, etc."
>
> (Frank 1925, p. 467)

Public policy remains the cornerstone of landscape change in Australia. Two concurrent, and conceivably contradictory, changes in Australian land use policy began in the 1970s: a move away from state-sponsored and subsidised production, and a proliferation of environmental legislation. The former change stimulated a shift from government to governance to increase the economic competiveness of Australian agriculture in the world market. Governance refers to self-organising, inter-organisational networks that complement markets as governing structures to allocate resources and exercise authoritative control and coordination (Rhodes 1996). The purpose of the shift was to allow production to be driven more by market forces and less by government intervention (Dibden and Cocklin 2005). Responsibility, within a system of governance, is devolved to the individual who becomes primarily responsible for the management of the environment (Lewis, Moran *et al.* 2002). The proliferation of environmental legislation, however, saw an increased regulatory burden placed on private landholders to reverse Australia's environmental degradation. Landholders were required to comply with the new regulations in the face of decreasing government subsidies. These two changes are important to the discussion of private land management because they provide the current economic, political, and environmental framework that characterises land use and private property rights in Australia.

The government's changed position from one of support and subsidisation of rural areas to one of free market policy, or neoliberal productivism, was the result of a combination of factors. The global economy began to deteriorate in the 1970s and 1980s, which included "a worldwide economic recession in 1973-74; the loss of traditional agricultural markets when Britain joined the European Economic Community in 1973; subsidised overproduction in Europe and North America; rapid inflation and falling commodity prices" (Tonts 2005, p. 195). Global economic forces pushed the Australian government to decrease its spending and to move the national policy towards a liberalised economy that could function more efficiently (Tonts 2005). These changes

reflected the fundamentals of the neoliberal agenda: "economic efficiency, transparency and accountability, and an assumed superiority of market competition over government involvement" (Dibden and Cocklin 2005, p. 136). The adoption of this free market policy position aimed to make Australian producers more competitive via a reduction in import restrictions, price support mechanisms, and subsidies, which had previously protected them from the variability of global commodity prices (Dibden and Cocklin 2005; Tonts 2005).

The effect of these policy changes within the rural landscape was three-fold. First, out-migration of rural areas occurred because profitable smaller- and medium-sized enterprises borrowed heavily to expand or upgrade their business, but high interest rates in the 1980s and early 1990s resulted in heavy debt for many of these landholders who had to sell their properties and move to other areas to gain employment. This out-migration affected economic, social and human capital in rural areas due to reduced spending, contracted local economies, and decreased employment opportunities that limited the community's ability to self-sustain (Tonts 2005). Second, environmental degradation continued because the effect of reduced government subsidies, decreasing prices for agricultural products, and increasing costs of inputs forced landholders to increase the scale and intensity of production (Cocklin and Dibden 2009). Third, landholders were increasingly being held accountable by both the government and community for land degradation. Landholders were "angry that their efforts in producing food for the nation and the world [we]re being 'rewarded' with accusations of environmental vandalism" (Lawrence 2005, p. 113). Indeed, landholders "often have long memories, kept alive by the all-too-tangible reminders of better times evident in disused or decaying buildings and faltering local institutions" (Davison 2005, p. 39). Changes in government policy began to change the social fabric of rural Australia. It may be fair to assume that landholders felt they were bestowed with the responsibility to maintain both a viable agricultural industry and a healthy environment, while the government alleviated itself of the responsibility of preserving or protecting rural communities (Alston 2004).

In theory, neoliberal regimes are supposed to increase the capacity of landholders to achieve economically 'rational' practices that support social and environmental goals (Higgins and Lockie 2002). Yet in the Australian context, neoliberal policy approaches

continue to clash with new environmental regulations. For example, during the late 1990s, up to 1,375 km^2 of vegetation was cleared each year in Queensland, which accounted for 80% of all clearing in Australia (Australian Greenhouse Office 2000). To curb vegetation clearing, the Queensland Government implemented the *Vegetation Management Act QLD (1999)* (VMA) that prohibited broad-scale clearing of vegetation on private land. Landholders opposed the Act because they believed it was counter to the neoliberal policy agenda, an infringement on their property rights, and that they were "bearing the cost of biodiversity conservation while forgoing the opportunity to increase production through [vegetation] clearing" (McAlpine, Heyenga *et al.* 2007, p.28). The conflict between property rights, environmentalism and business survival was encapsulated in property signs that appeared across the state: "My land! My trees! My business!" (Reeve 2001, p. 257). Landholders had been adopting the neoliberal ethic: deregulation, self-regulation, a greater reliance on market forces and less government intervention in private land management practices (Dibden and Cocklin 2005). Government intervention in the form of the VMA therefore stood to compromise their newly adopted way of doing business.

Environmental, economic, and political consequences arose from the introduction of the VMA. Environmentally, clearing rates increased by almost 200% to 3,075 km^2 in 2000 as landholders who held permits to clear their land scrambled to remove the trees before the legislation came into force (Environment Protection Authority 2003). The government was forced to commit $150 million dollars to assist landholders to adjust to their changed property rights which included money for direct financial assistance in the form of Enterprise Assistance packages, on-ground works and the development of best management practices (Lockie and Higgins 2007). Politically, the government adopted a tougher position on land clearing given the high rates of clearing that resulted from the implementation of the VMA. The subsequent *Regrowth Vegetation Code*, which prohibits the clearing of protected endangered or riparian regrowth vegetation, was adopted six short months after the initial *Vegetation Management (Regrowth Clearing Moratorium) Act 2009* was implemented (Department of Environment and Resource Management 2009), denying landholders the opportunity to clear regrowth before the Code came into effect.

2.3.3 EFFECTS OF POLICY CHANGE

> "While the claims of landowners will often be in terms of so-called natural rights and freedom, property rights are justified by purpose, and limited by necessity."
>
> (Christman 1994)

Landholders can experience both social and financial effects of policy change. The social costs of policy compliance for private landholders can be severe. In 2010, a New South Wales (NSW) farmer, Peter Spencer, endured a 52-day hunger strike on a suspended platform atop a wind turbine in protest against the state government's vegetation clearing legislation (Australian Broadcasting Coorporation 2010). Changes to vegetation clearing in NSW and Queensland resulted in much tighter controls on broad-scale clearing than other states in Australia and, consequently, landholders in those states experienced greater negative effects of compliance, such as reduced land area for production (Productivity Commission 2004). Spencer stated that the farmers in NSW were not adequately compensated for changes to government legislation that affected their land management practices and property rights, and was also concerned about the wellbeing of his farming colleagues. Every four days a rural Australian commits suicide, a rate significantly higher than non-farming rural males and males in non-rural areas (Judd, Jackson *et al.* 2006). Male farm managers constitute 67-97% of these deaths (Page and Fragar 2002; Judd, Jackson *et al.* 2006). Changing agricultural policy has been identified as a contributor to farmers' decisions to commit suicide (Malmberg, Simkin *et al.* 1999), so too have land reforms which can create major periods of social upheaval (Bromley and Hodge 1990).

From a financial perspective, changes in government policy can generate significant consequences for landholders. Environmental legislation that restricts business activities often results in financial losses for producers (Productivity Commission 2004). Landholders will need to pay the transaction costs that are required to adjust to, or implement new legislation. These costs can include labour and direct financial expenditure for new or changed activities, as well as increased compliance costs (Blunden, Cocklin *et al.* 1996). The Australian Productivity Commission's (2004) report on the effects of native vegetation and biodiversity regulations outlined a number of adverse effects on landholders' income: limited opportunities to reconfigure or expand areas of production or introduce new technologies; restricted ability to maintain the proportion of productive land; and challenges to land management practices, such as

vegetation thinning, crop and animal rotation, clearing fence lines and weed and feral animal management. Financial losses related to lowered property values, compliance costs that included permit applications and associated delays, offset planting, ongoing vegetation management costs and lost productivity costs.

Of course, there are many examples of land management policies and programs that have been implemented in Australia that have provided beneficial outcomes. Perhaps the most influential program is Landcare. Landcare began as a grassroots movement in the 1980s to redress soil salinity along the Murray River, but became a national program in 1989 when the then Prime Minister Bob Hawke announced the Year and the Decade of Landcare and committed $320 million to combat soil degradation and re-green the nation (Commonwealth of Australia 1989). Between 1989 and 2008, over $1 billion was invested in Landcare projects and activities (Department of Agriculture Fisheries and Forestry 2009). Today, there are approximately 4,500 Landcare groups in Australia, an increase of 2,000 groups since 1997 (Lockie and Vanclay 1997). It is interesting to reflect back on the musings of the first National Landcare Facilitator, Andrew Campbell:

> "Imagine a country in which one person out of every four belongs to a conservation group, actively seeking ways of improving their local environment. Think about the possibilities of this scenario for issues such as waste management, water quality, transport, urban design, food and fibre production, and wilderness management. In rural Australia this is already happening" (Campbell 1994, p. 1)

Landcare has undoubtedly produced a shift in the environmental conscious of rural landholders across Australia, and has contributed to the development and strengthening of social capital (Cary and Webb 2001; Sobels, Curtis *et al.* 2001). The extent to which Landcare has reversed environmental degradation is largely site-dependent; nonetheless significant environmental improvements and biodiversity gains have been documented (Curtis and De Lacy 1996; Landcare Australia 2010).

2.4 POLICY INSTRUMENTS & BIODIVERSITY CONSERVATION PROGRAMS

> "The success of policy instruments relies on matching them to the particular ecological, political and economic situation and to the capabilities of institutions and stakeholders."
>
> (Cocklin, Mautner *et al.* 2007, p. 989)

This section explores the use of policy instruments in the design of policies and programs aimed at restoring, conserving and protecting ecosystems.

Attempts to improve the quality and extent of biodiversity conservation on private land have resulted in a shift in policy approaches (Table 2.1). Until the 1980s, regulation was the preferred policy instrument1 of choice to arrest environmental degradation because governments could respond quickly to reduce or prohibit activities that caused serious environmental harm and both the government and the public understood how regulations operated (Connelly and Smith 2003). By the end of the 1980s, however, the implementation of direct regulation "had not turned out the way policymakers had intended" (Gunningham, Grabosky *et al.* 1998, p. 6). Regulatory resistance within the community arose due to the inflexibility and inefficiency of regulations, coupled with prohibitive compliance costs and the absence of incentives to innovate, the need for regulators to have an accurate and deep understanding of the operation and capacity of an industry, the vulnerability of regulation to political manipulation and the potential for increased administration (Gunningham, Grabosky *et al.* 1998). Although regulatory approaches may have been more prominent in the context of land management, Gardner (1998, p. 50) argues that they were under-developed because of "community attitudes to the use and conservation of agricultural land". That is, the use of regulations has been ad hoc and limited by the unwillingness of bureaucrats and politicians to intervene in existing activities, which is presumed to be legitimate by the community (Gardner 1998).

During the 1980s, programs that employed voluntary instruments came into vogue, and in the subsequent two decades we have seen a rise in the use of economic policy instruments. Some of the first examples of voluntary programs were Australia's

[1] Policy instruments are mechanisms that government and non-government agencies employ to assist in achieving their policy goals for the lowest possible cost, subject to external constraints (Richards 2000).

Landcare program which aimed to protect and repair the environment through sustainable land use (Lockie and Vanclay 1997; Victorian Landcare 2010); and United States conservation easements, legally binding agreements between the landholder and the holder of the easement (e.g., Land Trust Alliance), which restrict future land uses to achieve particular conservation outcomes (e.g., wildlife and habitat protection, preservation of farm and forestland) (McLaughlin 2002). Economic instruments were first used in programs such as the United Kingdom's Environmentally Sensitive Areas scheme in the 1980s, a program which offered farmers a payment for reducing stocking rates and pesticide and fertiliser use (Dobbs and Pretty 2008). In recent decades there has been a proliferation of the use of these economic instruments. For example, in the 1990s New York City administered the Catskills water purification project which invested $1.5 billion in natural rather than built capital, through the acquisition of critical watershed properties and implementation of land management programs to reduce water contamination, saving the city $4.5 billion in avoided infrastructure costs (Salzman 2005). Since then, the design and implementation of conservation programs has become more sophisticated. For example, the Bushtender program, developed and implemented by the Victorian Government in 2000, used an auction system (Stoneham, Chaudhri *et al.* 2003) that created a market for public goods (Latacz-Lohmann and Hamsvoort 1997), in combination with 'habitat hectares', an objective method to assess the quality of native vegetation to monitor vegetation decline and recovery (Parkes, Newell *et al.* 2003). The government paid landholders to perform specific management activities to enhance and preserve native vegetation on their property (Ha, O'Neill *et al.* 2002).

The nature of regulatory policy instruments has also changed, in part because landholders traditionally do not like to be told how to manage their property and "disgruntled landowners make poor conservationists", who can fail to deliver desired biodiversity outcomes (Farrier 1995, p. 397; Bates 2001). Unlike traditional regulations that restrict or eliminate activities that may cause harm, the environmental duty of care, for example, is an outcomes-focused (quasi) regulation that allows the landholders to decide what actions they will or will not take to provide particular outcomes (Young, Shi *et al.* 2003). The concept of a duty of care requires landholders to take practical and reasonable actions to prevent environmental harm from their activities, encourages ongoing environmental improvement and internalises externalities (i.e., the economic,

social, and environmental costs of the production, distribution, and disposal of goods and services that are not reflected in the price of those goods and services), thereby creating an efficient way to define landholders' role in the provision of public benefits, such as biodiversity conservation (Young, Shi *et al.* 2003). Additionally, the concept can be used to determine where the duty of care ends and where the 'public conservation service' begins and therefore a justification for the use of economic policy instruments.

It is important to note, at this point, that rarely are policy instruments used in isolation from one another. For example, voluntary programs can either induce participation through providing positive incentives (e.g., economic instruments) or threatening harsh penalties (e.g., regulatory instruments) if the outcomes are not achieved (Segerson and Miceli 1998). Goodin (1986, p. 437, 443) argues, however, that regarding voluntary programs, "anything that the government is morally entitled to do with voluntary agreement […] it would be equally entitled to do without it" such that voluntary programs are "no way morally superior to legislative compulsion". Indeed, a voluntary agreement establishes a degree of regulation over particular activities and is therefore "a concrete instrument of policy and is distinguished from 'understandings' and 'consensus' by its regulatory machinery and/or its explicit recognition of 'good and bad practice'" (Baggott 1986, p. 52). There is perhaps then, no choice to be made between voluntary or regulatory policy instruments, but rather a choice to be made "over a bundle of alternatives, some of which contain a greater balance of legislation and some of which contain a greater balance of voluntary agreement in the policy mix" (Baggott 1986, p. 57). That is, voluntary and economic approaches to conservation "will be enhanced by a […] regulatory framework rather than serve as an alternative to it" (Gardner 1998, p. 52).

Although voluntary instruments have been in use for three decades (Reichelderfer and Boggess 1988; Thackway and Olsson 1999; Salafsky, Margoluis *et al.* 2002; Figgis, Humann *et al.* 2005), there remain limitations to their application in conservation program design. Voluntary instruments are most suited to those individuals who already have a desire to preserve the natural environment; can involve high transaction costs and may require additional resources to support staff to monitor the management of conservation areas; can fail to establish adequate monitoring regimes, such that the

outcomes of voluntary programs are commonly unknown (Cocklin, Mautner *et al.* 2007); provide landholders with the "opportunity to hold the benefits of their work for ransom" when agreements need to be renewed (Gunningham, Grabosky *et al.* 1998, p. 59); lend themselves to "free-rider" problems, where landholders who do not participate in conservation programs may benefit from the activities carried out by neighbouring landholders who do participate; can be considered as a creative form of direct regulation when coercion forms part of stakeholder engagement (Gunningham, Grabosky *et al.* 1998); and are often delivered inconsistently across sectors and land management problems, and can be irregularly resourced or insufficiently funded (Dovers 1995; Doremus 2003).

Economic instruments also have a range of limitations. Crowding-out can occur, whereby intrinsic (e.g., voluntary) motivations are overridden by a desire to receive extrinsic (e.g., economic) incentives (Cárdenas and Ostrom 2004). For example, competitive tenders were found to crowd out (i.e., reduce) voluntary conservation contributions, and the crowding effects persisted after the incentives were revoked (Reeson and Tisdell 2006). Although incentive schemes tend to have greater political acceptability (Cocklin and Doorman 1994; Peterson and Coppock 2001), adequate representation of biodiversity is not always guaranteed, especially if properties are not targeted, which can result in ad-hoc distributions of protected species and ecosystems (Lawrence, Richards *et al.* 2004; Chomitz, da Fonseca *et al.* 2006). Economic incentive programs may do little to change land management practices unless practice change is a specific feature of the program (Pannell and Wilkinson 2009), and 'land stewards' can become dispirited when incentive payments are provided to landholders who are viewed to be poor land managers (Salzman 2005). Economic instruments may only be justified when: a landholder is encouraged or forced to change their land use practices in ways different to similarly sited landholders, particularly if the landholder incurs costs as a result of the work (Freyfogle 2007); they will increase the adoption of sustainable land management practices (Serbruyns and Luyssaert 2006), they provide long-term benefits from short-term assistance (Lockie and Rockloff 2004), and they stimulate practice change that is not already occurring spontaneously (Pannell 2001).

The application of inappropriate policy instruments can limit the effectiveness of conservation programs. To illustrate, market-based instruments are often used to

internalise externalities. Yet, when market-based instruments are used in the design of conservation programs that are administered by government or non-government organisations, with only one buyer (e.g., the program administrator) and multiple sellers (e.g., landholders) externalities are not truly internalised. Consequently, these market-based approaches are unlikely to mitigate environment degradation or conserve biodiversity in the long-term (Yang, Bryan *et al.* 2010). Moreover, a lack of low-cost valuation and measurement methods can preclude many ecosystem services from being protected or enhanced through market-based programs (Kroeger and Casey 2007). Challenges also remain on how to convert payments into effective conservation outcomes (Wunder 2007). Ultimately, markets alone are insufficient to protect the environment (Mansfield 2006).

The method of program implementation can also limit the extent of ecological outcomes, even if the most appropriate policy instrument/s has been chosen. The use of monitoring regimes, for example, can fail to measure accurately, or at all, the costs or benefits of private land conservation (e.g. Pierce 1996; Feather, Hellerstein *et al.* 1999), often due to a lack of funding or resistance of participants (Kleiman, Reading *et al.* 2000). Similarly, program success is often defined by program administrators as program or policy 'outputs'(e.g., the number of programs implemented, total program expenditure), rather than the on-the-ground program or policy 'outcomes' (e.g., increased number of threatened species) (Press 1998). Rarely is a program considered complete when the objective has been properly achieved; instead the program ends when the funding or political cycle does (Singh and Volonte 2001). Short-term programs can fail to deliver anticipated outcomes and do little to support long-term biodiversity conservation (Windle, Rolfe *et al.* 2009), particularly when participants have seen either no observable benefit, or a cost, from their participation. Similarly, programs that are too localised may fail to deliver outcomes relevant to the catchment, that is, when programs are implemented at inappropriate scales (Editorial 2011). At the farm-scale, for instance, biodiversity may be unlikely to provide any benefits beyond those available for direct use (i.e., utilitarian benefits), and is often maintained at levels lower than that required to maintain ecosystem services (Swift, Izac *et al.* 2004). That is, the landscape context (e.g., land uses within a catchment such as grazing and cropping) can influence biodiversity outcomes (Martin, McIntyre *et al.* 2006). Ineffective conservation outcomes can also occur when: landholders provide inconsistent or incomplete information necessary to inform conservation decisions

(Polasky and Doremus 1998); programs halt ecosystem loss and degradation, but do not provide for improved vegetation recovery or regeneration (Wilson 1997); conservation priorities are pitted against social justice (Langholz, Lassoie *et al.* 2000); and programs are offered in an area in which a range of other programs are on offer, creating competition and possibly conflict between programs (Mayer and Tikka 2006), which can cause frustration amongst landholders and program failure.

Inappropriate policy instrument choice, combined with poor program design and implementation, can result in a range of perverse outcomes, such as low additionality, slippage and inappropriate tradeoffs. Additionality is the extra benefit that is gained from the implementation of the program, in terms of improved environmental management, reduced or halted environmental damage and the generation of a public benefit (Carey, Short *et al.* 2003). An assessment of the English Countryside Stewardship Scheme found that a quarter of agreements provided low or no additionality, that is, the work undertaken as part of the agreement would have been undertaken in the absence of the agreement (Carey, Short *et al.* 2003). Similar results have been found in other programs, such as the Costa Rican payment for ecosystem services programs (Sierra and Russman 2006; Sanchez-Azofeifa, Pfaff *et al.* 2007). Slippage, movement away from the desired goals and objectives of a program, was found to occur in the United States Conservation Reserve Program: for every 100 acres of cropland retired, 20 acres of previously non-cropland was converted to cropland (Wu 2000). Significant tradeoffs can be made between environmental benefits when different ecological criteria are targeted (Babcock, Lakshminarayan *et al.* 1996). For instance, payment programs that focus on only one ecosystem service (Daily 1997), such as biodiversity conservation, carbon storage, or water purification, may unintentionally threaten the integrity or protection of other ecosystem services (Wunder, The *et al.* 2005).

Ultimately, conservation programs must be suitable for the landholders who are expected to participate in them, yet landholders' reasons for non-participation are often due to weak program design. Examples of weak program design include a lack of flexibility, profitability, program complexity, incompatibility with personal and property objectives, that the land is not always easily divisible into manageable parts to allow for the inclusion of some parts of the property in a program but not others

(Vanclay and Lawrence 1994; Vanclay 2004); insufficient provision of information and accessibility to the program (Young, Gunningham *et al.* 1996); concern that participation will result in future government control and regulation of landholders' properties (Raedeke, Rikoon *et al.* 2001); unacceptable levels of bureaucracy and doubt in the capacity of the administrator to deliver the program (Pasquini, Cowling *et al.* 2010); and insufficient returns on landholders' investment, long-term or intangible pay-backs and the inappropriate use of artificial incentives, such as subsidies, that reduce conservation costs only for the duration of the program (Bunch 1999; House, MacLeod *et al.* 2008). Non-participants have also stated that some programs are, in their view, contrary to good land management practices and are not relevant for their property, that participation would send their management on a different trajectory; or that they would simply be unable to meet the program requirements (Lobley and Potter 1998).

In summary, inappropriate policy instrument selection and ineffective program design and implementation can create perverse outcomes and fail to deliver desired ecological outcomes. These limitations of conservation programs stem from a lack of understanding of how to operationalise policy instruments and how to pair those instruments with landholders' needs and expectations. The resources of conservation agencies, government and landholders are limited; the more often we design effective programs, the more often we will have successful and meaningful ecological outcomes.

Table 2.1: Summary of main policy instrument types, including examples, advantages and disadvantages of each.

Instrument type	Examples	Common and potential advantages	Common and potential disadvantages
Regulatory instruments: seek directly to control or restrict environmentally damaging activities, mandating the reduction or restriction of activities identified as harmful			
Direct	Legislation, taxes and charges, standards, quality objectives	• enable quick response to an environmental harm • apply to the general public who understand regulations within a familiar framework • allow reduction of market failures • minimise "free-riders" who benefit from others voluntary actions	• generate inflexible and inefficient outcomes • present prohibitive compliance costs • fail to provide incentives to innovate • require accurate understanding of the operation and capacity of an industry • create opportunities for political manipulation • increase in administration costs • reduce or alter property rights • require enforcement to be effective
"End-of-pipe"	Effluent/ emissions control, cap & trade		
Self regulation	Best available technology, corporate social responsibility		
Educational instruments: provision of information is an essential prerequisite to economic efficiency, for only with adequate information can decision makers arrive at decisions that do not lead to unintended consequences			
Information supply	Brochures, online information	• empower landholders to make informed decisions • change attitudes and long-term land practices • supplement new regulations, fill knowledge gaps, improve industry know-how • influence behaviour in a cost-effective manner • encourage rather than enforce behaviour, hence socially acceptable and equitable • raise awareness and create a moral incentive to participate	• fail to close the gap between public and private objectives • fail to overcome individual prioritisation of private interests over the common good • provide delayed response to land use problems in many circumstances
Training	Workshops, field days		
Product certification and award schemes	Eco-labelling, environmental performance standards, Global 500 (UNEP)		

<table>
<tr><td colspan="4">Voluntary instruments: rely neither on coercion nor substantially on continuing financial incentives, but rather on voluntarism and self regulation</td></tr>
<tr><td>Voluntary programs</td><td>Landcare, “Friends of” groups</td><td rowspan="2">meet landholders’ social and cultural needs often and so are readily adopted
raise landholder awareness of environmental problems and potential solutions
cover partial costs of management through provision of financial incentives
target a range of landholders because they are financially attractive, non-intrusive, and non-interventionist
promote land stewardship
provide benefits to government/program administrators through a reduction in regulatory burdens
provide benefits to industry with fewer compliance costs and greater flexibility</td><td rowspan="2">rely on goodwill and enthusiasm
lack adequate and long-term data to clarify program outcomes
apply inconsistently across sectors
cost to administer monitoring programs, when necessary
fail to guarantee perpetual conservation of biodiversity
suit individuals who already have a desire to preserve the natural environment
provide opportunities for landholders due to renew an agreement to hold the benefits of their work for “ransom”
encourage “free-rider” effect, where landholders benefit from neighbours’ participation</td></tr>
<tr><td>Management agreements</td><td>Voluntarily entered into, but typically legally binding upon execution</td></tr>
<tr><td colspan="4">Economic instruments: influence prices directly, raise revenue to pay for the cost of conservation in an equitable manner, and shift community norms about, and attitudes to, biodiversity conservation</td></tr>
<tr><td>Price-based</td><td>‘Green’ taxes rate rebates, subsidies, penalties</td><td rowspan="3">value economic aspects of natural resources which can lead to efficient resource use
achieve environmental outcomes more effectively than direct regulation where market price accommodates all environmental costs
increase in protected area through application of covenants to private land
overcome both market failure and inadequately defined property rights via mechanisms that align resource use with societal expectations
provide cost effective fixed price schemes and tender schemes
reward landholders who are “stuck” with areas of high conservation value</td><td rowspan="3">create perverse incentives where vegetation clearing controls should protect vegetation on private property
promote community and scientific distrust of offset schemes that rely on incomplete information
crowd-out intrinsic motivations in favour of extrinsic incentives
fail to provide adequate representation of biodiversity due to ad-hoc distributions
fail to change land management practices unless such changes are a specific feature of the program
cause genuine ‘land stewards’ to become dispirited when incentive payments are provided to poor land managers</td></tr>
<tr><td>Rights-based or quantity-based</td><td>Tradeable quotas and permits, covenants, offsets</td></tr>
<tr><td>Market-based</td><td>Competitive tenders, removal of perverse subsidies, market friction, and market creation</td></tr>
</table>

(Adapted from Young, Gunningham *et al.* 1996; Gunningham, Grabosky *et al.* 1998; Cocklin, Mautner *et al.* 2007)

CHAPTER 3
RESEARCH METHODS

3.1 INTRODUCTION

Social science is a multifaceted and disputatious discipline. "Wars" are waged on "battlefields" among "warriors" from different tribes, each fighting for their alternative paradigm: postpositivism, constructivism, pragmatism. (Tashakkori and Teddlie 1998; Creswell 2009). And rightly so: the relevance and applicability of the outcomes of social science research depend almost entirely on the legitimacy of the research approach.

Of particular concern to this research is the ability to combine qualitative and quantitative methods to derive meaningful but insightful information on landholder motivations and barriers to participate in conservation programs and their preferences for policy instruments and associated incentives. This chapter explores the use of mixed methods research and the nature of the results that can be derived from such research design.

3.2 JUSTIFICATION FOR METHODOLOGY

> One of the livelier academic debates of recent years has concerned the "scientific" status of those disciplines gathered under the rubric of the social sciences…basically at issue is whether human behaviour can be subjected to "scientific" study.
>
> (Babbie 1990, p. 19)

A justification for the methodology used in this research is important for three main reasons. First, there is much debate within the social sciences as to the validity of different research methods, and awareness of the debate is necessary to assess whether the selected methods for a given research topic are appropriate. Second, method selection is not just about whether numbers are used (quantitative) or not (qualitative); the methodology points to the philosophical viewpoint of the researcher and how they believe they can best understand their research topic (Creswell 2009). Third, a clear

explanation of the research methodology is necessary for other researchers who may want to adopt a similar approach to answer a research question.

Discussion of the range of available methodologies is presented in the first part of this section. More detailed descriptions of the methods are provided in the latter part of the section.

3.2.1 PHILOSOPHICAL POSITIONS ON SOCIAL SCIENCE METHODOLOGIES

> Every way of knowing rests on a theory of how people develop knowledge.
>
> (Charmaz 2006, p. 4)

There are two main debates over social science methodologies. The first debate is between physical scientists and social scientists. Physical scientists have questioned whether social science is a "science" given that social methods tend to be less empirical and controlled than physical methods and subsequently it is more difficult to establish cause and effect and therefore more difficult to develop theory[1]. Indeed, social science theories are not yet comparable with those developed by the physical scientists (Babbie 1990), or perhaps it is the fact that social processes are not particularly amenable to scientific methods developed for the physical sciences. But then social science methods have not been applied for as long as those methods in the physical sciences. Nevertheless, given that science aims to a) describe, b) discover regularity, and c) formulate theory and laws (Babbie 1990), social science appears to fit the criteria. The second debate is between the social scientists themselves, who tend to support different philosophical paradigms (also worldviews, belief systems, epistemologies) that guide the methodologies they employ. This section explores the latter debate and presents the dominant paradigms that are used to justify quantitative, qualitative and mixed methods approaches to social inquiry.

[1] The difference may be described as follows: "People have a tendency to read the subjects of the physical sciences as more regular than those of the social sciences. A heavy object falls to the earth every time it is released, while a person may vote for one candidate in one election and against the same candidate in the next election. Similarly, ice always melts when heated, while seemingly religious people do not always attend church" (Babbie 1990, p. 21).

There are four aspects of social sciences that inform research design, data analysis and data collection (Crotty 1998):

1. Ontology & epistemology: categories of reality and how that reality is known and reasoned, the theory of knowledge that is embedded in the theoretical perspective (e.g., subjectivism, objectivism);
2. Theoretical perspective: the philosophical position that underpins the methodology (e.g., positivism, interpretivism);
3. Methodology: the strategy that governs the selection and application of methods and links them to outcomes (e.g., survey research, ethnography); and
4. Methods: procedures and techniques of data collection and analysis (e.g., questionnaires, interviews).

These aspects demonstrate the interrelated levels of social research design (Table 3.1) that range from broad assumptions to practical decisions (Creswell 2009). The general aspects of each of these dominant paradigms are now examined in relation to this research.

Table 3.1: Four alternative combinations of paradigms, strategies of inquiry, and methods.

Research approach	Paradigm	Methodology	Methods
Quantitative	Postpositivist	Experimental Non-experimental (e.g., surveys)	Pre-determined Instrument-based questions Performance data: attitude data, observational data, and census data Closed-ended questions Numeric data Statistical analysis
Qualitative	Constructivist Emancipatory	Grounded theory Ethnography Case studies Narratives Phenomenology	Emerging methods Open-ended questions Interview data: observation data, document data, and audiovisual data Text and image analysis
Mixed methods	Pragmatic	Concurrent Sequential Transformative	Both pre-determined and emerging methods Both open- and closed-ended questions Multiple forms of data drawing on all possibilities Statistical and text analysis

(Adapted from Creswell 2003; Creswell 2009)

3.2.1.1 Quantitative methods

To a large extent, quantitative approaches have been used to answer social research questions. Quantitative social science research methods stem from the belief that

natural scientific study can be applied to people and society. The idea is that the same methods and logic that apply to the physical sciences, such as chemistry, physics and mathematics, could equally apply to social studies, so long as they were appropriately modified to the objects of the enquiry (Blaikie 1993). There are three paradigms that support the use of quantitative methods in social science: foundationalism, positivism, and postpositivism.

Foundationalism

Until the late 19th century, major Western epistemologies were based on foundationalism, knowledge that had a secure foundation and thus could be securely established. Foundationalism emerged when Descartes (1596-1650) recognised that many of the beliefs that people held were false. He discarded all his opinions and then began the process of rebuilding them from the foundations: "he closeted himself in a small room with a fireplace and spent the winter examining his beliefs using "the light of reason", until he identified one that seemed absolutely secure and indubitable – the famous "cogito, ergo sum" (I think, therefore I am)" (Phillips and Burbules 2000, p. 6). Descartes was a member of the rationalist camp of foundationalists because he used *rationality* to determine what could not be doubted and therefore must be true. As a slight contrast, empiricists of that time placed the secure foundation of knowledge in *experience* from which a sample of ideas could be combined and contrasted to form more complex ideas (Phillips and Burbules 2000). Observational data or measurements provided a method to justify ideas or knowledge that was experienced. A claim could become knowledge if observations were made that supported that claim. Yet, despite the importance of rationality (reason) and experience as a basis for knowledge, they are not necessarily "foundational in the sense of being the *secure* basis upon which knowledge is built" (emphasis added) (Phillips and Burbules 2000, p. 7).

Positivism

Positivists held an objective view, that there is only a single reality and that the knower and the known are independent (Tashakkori and Teddlie 1998). The basic assumption of positivism then is that the researcher can study a subject without influencing it or being influenced by it (Guba and Lincoln 1994). The methodologies of positivists included experimental and manipulative research that were subjected to empirical tests (Guba and Lincoln 1994).

Positivism on its own, however, was found to be an inadequate method to understand people and society. Chief among the criticisms of positivism were that "positivism leads to inadequate conceptualisation of what science is"; and that positivism has produced "research with human respondents that ignores their humanness" (Lincoln and Guba 1985, p. 25, 27). Moreover, doubt was raised as to whether a single reality exists, that is, whether the researcher and the subject really are independent, and whether the research was value-free (i.e., that research was free from value systems and thus bias) (Lincoln and Guba 1985). Positivism was rejected by a wealth of social scientists and was eventually replaced by postpositivism in the 1950s and 60s (Howe 1988). Positivism does, however, remain strong in the sciences.

Postpositivism

Postpositivism assumes that social research is influenced by the values of the researchers, the theory or framework that the researchers use and the nature of reality, or how reality is constructed (Tashakkori and Teddlie 1998). Postpositivists recognised that "we [social scientists] cannot be "positive" about our claims of knowledge when studying the behaviour and action of humans" (Creswell 2009, p. 7) and challenged the idea that knowledge is an absolute truth (Phillips and Burbules 2000). No longer are the researcher and the subject considered independent entities, thus the epistemology changes from dualist (positivism) to modified dualist (Tashakkori and Teddlie 1998). The nature of reality of the postpositivists' is one of critical realism: "reality is assumed to exist but to be only imperfectly apprehendable because of basically flawed human intellectual mechanisms and the fundamentally intractable nature of phenomena" (Guba and Lincoln 1994, p. 110).

Because the postpositivist must carefully observe and measure objective reality, which exists external to them, the development of numeric measures of observations and behaviours is critical. Therefore, within their scientific frameworks, the postpositivist begins with a theory, tests that theory via collecting and analysing data which either supports the theory or not, and then determines which additional data are required to further test the theory (Creswell 2009). Quantitative research does not lead to absolute truths; hypotheses are not proved, but are rejected to refine claims to shape knowledge (Phillips and Burbules 2000). This view conforms with Karl Popper's critical rationalist

approach to science, which states that repeated positive outcomes do not confirm a scientific theory, but a single contrary outcome can disprove the theory, or prove the theory false. Popper's falsification ideas relate to the notion that if a theory is false, then experiments or observations will demonstrate this to be true. Objectivity is therefore paramount; reliability, objectivity and internal and external validity tests are necessary to perform on methods and data to identify areas of bias (Lincoln and Guba 1985). Postpositivism is the main paradigm of quantitative methodology.

Experiments and surveys represent the dominant quantitative methods in the social sciences. An experiment is a well-constructed and executed plan to collect and analyse data that will prove or disprove a hypothesis (Keppel and Wickens 2004). Conditions are administered to experimental groups of individuals, but not to a control group of individuals. The observed differences in collected data between the experimental and control groups can then be attributed unambiguously to the differences between treatment conditions. This approach allows for *causation* to be established (Keppel and Wickens 2004). Surveys are used to obtain descriptive and explanatory information to apply to the generalised population from which the initial sample was taken (e.g., if a representative sample of Australian farmers was used, then the results would apply to Australian farmers). A sample of people are chosen, a questionnaire is designed to elicit information relevant to the research question(s), such as attitudes or demographic details, which is administered to the sample (Babbie 1990). The survey can be completed during an interview, by phone, or by mail (self-administered). The survey responses are coded into a standardised form that can be used for quantitative analysis. Aggregated analysis can provide descriptions of the population and can reveal correlations between responses (Babbie 1990).

3.2.1.2 Qualitative methods

Qualitative methods were also used to examine the research aims. There are two main paradigms that employ qualitative methods: constructivism and emancipatory (also known as critical theory, participatory action or advocacy) research. Emancipatory research is concerned primarily with social justice and movements for social transformation, particularly in the developing world (Kemmis and McTaggart 2005). Such research involves self-reflective cycles of planning, acting, reflecting, replanning, acting and so on, (Kemmis and McTaggart 2005). Given that this research does not

focus on social justice or transformation, the discussion of qualitative methods will focus on constructivist approaches.

Constructivism

Constructivism relies on individuals to "construct" their own meaning of reality. Also called *naturalism*, this paradigm supports the idea that individuals' subjective experiences of life are complex and should not be broken down into narrow categories (Creswell 2009). Individuals' mental constructions are intangible, multifaceted, social, experiential (i.e., from experience), local and specific in nature, and relate to the individuals or groups who hold those constructions (Guba and Lincoln 1994). Unlike postpositivism, the epistemology of constructivism is transactional, that is "the investigator and the object of the investigation are assumed to be interactively linked so that the "findings" are *literally created* as the investigation proceeds" (Guba and Lincoln 1994, p. 111). Cultural norms, and socio-historical factors shape individuals and are used in qualitative research to construct theory from the ground up, rather than starting with a predetermined theory (as is the case with postpositivist approaches) (Creswell 2009). "Grounded theory" therefore:

> "is a necessary consequence of the naturalistic paradigm that posits multiple realities and makes transferability dependent on local contextual factors. No *a priori* theory could anticipate the many realities that the inquirer will inevitably encounter in the field, nor encompass the many factors that make a difference at the micro (local) level"
>
> (Lincoln and Guba 1985, p. 204-5)

Grounded theory emerged in the 1960s as a series of methods that could be used to advance a developing theory, rather than deducing testable hypotheses from already existing theory (Glaser and Strauss 1965; Charmaz 2006). The process involves simultaneous data collection, construction of codes and categories, constant comparison and refinement of categories of information, and theory advancement of a topic, which is not necessarily applicable outside of a specific context, time or place (Glaser and Strauss 1965). Grounded theorists use a process of memo-writing to expand categories, specify the properties of those categories and define relationships and gaps within and between the categories (Charmaz 2006).

There are several other methodologies that are associated with qualitative research: ethnographies, case studies, narrative research and phenomenological research.

Ethnographies involve describing cultures in a natural setting over a long period of time via the collection of predominantly observational data (Charmaz 2006; Creswell 2009). These observations can be open-ended narrative descriptions or can be collected according to published checklists and field guides (see Rossman and Rallis 2003; Angrosino 2005 for a discussion on the use of ethnographic methods). A case study does not represent a methodological choice, but rather a choice of *what* is to be researched (Stake 2005). Case studies are used to understand some aspect of a specific case and as such the researcher must concentrate on the experiential knowledge of the case and the influence of political, social and other contexts (Stake 2005). The five requirements of a case study are: topic choice, triangulation, experiential knowledge, contexts and activities (see Stake 2005). Narrative research takes place when a researcher asks an individual to provide a story about their life, which is then retold into a narrative chronology (Creswell 2009). Specific approaches to narrative research tend to be "shaped by interests and assumptions embedded in researchers' disciplines" (Chase 2005, p. 658). Finally, phenomenological research involves an exploration of how people experience a phenomenon, how they make sense of that experience and how they transform the experience into consciousness. The main purpose of phenomenological research is to uncover the essence/s of shared experience, that is, the central meaning of a phenomenon that is commonly experienced, such as the essence of loneliness or of being a mother (Patton 2002).

3.2.1.3 Mixed methods

Mixed methods research combines quantitative and qualitative research, which can strengthen the understanding of the research problem more so than using either of the approaches in isolation. The main paradigm of mixed methods research is pragmatism.

Pragmatism

To begin, pragmatism and mixed methods research are not synonymous. Instead, pragmatists believe that the research question is more important than a method or worldview that supports the choice of methods (Tashakkori and Teddlie 1998). Consequently, the research question is primary, and the choice of methods, whether quantitative, qualitative or mixed, is secondary; the researcher answers their research question with the most appropriate methodological tool (Cherryholmes 1992). Pragmatists do not subscribe to only one way of answering their research questions,

rather, “truth is what works at the time” and what methods will best allow them to understand their research question (Creswell 2009, p. 11). Nonetheless, pragmatists must explain their rationale for mixing methods. Unlike the postpositivists and constructivists, pragmatists believe that “we [social scientists] would be better off if we stopped asking questions about laws of nature and what is really "real" and devoted more attention to the ways of life we are choosing and living when we ask the questions we ask” (Cherryholmes 1992, p. 16). That is, pragmatists explore what questions are being asked by scientists and whether they are the relevant questions that should be asked.

There are three main ways in which quantitative and qualitative methods can be combined. First, concurrent mixed methods research involves the collection of quantitative and qualitative data at the same time; the data are integrated to interpret the results (Creswell 2009). Second, sequential mixed methods research involves the collection of qualitative data to develop quantitative surveys that can be used to make generalisations about a population. In contrast, quantitative data can be collected to test a theory or concept that is followed up by detailed exploration of individual (qualitative) cases (Creswell 2009). Third, transformative mixed methods research involves the application of a theoretical lens which provides a framework for methods selection. The data collection could involve either concurrent or sequential approaches. Transformative research is often conducted within an emancipatory paradigm because lenses commonly explore feminism, racism, discrimination and marginalised groups (Mertens 2003).

3.2.2 CHOICE OF RESEARCH STRATEGY

As presented in Chapter 1, the main aims of this PhD dissertation were to understand:

1. How the social characteristics of landholders, who had participated in one of three conservation programs, differed;
2. What motivated and limited the involvement of participants;
3. How the social characteristics of conservation program participants and non-participants differed;
4. Why some landholders chose not to participate in conservation programs; and

5. How conservation programs could be designed to enlist landholders who may otherwise be non-participants.

To answer these questions, a concurrent mixed methods research design was selected (Figure 3.1). As stated by Greene (2008, p. 20):

> "A mixed methods way of thinking is an orientation toward social inquiry that actively invites us to participate in dialogue about multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important and to be valued and cherished. A mixed methods way of thinking rests on assumptions that there are multiple legitimate approaches to social inquiry and that any given approach to social inquiry is inevitably partial. Better understanding of the multifaceted and complex character of social phenomena can be obtained from the use of multiple approaches and ways of knowing. A mixed methods way of thinking also generates questions, alongside possible answers; it generates results that are both smooth and jagged, full of relative certainties alongside possibilities and even surprises, offering some stories not yet told…:

A mixed methods approach is therefore particularly useful in the context of private land conservation that represents a complex interaction of environmental, social, economic and political priorities, which can complement or conflict with one another, and which will differ between and among landholders.

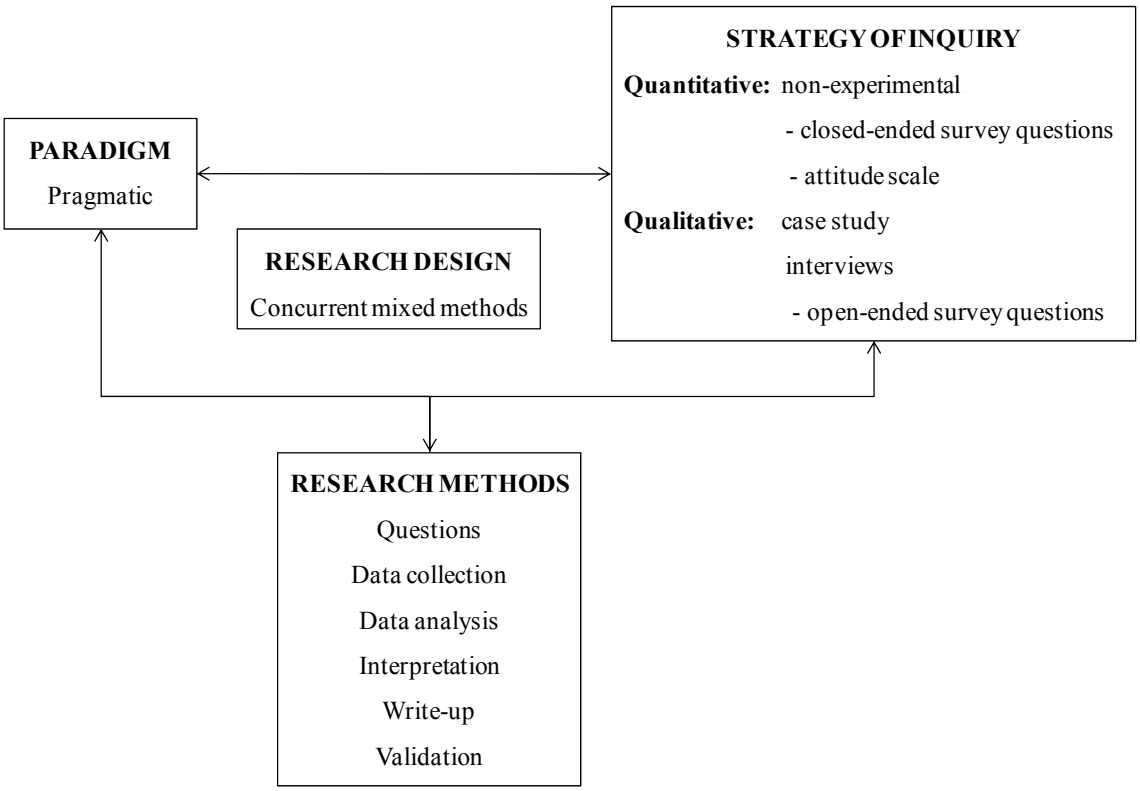


Figure 3.1: The research design framework that demonstrates the relationship of the paradigm, strategy of inquiry and research methods (adapted from Creswell 2009, p. 5).

3.2.2.1 Case study

In the research design I used a revealed-preference case study approach, to generate multiple descriptive cases. A case study is "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (adapted from Creswell 2009, p. 5). Moreover, a case study inquiry (Yin 2009, p. 18):

> "copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis".

The replication design of this multiple case study aimed to a) predict contrasting results between conservation program participants of different programs for explainable reasons, that is, policy instrument preference (theoretical replication); b) predict similar results among program participants within a program (literal replication); and c) predict contrasting results between conservation program participants and non-participants

(theoretical replication) (Yin 2003) (Figure 3.2). This replication logic is different to sampling logic which requires a sample to be randomly selected so the results can be used to describe a population. Instead, case studies are used here to develop theory, which may or may not, apply to a broader population. Therefore, case study research design does not lend itself to traditional statistical sampling methods.

The descriptive approach was taken to provide a description of a phenomenon (participation in private land conservation programs) within a given context (north Queensland) (Yin 2003). Descriptive cases were selected because the research was primarily focused on the contextual differences and similarities of landholders and their motivations to conserve natural values on their respective properties. Alternative methods that were not as suitable were exploratory cases, which involve the definition of questions and hypotheses that will shape a future study or determine the feasibility of a research approach, and explanatory cases, which examine cause and effect relationships and explain how and why certain events or circumstances occurred (Yin 2003).

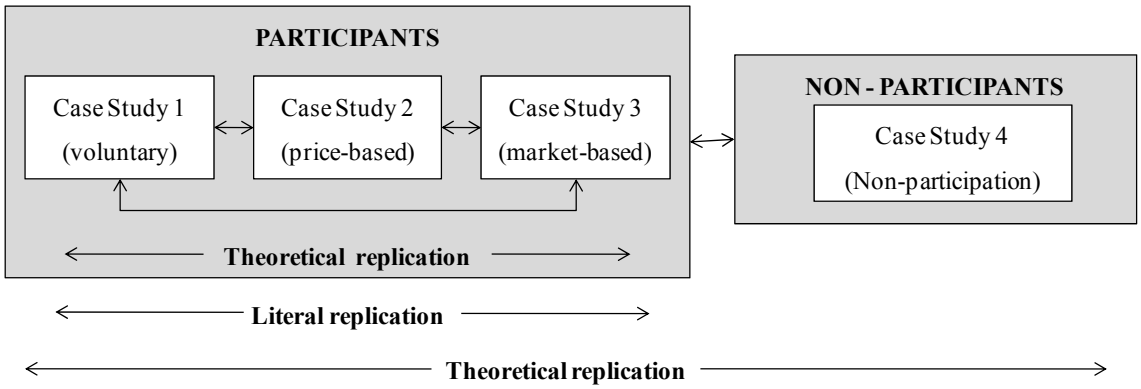


Figure 3.2: Comparisons between multiple cases – differences between conservation program participants, similarities between conservation program participants, and differences between participants and non -participants.

Revealed-preference case studies were selected. Revealed-preference methods involve "observations of people acting in real-world settings where people must live with the consequences of their choices" (Freeman 2003, p. 23). Revealed-preference studies deliver operationally meaningful foundations of behaviour based on an individual's revealed preferences (Samuelson 1948). They contrast with stated-preference methods that "refer to any survey-based study in which respondents are asked questions that are designed to reveal information about their preferences or values" (Freeman 2003, p.

161). Stated-preference studies do not always predict actual behaviour; revealed-preference studies can therefore either be used to validate stated-preference results or provide more precise information on individuals' preferences (Lichtenberg 2004). This approach was used to uncover the scope and depth of landholders' willingness and capacity to participate in conservation programs offered in their region(Yin 2003).

The case studies were selected according to a process that first involved a review of the different conservation programs offered in Queensland. Once details of existing programs had been collated, the policy instrument used in their design was determined. Next, case study programs were grouped according to regions. This approach was adopted to control for differences in geographical, political, social, and cultural environments that may confound the interpretation of results. The final stage of the process involved selecting a region that displayed a mix of conservation programs that employed different policy instruments but which had similar program objectives. Three conservation programs were found a) in north Queensland; b) that had been implemented for at least two years to ensure participants could discuss their program experience; and c) that involved the application of a conservation covenant or agreement. Each of the three programs employed a different policy instrument and was administered by a different agency. The three policy instruments were: voluntary, price-based (economic), and market-based (economic). The three administrators were: local government, state government and a non-government organisation (see section 3.4).

3.2.2.2 Interviews

Interviews were selected as the best method to elicit landholders' motivations and barriers to private land conservation[1]. Interviews generate more detailed responses than self-completed questionnaires and can readily adapt to participant responses due to their flexible nature (Bell 2005). Moreover, interviews can demonstrate to the respondent that the researcher is equally committed, in terms of time, effort and thought, to the research (Oppenheim 1992). A major disadvantage of interviews, however, is that when multiple interviewers are used to interpret and analyse interviews and associated

[1] The interview approach was selected to generate more insightful responses to open-ended questions. Discussion over some of the closed-ended questions also provided useful information.

data inconsistencies can occur (Oppenheim 1992). To overcome this disadvantage, I conducted all the interviews and transcribed and coded the interview data.

All efforts were made to conduct the interview in person. When all reasonable steps had been taken to meet the landholder in person, but they were not available, I conducted a phone interview. The advantages of phone interviews are that they are more cost-effective than face-to-face interviews. It can, however, take longer for the interviewer to develop rapport with the respondent over the phone. Rapport is an "elusive quality, which keeps the respondent motivated and interested in answering the questions truthfully" (Oppenheim 1992, p. 89). A US study found that there were no significant differences in the quality, nature and depth of responses between individuals who were interviewed over the phone compared to individuals interviewed in person (Sturges and Hanrahan 2004) (see Table 3.4 for statistics on phone and face-to-face interviews).

A semi-structured interview was conducted that involved both closed-ended (quantitative) and open-ended (qualitative) questions (Appendix 1A, Appendix 1B). This mixed methods approach allowed the quantitative data to be supplemented and enriched with qualitative data to uncover deeper understandings of individual motivations to conserve biodiversity. The first section of the interview involved the respondent answering closed-ended questions and providing demographic data; the latter part of the interview allowed for a more general discussion around conservation program participation, through the use of open-ended questions. The benefit of this approach was that the interview had a flexible nature yet allowed me to leave the interview with contextual quantitative data and a set of qualitative responses that could be summarised, analysed and compared with the responses of other individuals (Bell 2005).

3.2.2.3 Closed-ended survey questions

Closed-ended questions are those in which the respondent is given a fixed number of alternatives to express their answer. The advantages of closed-ended questions are that they require little time to obtain answers; are easy to process; can provide for easy comparisons within or between groups; and can be used to test hypotheses (Oppenheim 1992). Importantly, closed-ended questions can be used to quantify the data. Their

disadvantages include the lack of spontaneous responses; potential bias in the categories offered as alternative responses; and they can annoy respondents, for example, if the respondent wants to provide a more detailed response than simply agree or disagree (Oppenheim 1992). Closed-ended questions were used to collect data to identify the differences and similarities between program participants and non-participants (Appendix IA, Appendix 1B)

Likert scales were used to provide response categories. Likert scales, developed in the 1930s by psychologist Rensis Likert to measure attitudes, are commonly used because they provide "unambiguous ordinality" of individual responses that can be measured according to their relative strength (Babbie 1990, p. 164). These rating scales are commonly used in the social sciences to measure personalities, opinions, emotional states, and personal descriptive information, such as an individual's livelihood and living environment (Spector 1992). The Likert scale requires a respondent to select how much they agree or disagree with a statement. The scales are generally reliable (i.e., generate consistent results over time) (Oppenheim 1992) and they are familiar to most individuals who have previously completed surveys.

The number of points on the Likert scale needs to be carefully chosen because the nature of the scale can affect the results. For example, some authors suggest at least a 7-point Likert scale that includes both 'don't know' and 'undecided' categories to ensure statistical reliability and validity (as well as strongly agree, agree, neutral, disagree, strongly disagree) (Foddy 1993). Inclusion of a 'don't know' category, however, can create *false negatives* whereby a respondent falsely states that they have no opinion when in fact they do have an opinion (Gilljam and Granberg 1993). *False positives* can also occur when an individual is made to state an opinion but does not have one or know the answer (Neuman 2000). Precision of results is increased when multiple categories are provided, however, a neutral point is not always considered necessary (Spector 1992).

To overcome these survey design challenges, a four-point Likert scale was selected for this research (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree). This approach encouraged participants to state their preference to either agree or disagree. At the beginning of the interview, respondents were told that if they did not want to

answer the question, if it was not relevant or if they did not have an answer, they could leave the question unanswered. Those items that respondents did not want to answer, to or to whom the item was not applicable were left blank; 3.3% of all the items in the survey with Likert scales were left unanswered (Table 3.2).

For some questions, a Likert scale was not applicable and instead a range of different response categories was provided. These alternatives were developed through a pilot study of similar landholders. In each case, landholders were offered an alternative "other" to list any responses that were not available to select but which were applicable to them.

Table 3.2: Non-response rates of participants to categories of closed-questions.

	Statements (n)	Participants (n)	No answer responses	Average no answer response rate
Personal circumstances	18	74	59	(4.7%)
Program experience	21	45	23	(2.5%)
Attitude items	15	74	33	(2.9%)

3.2.2.4 Open-ended survey questions

Open-ended questions are not followed by any kind of choice, the respondent is free to answer in anyway they like. The principle advantage of open-ended questions is that they provide freedom to the respondent to answer the question in their own words, they are "unencumbered by a prepared set of replies" (Oppenheim 1992, p. 113). Open-ended questions allow "respondents to say what they think and to do so with greater richness and spontaneity" (Oppenheim 1992, p. 81). They can provide more meaningful information than closed-questions and reduce the likelihood that respondents will be influenced by the alternatives provided in closed-ended questions (Schuman and Presser 1981). Open-ended questions can also provide useful information about individuals' ideas or awareness of a concept and can allow for unusual or unexpected responses that lead to new areas that may be explored (Oppenheim 1992; Bryman 2008). Open-ended questions can be time-consuming though, can expect more time of the respondents, and can be costly, slow and unreliable to interpret and code (see section 3.3.4.2) (Oppenheim 1992; Bryman 2008).

Open-ended questions were used to understand what motivated landholders to participate in a program, how they experienced the program and what barriers they

perceived to using more land for conservation. Answers to open-ended questions were recorded in full on a dictaphone.

3.2.2.5 Attitude scale

An attitude may be defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly and Chaiken 1993, 1). In this context, a psychological tendency is "a state that is internal to the person" and evaluating refers to "all classes of evaluative responding, whether overt or covert, cognitive, affective or behavioural" (Eagly and Chaiken 1993, p. 1). Attitudes are affected by beliefs. Beliefs can be held about objects, actions, means or ends and can be capable of being true or false (descriptive or existential beliefs); be considered good or bad (evaluative beliefs); or judged as desirable or undesirable (prescriptive or proscriptive beliefs) (Rokeach 1973).

Scaled items provide an efficient means to elicit individuals' attitudes towards an object, topic or phenomenon. The New Ecological Paradigm (NEP) was selected to measure landholders' pro-environmental attitude. The NEP is widely used to measure environmental attitudes, as are the ecological attitude scale and the environmental concern scale. All three scales are used to examine multiple phenomena of concern and multiple environmental topics (Dunlap and Jones 2002). The internally consistent NEP is the most widely used (Dunlap 2008), since its original publication in 1978 (as the New Environmental Paradigm), because it measures more generally what people believe about the relation between humans and the environment and so is contextually relevant (Hawcroft and Milfont 2010). The NEP has been used in a range of contexts (e.g. Stern, Dietz *et al.* 1995; Wiidegren 1998; La Trobe and Acott 2000; Rideout, Katherine *et al.* 2005). The survey is internally-consistent, that is, respondents' scores on an item that measures one attitude is related to other items that measure the same attitude (Bryman 2008). The scale measures pro-environmental orientation and balances pro- and anti-environmental statements that can provide insight into an individual's worldview (Dunlap, Van Liere *et al.* 2000) (Box 3.1).

There are two main limitations of the NEP as an attitude scale. First, the authors of the NEP now suggest that the items more accurately represent beliefs than attitudes (Dunlap 2008). Second, the NEP is not necessarily a superior scale, compared to other attitude

scales, to measure attitudes or beliefs (Cordano, Welcomer *et al.* 2003), in part, because some items are out-dated (LaLonde and Jackson 2002). Importantly, individuals who hold particular attitudes will not necessarily demonstrate those attitudes in their behaviours. For instance, individuals who endorse the NEP will not consistently demonstrate pro-environmental behaviour (Dunlap and Van Liere 1978). Nonetheless, the NEP represents a valid method to demonstrate a pro-environmental orientation that may reveal important information about landholders' decisions to participate in conservation programs. A four-point Likert scale was applied to each of the 15 items. I examined the *influence* of attitudes (and norms) on behaviour, but not to *predict* behaviour, as is often done in stated-preference studies

Box 3.1: New Ecological Paradigm scale items.

- Humans have the right to modify the natural environment to suit their needs
- The Earth has plenty of natural resources if we just learn how to develop them
- Human ingenuity will insure [*sic*] that we do NOT make the Earth unliveable
- We are approaching the limit of the number of people the Earth can support
- The balance of nature is strong enough to cope with the impacts of modern industrial nations
- The so-called "ecological crisis" facing humankind has been greatly exaggerated
- When humans interfere with nature it often produces disastrous consequences
- Humans are severely abusing the environment
- Humans were meant to rule over the rest of nature
- Plants and animals have as much right as humans to exist
- Humans will eventually learn enough about how nature works to be able to control it
- Despite our special abilities, humans are still subject to the laws of nature
- The Earth is like a spaceship with very limited room and resources
- The balance of nature is very delicate and easily upset
- If things continue on their present course, we will soon experience a major ecological catastrophe

(From Dunlap, Van Liere *et al.* 2000)

3.3 RESEARCH PHASES

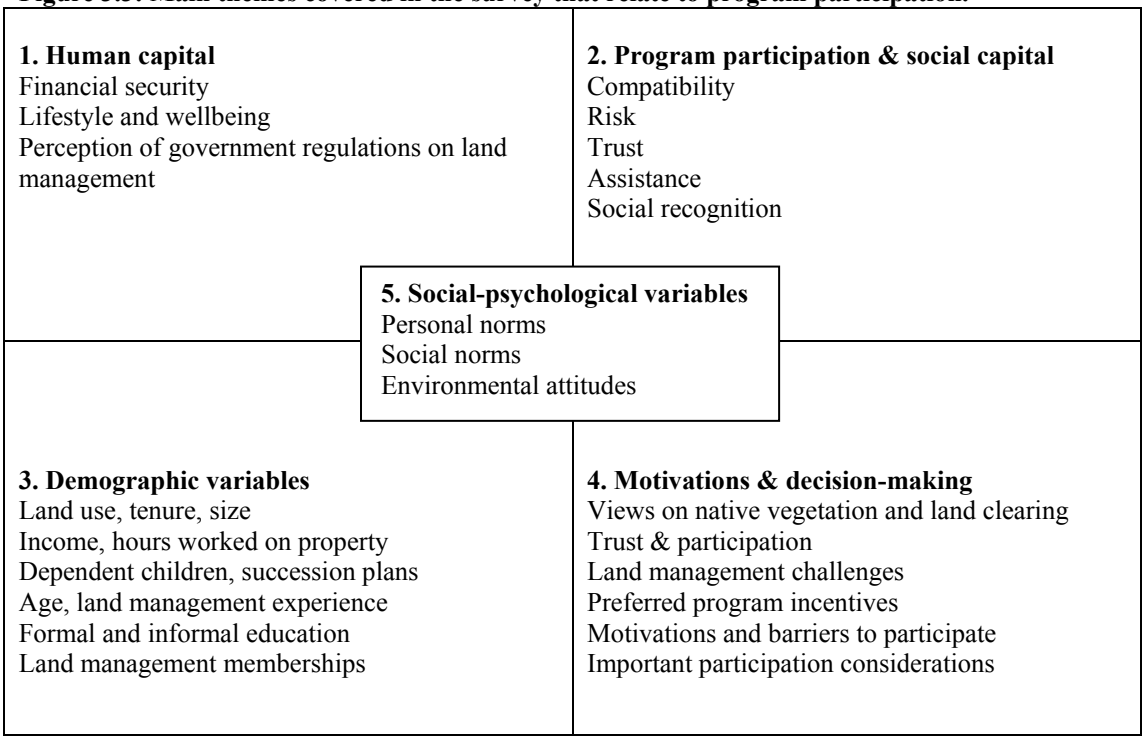
3.3.1 THE SCOPING STAGE

Scoping for this research project was undertaken in November 2008 as part of the final monitoring round of the Desert Uplands Landscape Linkages program. The researcher spent 12 days in the Desert Uplands with landholders discussing property management and rural livelihoods. Common themes that were discussed during the scoping exercise included land management, conservation strategies, lifestyle and the history of the region.

3.3.2 SURVEY DEVELOPMENT

Several themes emerged from the scoping study and literature review that proved important to conservation program participation (Figure 3.3). These themes were divided into sub-categories and a range of questions was developed for each sub-category (Appendix 1A, Appendix 1B). These themes, although recognised in the literature as influential on participation, have not, to the best of my knowledge, been examined together in one revealed preference study of participants. Greater detail of these themes is provided in Chapters 4-8.

Figure 3.3: Main themes covered in the survey that relate to program participation.



3.3.3 THE PILOT STUDY

Seven landholders were involved in the pilot research in the Ayr and Home Hill area, 150 kilometres south of the Wet Tropics Bioregion (Figure 3.4). These landholders were asked to both answer the survey questions and to provide comment on the question structure and content, for example, did the question make sense, was the question relevant? The interviews took up to four hours and were conducted in each landholder's home or place of work.

The pilot study generated the following changes to the survey:

- Some pilot study questions were omitted because they proved irrelevant to the main research questions, e.g., I am covered financially in the event of a possible natural disaster;
- Some new questions were added because the landholders believed the answers that would be generated were important to landholder decisions to participate in conservation programs, e.g., on landholders' social circumstances: Living on the land is emotionally stressful;
- Some questions were collapsed into one question with a range of answers, e.g., What land management challenges do you face on your property with a list of eight options, such as variable climate and weed control; and
- Some rearranging and refinement was undertaken to make the survey more concise and more relevant to both the landholders and the study.

Each of the pilot study respondents were provided with copies of the research results, along with the main study respondents. One pilot landholder, upon being sent a copy of the research results, commented: "It's interesting especially to read through the results of responses to the questionnaire. It fits pretty well with my feelings about the questions still" (Pilot Landholder 6).

3.3.4 ADMINISTRATION OF THE SURVEY

The final participant survey consisted of closed-ended (quantitative) questions, open-ended (qualitative) questions and a 15-point attitude scale for participants (Table 3.3). See Appendix 2, section A2.1 for details on landholder engagement.

The interviews were conducted from March to June of 2009. The majority of interviews were conducted in person, namely at the landholder's property (Table 3.4). When an interview time could not be arranged, a suitable time for a phone interview was agreed upon. The average length of the interview was one hour, six minutes. The research was conducted according to relevant ethics standards (see Appendix 2).

Table 3.3: Number of questions asked of respondents in the final survey.

	Participants	Non-participants
Closed-ended questions	64	42
Open-ended questions	10	8
Attitude scale items	15	15

Table 3.4: Statistics of interview lengths for participants and non-participants.

	Minimum (hrs)	Maximum (hrs)	Average (hrs)
Participants			
Phone (n=9)	0.3	1.6	1.1
Property (n=27)	0.5	2.0	1.1
Other location (n=9)	0.5	1.5	1.1
Non-participants			
Phone (n=9)	0.4	1.4	0.8
Property (n=20)	0.5	2.8	1.2
All respondents			
Women (n=28)	0.3	2.0	0.9
Men (n=37)	0.5	2.8	1.1
Couples (n=9)	0.8	1.5	1.1
Total (n=74)	0.3	2.8	1.1

3.3.4.1 Theoretical Saturation

Broadly, the concept of theoretical saturation was employed in the administration and interpretation of the survey. Within grounded theory, theoretical sampling is the concurrent collection, coding and analysis of data that determines the direction and location of the search for new information (Glaser and Strauss 1965). Theoretical saturation is a part of this process and occurs when "all categories are well developed in terms of properties, dimensions and variations" (Corbin and Strauss 2008, p. 263). After approximately 12 landholders had been interviewed, however, the responses did not reveal any particularly new or relevant information (theoretical saturation). A greater number of non-participants (n=29) were interviewed because they spanned the three case study regions and so it took a greater number of individuals to be interviewed to derive comprehensive results, given the context variability.

3.3.5 DATA ANALYSIS

3.3.5.1 Quantitative data analysis

The basis of the quantitative data analysis was univariate descriptive analysis. This approach is commonly used to summarise the characteristics of a phenomenon based on the distribution of variables (Blaikie 2003). The aim is to identify relationships between variables. Frequency tables were used for much of the data presentation, particularly due to the small numbers of respondents in each case study. Chi-square tests were used

in this analysis, which compare the frequency that is observed in certain categories with the frequencies that would be expected in those categories (Field 2009)[1]. When the expected frequencies for the chi-square tests were less than five, Fisher's exact test was used. The statistics results presented for the chi-square include the test statistic (χ^2); the degrees of freedom (df); and the statistical significance (p). For Fisher's exact test only the test statistic (χ^2) and the statistical significance (p) are presented.

3.3.5.2 Qualitative data analysis

Memos & coding

The data analysis methods of grounded theory were used in this research (Glaser and Strauss 1965). Grounded theory emerged during Glaser and Strauss' work on the experience of dying hospital patients in the 1960s, and involved an explicit approach to the analysis of qualitative data. In particular, the approach employs the use of memos and codes to analyse qualitative data. Memos are written records of analysis (Corbin and Strauss 2008) and are used to extract major concepts from the qualitative responses, which are then developed in terms of their dimensions and properties (Corbin and Strauss 2008). Codes are developed to detect the expression of the major concepts in each response. Coded responses are categorised according to the most applicable major concept. Within the result section, quotes are presented from different landholders to illustrate the various dimensions of each concept.

3.3.5.3 Reliability and validity

The reliability and validity of a survey are integral to its use and application to ensure that the survey actually measures what it was designed to measure. Reliability refers to the consistency of the various measures of a concept and includes internal reliability and inter-observer consistency (Bryman 2008). Internal reliability is particularly important to closed-ended questions and ensures that respondents consistently answer items that aim to measure the same concept or idea. Inter-observer consistency relates to situations when multiple individuals are involved in the subjective judgement of the collection, analysis and interpretation of data. To overcome these reliability challenges, the pilot phase of the research program involved multiple questions that assessed the

[1] Chi-square tests are particularly useful for categorical data because these data cannot be normally distributed; only ordinal or continuous variables have the potential to be normally distributed. The use of frequencies therefore is a statistical test that can be performed on categorical data, that does not rely on using distributions.

same topic. Items that consistently measure the same responses were considered to be reliable; the most directly worded item was included in the survey. Items that the pilot landholders did not immediately understand were either omitted, or reworded in conjunction with the landholder. I was the only research involved in data collection, analysis and interpretation, which prevented problems related to inter-observer inconsistency.

There are three types of validity that can apply to surveys. Construct validity relates to the use of correct measures for concepts being examined. Internal validity refers to the ability of a survey to predict cause and effect. This type of validity is not relevant to descriptive case studies (Yin 2009). External validity refers to the context in which the research findings can be applied. To meet construct validity requirements, pilot interviews were conducted to ensure that the correct language was used and that questions related to the dominant themes that relate to conservation program participation. To ensure external validity, the three case studies were selected across different bioregions (Wet Tropics, Desert Uplands, Einasleigh Uplands), land uses (cattle grazing, dairy and conservation) and involved both conservation program participants and non-participants which allowed for a more complete range of barriers to program participation to be included. Moreover, the survey was designed upon an extensive literature review so that comparisons of the data in this research may be compared with similar studies.

During the research, several protocols were developed to improve the reliability and validity of the survey. For example, when answering questions that related to their finances, landholders were asked to consider explicitly the last 5 years (Appendix 1A, Appendix 1B, items S1-S5). When terminology could be interpreted differently, such as native vegetation, a decision was made as to what the terminology was to referring to. Given that the interviews were conducted in person, there were frequent discussions, between the respondent and the interviewer, around the themes and concepts of the survey, which provided clarity regarding the response of landholders to the questions. Moreover, items were grouped together so the respondent understood what aspect of their personal circumstances, program participation, demographics or decision-making were being discussed at any point during the interview.

To assess the reliability of the coding process, 40% of the total number of responses to each of the qualitative questions were coded first by myself and then by a second researcher. We assigned the same concepts for 70% of the responses. When different concepts were applied to a response, we discussed and modified the coding strategy to increase the reliability of the data analysis. Some coded responses could have been assigned to more than one concept; concept selection was made on the basis of the first response if two brief responses were provided to a single question, or when longer responses were provided, the response that was discussed for the longer period of time.

3.4 PROGRAM SELECTION & CASE STUDY CHARACTERISTICS

Conservation programs were selected on the basis of the policy instruments used in their design. Three north Queensland programs were selected that employed voluntary, direct-payment and market-based instruments (Table 3.5). The programs had each been implemented for at least two years, which allowed participants to have had some program experience. This final section discusses the regional characteristics of the case study areas and the development and implementation of the selected case study programs designed to enhance conservation outcomes within each region.

3.4.1 CASSOWARY COAST CONSERVATION COVENANT RATE DEFERRAL SCHEME

The former Johnstone Shire Council (JSC)[1] covered 1,639 km^2, and was located within the Wet Tropics bioregion. The bioregion is characterised by tropical rainforest, extensive low lands, floodplains, beach scrub, tall open forest, and mangrove communities (National Land & Water Resources Audit 2008). Within the Wet Tropics bioregion, there are 20 National Parks, and five Conservation Parks that include 73% of regional ecosystems and account for 19% of the bioregion (National Land & Water Resources Audit 2008). Almost half of the former JSC (47%) is classified as World Heritage Area, managed by the Wet Tropics Management Authority (Figure 3.4). The remainder of the Shire was freehold and crown land. Dominant land uses in JSC included forest (54%), pastures and grazing (28%), sugar cane (12%), horticulture (2%), and rural residential and urban areas (2%) (Johnstone Shire Council 2005). The major towns and centres of the Shire were Innisfail, Silkwood, Mena Creek, El Arish and

[1] The Johnstone Shire Council amalgamated with Cardwell Shire Council in 2008 and is now known as the Cassowary Coast Regional Council.

Mission Beach and the population was approximately 19,500 (Johnstone Shire Council 2006). The economy of the Council area was based on agriculture and grazing. The majority of the population was employed in primary industries, although the tourism and manufacturing industries were expanding (Johnstone Shire Council 2006).

Fifty regional ecosystems were recorded within the Shire (Johnstone Shire Council 2005) . Many of these ecosystems continue to be threatened by human activities, including historical and recent vegetation clearing and fragmentation, urban and industrial development, agriculture, and alterations to water tables and natural drainage systems (Johnstone Shire Council 2005).

Conservation on private land became a high priority for the Council in the early 1990s. As part of the Shire Development Plan process, a community survey and environmental audit were conducted by the Shire. Landholders and community groups stated in the surveys that rate rebates would provide a good incentive to conserve biodiversity on their property (Gordon 2008). These price-based policy instruments, such as rate rebates, taxes, subsidies, and penalties, assign monetary value to biodiversity and can be used to influence landholders' behaviour, typically with the support of regulation (e.g., legislation, quality standards) (Young, Gunningham *et al.* 1996). Based on the survey responses, and with funding from the Natural Heritage Trust, Council appointed a project officer and established a trial program that evolved into the Conservation Covenant Incentive Scheme. The aim of the program was primarily to protect habitat on private property for cassowaries (*Casuarius casuarius johnsonii*), an endangered flightless bird, and by offering a deferral "on the general rate for property owners who have entered into a covenant with Council to protect the habitat values of their properties" (Johnstone Shire Council 2003, Section 3).

A rate deferral was offered to landholders who were willing to place a conservation agreement or covenant on their property. A *conservation agreement* between the landholder and council is an ongoing agreement that can be revoked at any time during ownership or when the property is sold. A Deed of Novation is required to transfer the agreement to a subsequent owner, at the new owner's discretion. A *conservation covenant* is different to an *agreement* because it is perpetual and therefore cannot be revoked. The covenant is recognised under the *Land Titles Act 1994* and administered

by the Department of Environment and Resource Management (DERM). Conservation covenants are voluntary agreements that commit landholders to conserve a portion of their land primarily for biodiversity conservation (Harrington, Lane *et al.* 2006); there are over 2,000 such covenants on private land across the country (Stephens, Lambert *et al.* 2002). Participants were prohibited from removing native vegetation within the protected area and had to comply with contract specifications (e.g., dogs excluded from conservation areas); however, contract compliance was not monitored on an ongoing basis.

Landholders were provided with a reduction in their council rates (property tax) that was calculated by multiplying the percentage of the property under the covenant by a habitat classification score. Rate reductions for the eligible conservation component of the property ranged from 20% for potential linkage habitat (e.g., unconnected remnant patches with low levels of biological) to 60% for critical habitat (e.g., rainforest patches that connect multiple properties with high levels of biodiversity essential for cassowary survival and breeding), in accordance with habitat classifications based upon the council's Environmental Audit and Conservation and Biodiversity Strategy (Appendix 3, Table A3.1). The rate reduction value was calculated and subtracted from the council rates each year. Landholders who withdraw from an agreement had to repay the Council for the number of years they received the rate reduction, up to a maximum of 10 years, including interest and administration costs. In total, the covenants and agreements protected 20.2 km^2 on 52 properties and equated to a total cost of \$60,000/year (\$2,970/ km^2/year) (pers. comm. Gordon 2008).

3.4.2 DESERT UPLANDS LANDSCAPE LINKAGES PROGRAM

The Desert Uplands bioregion covers 27,850 km^2 in central Queensland and is primarily eucalypt and acacia woodlands (Rolfe, McCosker *et al.* 2008). Within the Uplands, there are five National Parks, and two reserves that include 27% of regional ecosystems and account for 2.3% of the bioregion (Bastin and ACRIS Management Committee 2008). The bioregion is characterised by low rainfall, thin and infertile soils and an arid climate (National Land & Water Resources Audit 2008). The dominant land use (94% of the total land area) is beef cattle grazing and some sheep grazing (Bastin and ACRIS Management Committee 2008); small areas of mining and conservation represent two

minor land uses in the bioregion (Desert Uplands Committee 2010). The major towns in the bioregion are Barcaldine, Jericho, Alpha, Hughenden, Prairie, Torrens Creek, Pentland, Aramac, and Muttaburra. The population of the Desert Uplands is approximately 6,000 (Desert Uplands Committee 2010). These individuals primarily live and work in the townships or on the pastoral stations.

One of the highest tree clearing rates in Queensland has been observed in the Desert Uplands (National Land & Water Resources Audit 2008). Clearing activities for intensive agriculture was traditionally confined to the *Acacia* communities that persisted on heavy soils but has more recently included eucalypt woodlands on infertile sand plains. Grazing and tree clearing therefore represent the major threats to ecosystems in the Desert Uplands: 29 regional ecosystems are classified as vulnerable and 14 regional ecosystems are endangered (National Land & Water Resources Audit 2008). Visible environmental degradation exists in the Uplands from overgrazing, historical and recent tree clearing, and weed infestation (National Land & Water Resources Audit 2008; Rolfe, McCosker *et al.* 2008).

Conservation has been the priority of the Desert Uplands Build-up and Development Committee (DUC), which was formed in 1995 to manage the unique environmental, social and economic problems that landholders experience in the Desert Uplands bioregion (Figure 3.4). The DUC is comprised of local community members, including landholders and government, who meet to discuss regional problems and administer land management programs. The DUC has administered several conservation projects, such as Advancing On-Ground Nature Conservation (110 projects, $1.17 million), National Landcare and Envirofund projects (37 projects, $765,000), Property Management Planning ($150,000), and Blueprint For The Bush Weed Project ($440,000).

The DUC also designed and delivered the market-based Landscape Linkages program, which was selected as a case study for this research. Market-based policy instruments are used in this context provide financial support for desired environmental outcomes. These instruments include modifications to property rights, taxes, or, as in this case, the creation of a market for a product that has at least one buyer (DUC) and at least one seller (landholders) (Young, Gunningham *et al.* 1996). The 2-year program aimed to

improve a vegetation corridor to increase species richness and the connectivity of native vegetation between properties (Windle, Rolfe *et al.* 2009). A competitive closed-auction process was used, whereby landholders proposed a price they would accept to improve the condition of vegetation on a portion of their property through reduced intensity of livestock grazing in three bidding rounds. The three bidding rounds let participants know the value of the other bid proposals to improve the competitiveness of their own bid, and to maintain competitive pressure on pricing (Windle, Rolfe *et al.* 2009). The final offer was converted to a relative bid value by dividing it by an environmental benefits score. Environmental benefits scores were calculated on the basis of the extent of corridor linkage (e.g., area to be conserved, connection to private conservation areas or national parks), type of biodiversity (e.g., ecosystem diversity, habitat for threatened or endangered species), and health and quantity of vegetation (e.g., perennial ground cover, biomass of vegetation in areas used as pasture, presence of invasive non-native species, diversity of tree and shrub species) (Windle, Rolfe *et al.* 2009) (Appendix 3, Table A3.2). The relative bids that would generate the greatest environmental benefit for the least cost were accepted. The program protected 850 km^2 of native vegetation on 15 properties for a total of $350,000 ($411/km^2/year) (Windle, Rolfe *et al.* 2009). The local natural resource management group, the Burdekin Dry Tropics (now the North Queensland Dry Tropics), secured the funding in 2006 to support the project (Windle, Rolfe *et al.* 2009). Three assessments of vegetation condition were conducted on each property over the two years of the program. Landholders received an upfront payment of 40%, and an additional 30% at the end of the first and second years but only if the program conditions had been met.

3.4.3 Department of Environment & Resource Management Nature Refuge Program

The Department of Environment and Resource Management (DERM) administers the Nature Refuge Program. This program is an ongoing and state-wide program; only those participants who were in the Wet Tropics (section 3.4.1), Desert Uplands (section 3.4.2) and Einasleigh Uplands bioregions were selected to be involved in this research. This approach ensured that inter-regional differences were minimised and did not confound the findings of the research. The Einasleigh Uplands cover 46,300 km^2 and is dominated by ironbark eucalypt woodlands. Within the Einasleigh Uplands, there are 10 National Parks, three Resource Reserves and two Conservation Parks that include

35% of regional ecosystems and account for 2.42% of the bioregion (National Land & Water Resources Audit 2008). This bioregion connects the Desert Uplands to the Wet Tropics and straddles the Great Dividing Range which creates a unique climate and contains the upper catchments of large rivers that drain into the Gulf of Carpentaria (north) and the Pacific Ocean (south) (National Land & Water Resources Audit 2008). The Uplands comprise mainly leasehold lands that are used largely for grazing, with some cropping, horticulture and mining (Bastin and ACRIS Management Committee 2008). The major towns in the Uplands are Charters Towers, Mareeba, Croydon and Georgetown. Overall, the condition of the bioregion is declining: 23 regional ecosystems are vulnerable (15% ecosystems) and one is endangered (0.8% of ecosystems). The main threats to biodiversity in the region are grazing pressure, historical and recent broad-scale clearing, exotic weeds and changed fire regimes (National Land & Water Resources Audit 2008).

Nature Refuges were introduced in the Nature Conservation Act QLD (1992) to conserve the area's significant cultural and natural resources and provide for the controlled use of the area's cultural and natural resources (section 22) in the State of Queensland. The main aim of the program is to conserve areas of significant conservation value, such as ecosystems that support rare or threatened species, and ecosystems that are represented poorly in Australia's network of national parks (Figure 3.4). The Refuges are administered by DERM (formally the Environment Protection Authority (EPA)).

Landholders voluntarily apply for a Nature Refuge agreement. Voluntary policy instruments require a high willingness of landholders to protect and manage native vegetation at their own expense and can therefore represent a low-cost policy alternative. Similar conservation agreements have been used in other states of Australia (see Binning and Young 1997). They can reduce the regulatory burden on landholders and the cost of regulatory enforcement of government (Young, Gunningham *et al.* 1996); however, there can often be insufficient accountability or demonstrated environmental improvements (Cocklin, Mautner *et al.* 2007).

Officers at DERM approach, and are approached by, landholders who may have areas of high conservation value on their property (Appendix 3, Table A3.3). An officer

visits the property and undertakes a site assessment to determine the suitability of the property for the program. If areas of high conservation or cultural value are found, landholders are then invited to participate in the program. Each Refuge is bound by the standard Conservation Agreement as well as Schedule 4: Customised Conditions (Appendix 3, Table A3.3) (e.g., subdivision prohibitions, permissions for multiple use and production activities) that are negotiated between the officer and landholder. The Nature Refuge program relies on "community attitudes that value conservation objectives [and which are] integrated with day-to-day natural resource management" (Wells, Williams *et al.* 1995, p.221). As at December 2009, 351 landholders had signed perpetual conservation agreements, which protected 9,146 km^2, by December 2010 those figures had increased to 376 perpetual conservation agreements, protecting 20,780 km^2. There were 69 Nature Refuges in the Western[1] and Tablelands Regions[2] at the time the research was conducted (Figure 3.4).

Landholders can submit a request for financial assistance to conduct on-ground work, through the associated Nature Assist program, which will protect ecosystems and species, such as building fences or planting vegetation. Financial incentives, however, are not a guaranteed component of participation. Requests are granted on the basis of scores on an environmental-benefits index. The index includes the conservation value of the land, such as the presence of threatened species, the dollar amount of each request, and the overall value of the conservation outcome, measured as the best management outcome for the least cost. Approximately $5 million was granted to landholders in two rounds of funding in 2007–2008 ($547/$km^2$). Participants had to comply with the conditions of their agreement, such as excluding stock from conservation areas. Beyond an initial assessment, no formalized state-wide monitoring program had been implemented at the time of this research.

3.4.4 NON-PARTICIPANTS

The non-participants were located in various areas within the study area. Eight non-participants were recruited from the names of landholders provided by the Cassowary Coast respondents; three were recruited from the Desert Uplands respondents; and 18

[1] Western Region included the following Regional Councils: Flinders, Charters Towers, Etheridge, and Richmond.
[2] Tablelands Region included the following Regional Councils: Tablelands, Cassowary Coast, Cairns and Hinchinbrook.

were recruited from the Nature Refuge respondents. A low number of non-participants were recruited from the Desert Uplands respondents because only four respondents were willing to provide details of their neighbours. Nevertheless, many of the non-respondents who were recruited from the Nature Refuge respondents were located in desert areas, such as the western region of the Einasleigh Uplands who were similar to landholders in the Desert Uplands regions, in terms of property size, dominant land use, and distance to major towns.

Nine (31%) of the non-participant respondents I interviewed had been involved in at least one of 13 land management programs in the last five years, but which was not one of the three conservation agreement case study programs. Their participation demonstrates that they were not opposed to conservation programs in general. These programs were administered by the federal (*n*=2) or state government (*n*=3), non-government organisations (*n*=4) and natural resource management organisations (*n*=4). Respondent participation was rewarded with financial incentives for on-ground work in each case; they did not have to apply a covenant or management agreement to any part of their property. Most (*n*=7; 78%) of these respondents were production landholders (see section 7.2).

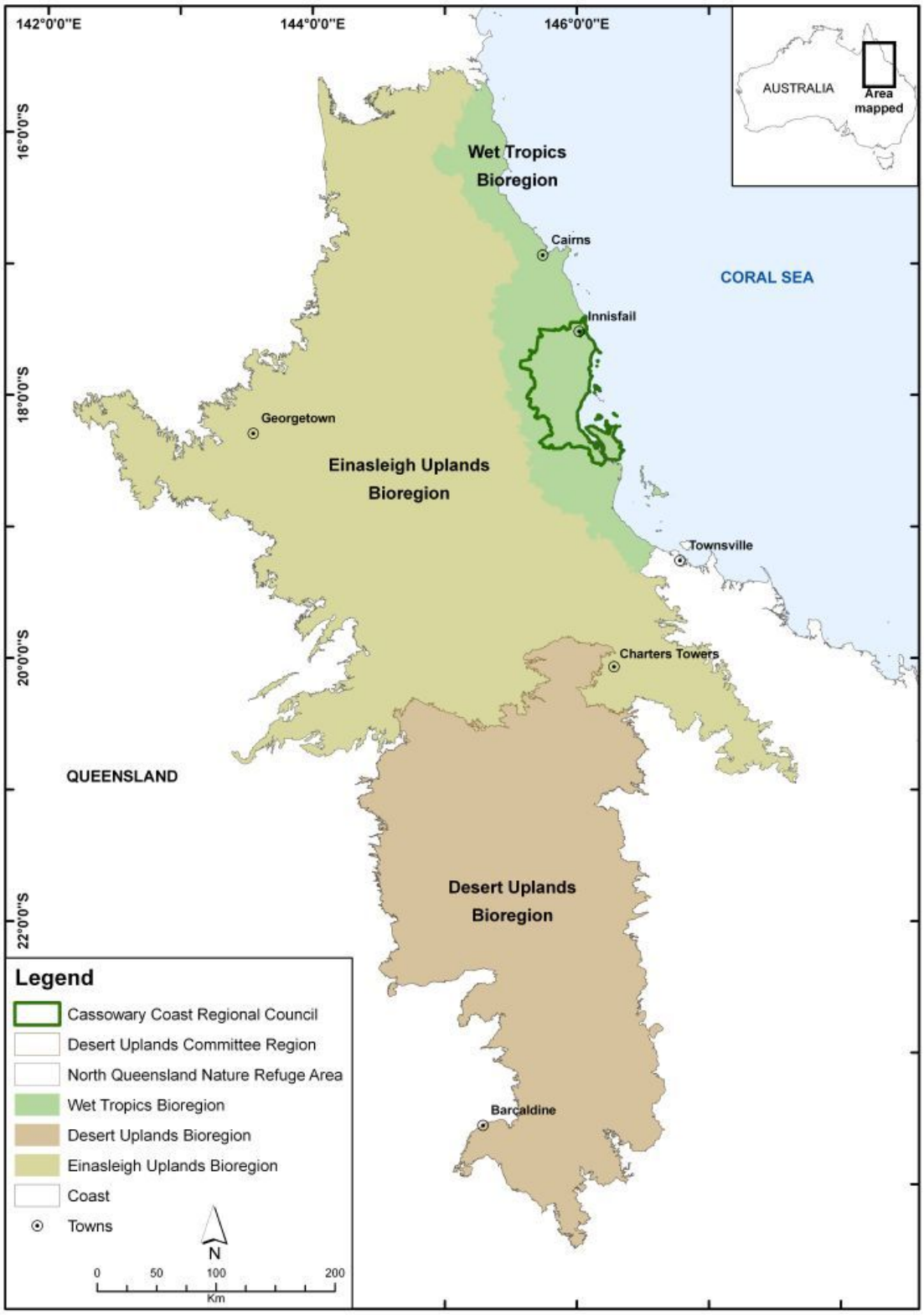


Figure 3.4: Map of the case study regions.

Table 3.5: Summary of the characteristics of the conservation programs.
The table highlights the similarities and differences of the programs and provides contextual information on the location of program implementation.

		Program	
Variable	**Cassowary Coast**	**Desert Uplands**	**Nature Refuge**
Policy instrument	Price-based: rate reduction, price determined by the program administrator	Market-based: tender scheme, price determined by landholders in the marketplace	Voluntary
Administrator	Local government	Non-government bioregion committee	State government
Bioregion	Wet Tropics	Desert Uplands	Wet Tropics, Desert Uplands, Einasleigh Uplands
Human population	30,800	6,000	Approx. 20,000[a]
Ecosystems	Tropical rainforest, low lands, floodplains, beach scrub, tall open forest, mangrove communities	Eucalypt and acacia woodlands	Ironbark eucalypt woodlands[a]
Dominant regional land use	Beef livestock grazing, sugar cane, horticulture	Beef livestock grazing, sheep grazing, mining	Beef livestock grazing, cropping, horticulture, mining[a]
Main activity affecting native vegetation retention	Vegetation clearing, residential and industrial development	Vegetation clearing, intensive livestock grazing	Vegetation clearing, intensive livestock grazing, controlled burns/fire suppression
Program area (km^2)	4,700	68,850	1,852,642[b], 189,706[a], 263,256[c]
Program duration	1998 - present	2006-2008	1992 – present
No. program participants	52	15	66[c]
No. respondents	14	14	17
Production landholders[d]	2	13	7
Non-production landholders[d]	12	1	10
Avg. property area (km^2)[e]	0.24	158.91	211.63
Min. property area (km^2)[e]	0.008	14.16	0.32
Max. property area (km^2)[e]	0.689	291.37	1000

[a] In the Einasleigh uplands.
[b] Entire state of Queensland.
[c] Area of the combined case study region that include the entire Wet Tropics, Desert Uplands and Einasleigh Uplands bioregions.
[d] Production landholders use the land to derive an income; non-production landholders do not use the land to derive an income.
[e] Area of properties of the participants who were involved in our research.

CHAPTER 4
HOW CONSERVATION PROGRAM PARTICIPANTS DIFFER[1]

In this chapter, I outline how the social characteristics of conservation program participants differed. I explain that the heterogeneity of the social characteristics of the respondents was related to their dominant land use, that is, whether they used the land for production or non-production purposes. Respondents' revealed preferences for policy instruments are used to inform conservation program design on the basis of dominant land use.

4.1 INTRODUCTION

Policy instruments are used in the design of conservation programs to guide the distribution of incentives and provide education and a regulatory framework. Instruments are selected on the basis of many factors, such as landholder willingness to change their behaviour, rights and responsibilities of landholders, available funding, and the agency's familiarity with the instrument (Young, Gunningham *et al.* 1996). Program administrators, however, may lack the administrative capacity to take a systematic approach to the design of conservation programs and may fail to use policy instruments that are consistent with landholders' needs, economic conditions, and attitudes toward land management (Tarlock 1993; Press, Doak *et al.* 1996). These agencies may be able to offer only one conservation program, treating landholders as a homogenous rather, than a heterogeneous group of individuals (Kuehne, Bjornlund *et al.* 2007). Consequently landholders may choose not to participate in these one-size-fits-all programs because they consider them irrelevant to their personal needs and circumstances.

Classifications, or typologies, operate to "synthesise a complicated reality in order to make it more comprehensible" (Kostrowicki 1977, p. 36), and provide a straightforward approach to assist agencies with the design and implementation of conservation

[1] Moon, K. and Cocklin, C. (in press). A landholder-based approach to the design of private-land conservation programs. *Conservation Biology.*

programs (Chamala 1987; Guerin 1999; Howden and Vanclay 2000; Emtage, Herbohn *et al.* 2006). Classifications are descriptive tools that allow for advanced conceptualisations, reasoning and data analysis by ordering or grouping individuals or entities on the basis of their similarities and differences; a good typology will allow program administrators to easily and efficiently identify and compare types of landholders (Bailey 1994). Classifications, therefore, collate crucial socio-psychological and economic information about the landholding population, who may be presumed to make similar land management decisions, which can be used by program administrators to tailor their programs to increase participation and conservation outcomes (Emtage, Herbohn *et al.* 2006; Emtage, Herbohn *et al.* 2007; Bohnet, Roberts *et al.* 2011; Greiner and Gregg 2011).

Constructive typologies for example, are simple classifications that are used to make generalisations about the differences and similarities of societies on the basis of the most commonly found traits (Becker 1940; McKinney 1966). Land use, specifically whether landholders derive an income from the land (i.e., production landholders [e.g., livestock grazing, fruit crops]) or not (i.e., non-production landholders [e.g., conservation, hobby farming]), represents a constructive typology, relevant to the conservation of biodiversity on private land. This classification is particularly useful to agencies responsible for increasing biodiversity conservation on private land because they can readily establish whether land is being used for production, or not, on the basis of property size and location, zoning, satellite imagery, and the familiarity of staff with local land uses (Moon and Cocklin 2011).

Whether a landholder uses the land for production or non-production can influence their personal and property goals, and thereby their willingness to participate in conservation programs. Production landholders, for example, may seek to improve the productive capacity of their land, preserve a reasonable standard of living from their production activities without having to obtain off-property income, maintain livestock and crops in good condition, and have a satisfying rural lifestyle (Malcolm, Makeham *et al.* 2005). Before conserving native vegetation as part of a formal agreement with a government or other institution on their lands, production landholders often consider the opportunity and management costs of retaining that vegetation (Cary and Wilkinson 1997) because such actions may impinge substantially on the use of land for production and may

reduce their income (Productivity Commission 2004). In contrast, non-production landholders often want to restore attributes of the land, improve the attractiveness of the property by planting trees, or isolate themselves from urban society (Hollier and Reid 2006; Pannell and Wilkinson 2009). Non-production landholders may be less reliant on financial incentives to motivate them to participate in a conservation program.

There are three primary sets of variables that describe landholders' personal circumstances (financial security, education and knowledge, lifestyle and wellbeing), which can be quantitatively measured, and have been demonstrated to explain landholders' capacity to participate in different conservation programs. For example, landholders whose income is uncertain may prefer short-term, low-risk programs that do not require major changes to their land-use practices (Petrzelka, Korsching *et al.* 1996). Formal education increases the likelihood that landholders can obtain off-property employment, which can provide the landholder with additional income and thereby reduce the financial risk of program participation (Cary, Webb *et al.* 2002). In contrast, regular attendance in short courses and informal education programs on land management can have direct effects on conservation on private lands. For instance, exposure to agricultural innovations and awareness of their application can increase their adoption (Cocklin, Mautner *et al.* 2007). Health and lifestyle considerations, such as care of ill or elderly family members, holidays, leisure pursuits, and other social obligations can reduce the relative importance of conservation activities and result in non-participation (Pannell, Marshall *et al.* 2006). Stress is a health variable that can reduce participation, particularly as it relates to time pressures (Pannell, Marshall *et al.* 2006). Full-time production landholders may reject programs that are time consuming, involve extra work at busy and inconvenient times, or inhibit production (Klapproth and Johnson 2001). Additional demographic variables are useful in providing important contextual information (Table 4.1).

An individual's worldview (e.g., norms and attitudes), that is how they interpret the world and create a social reality that guides their expectations of society and themselves (Pirages and Ehrlich 1974), may explain landholder participation in conservation programs. Norms are beliefs about how an individual is expected to act (Ajzen and Fishbein 1970), according to either perceived societal expectations (social norms) or their own personal beliefs (personal norms). Social norms can explain behaviour when

there is community pressure for landholders to participate in conservation activities (Ajzen and Fishbein 1970) or when an individual perceives they will benefit from collective social action (Ellickson 1991). For example, if the majority of landholders in a catchment improve the condition of riparian vegetation on their property, then individual landholders are likely to benefit from improved water quality. Personal norms can also explain behaviour, given that many land management decisions are made on the basis of the individual and the relative costs and benefits they will incur (Vandenbergh 2005). Attitudes can explain landholders' willingness to participate in conservation programs in general (Beedell and Rehman 2000) or their commitment to vegetation retention or the protection of a particular species (Winter, Prozesky *et al.* 2007).

Despite the usefulness of typologies in conservation program design, there remain several criticisms. Typologies can be susceptible to bias. For example, they may disguise or downplay potential commonalities between landholders' attitudes and practice and instead highlight differences; define landholders within one class as homogenous, when they may display a range of subjectivities (i.e., the landholder is not necessarily a coherent individual); and class landholders as mutually exclusive types that can limit a discussion on the interplay between the elements that comprise the different types (Fish, Seymour *et al.* 2003). Moreover, classifications can be pre-selected and imposed from the basis of a particular theoretical position (Vanclay 1998); differ in their units of analysis (e.g., landholder, household, production business) (Whatmore 1994); and are only as good as the variable on which they are based, making it crucial that the defining characteristics of the phenomenon are identified (Bailey 1994). Often, landholders are unaware of the different typologies, or styles of farming, in their region and may not even understand the characteristics of their own 'style' (Mesiti and Vanclay 1997; Howden, Vanclay *et al.* 1998; Howden and Vanclay 2000). More fundamentally, typologies "differ significantly in terms of the assumptions they embody about how social phenomena should be conceptualised and explained. These differences centre on the relationship between observation (empirical), representation (experience) and theory explanation" (Whatmore 1994, p. 32).

Irrespective of the theoretical limitations of classifications and typologies, they can nonetheless be useful in providing contextual information on the landholding population

to assist time- and budget-constrained agencies to improve program design. Of particular relevance to program design is the revealed preferences of production and non-production landholders for different policy instruments.

4.2 Overview of methods

Quantitative data, of participants in the Cassowary Coast, Desert Uplands and Nature Refuge programs, was used in this analysis. Because the number of participants in each of the programs was small, statistical analyses were used to identify differences between the participants, rather than to describe the broader population that the participants were sampled from.

Respondents were classified according to whether or not they derived an income from production activities (e.g., cattle grazing, dairy farming, fruit production) on their property. Production landholders represented those respondents who relied on the land for more than 50% of the household income and/or used more than 50% of their property from production activities, namely beef grazing (n=22). Non-production landholders represented those respondents who did not derive an income from production-related activities and used more than 50% of the land for formal conservation (n=20), informal conservation, such as remnant vegetation retention (n=2), and hobby farming (n=1).

Here, a preference for a program refers to a landholder's preference to participate in their particular program, not their preference among the range of programs because all three programs were not available to every landholder.

Refer to Chapter 3 for full details of the methods used in this research.

4.3 Results

4.3.1 Program participation and incentive preference

Production landholders participated in the short-term Desert Uplands program that offered large financial incentives (n=12, 86%), whereas non-production landholders

participated in the Cassowary Coast program that offered low-cost financial incentives (n=12, 86%) and the voluntary Nature Refuge program that offered no direct financial incentive (n=10, 59%) (χ^2=17.9, df 2, p<0.01). The majority (n=19, 83%) of non-production landholders, however, received either a council rate reduction or one-time payment for conservation work completed on their properties as part of the Nature Refuge program.

There was a significant difference between the proportion of land that production and non-production landholders placed under the conservation agreement (Figure 4.1). The majority of production landholders placed less than 25 % of their property under the agreement (n=12, 55%), and non-production landholders placed more than 75 % of their property under the agreement (n=15, 65%) (χ^2=25.2, p<0.01). Yet, production landholders' properties were significantly larger than non-production landholders' properties (χ^2=36.4, p <0.01), so the average area conserved by each group was 42 km^2 and 27 km^2, respectively.

The most preferred incentives, out of six different incentive options, for production landholders were monetary (n=13, 62%), and provision of materials (e.g., trees or fencing materials) (n=7, 37%). Non-production landholders demonstrated a greater diversity in their preferred incentives. Monetary and educational incentives were equally the most preferred (n=8, 36%), followed in decreasing order by provision of monitoring (n=6, 27%), labour (n=6, 27%), and materials (n=5, 25%). The least preferred incentive of production landholders (ranked in last place) was provision of labour (n=7, 37%), whereas the least preferred incentive of non-production landholders was monetary incentives (n=7, 35%) (i.e., one-third of non-production landholders preferred monetary incentives the most and another third preferred monetary incentives the least).

4.3.2 FINANCIAL SECURITY

Production landholders' financial security was less certain than non-production landholders', as measured by their reliance on the land for income, their struggle to repay loans, and the effect of increasing production costs on the profitability of their production activities. Production landholders were significantly more likely than non-

production landholders to derive an income from their property (χ^2=26.3, p<0.01). The majority of production landholders (59%, n=13) drew over 75 % of their income from the land, whereas non-production landholders (n=23, 100%) did not earn any income from production activities on the property. Three landholders (13%) did derive an income from non-production activities: accommodation and eco-tourism operations. Correspondingly, production landholders worked significantly longer hours on the property than non-production landholders (χ^2=14.5, p<0.01) and often worked more than 30 hours/week on the property (n=15, 68%). Those respondents who worked fewer hours employed farm labourers or worked in the mining industry. Non-production landholders largely worked fewer than 20 hours/week on their property (n=14, 61%). Production landholders (n=9, 43%) found it significantly more difficult to repay their loans than non-production landholders (n=1, 5%) (χ^2=9.6, p<0.01); the latter tended to earn off-property income or owned their property outright. The majority of production landholders, however, did derive enough income from the property to support the household (n=11, 55%), whereas non-production landholders did not (n=22, 100%) (χ^2=18.7, p<0.01). Most of the production landholders (n=17, 77%) said that increasing production costs, such as the price of fertiliser, represented a challenge that could directly affect their ability to produce an income.

4.3.3 EDUCATION

Formal education was correlated between groups and with off-property income. Non-production landholders had significantly higher levels of education than production landholders (χ^2=16.2, p<0.01). The majority (n=14, 61%) of non-production landholders had university degrees, whereas less than one-fifth (n=4, 18%) of production landholders had university degrees and half (n=11) had attended secondary school, but not all had graduated. Across all programs, formal education was significantly positively correlated with landholders' off-property income (χ^2=21.4, p=0.025). Respondents who obtained education up to the secondary school level (n=8, 67%) earned more than 75 % of their income from the property. In comparison, the majority of landholders with undergraduate degrees (n=4, 80%) and graduate degrees (n=8, 60%) did not derive any income from the property.

Production landholders were significantly more likely than non-production landholders to attend training programs and short courses on land management practices (χ^2=8.6, p<0.01). The majority (n=17, 77%) of production landholders attended short courses every year; only one producer (5%) never attended courses. Less than one-third (n=9, 27%) of non-production landholders attended courses every year, and one-third (n=7, 30%) had never attended a short course.

4.3.4 LIFESTYLE & WELLBEING

Production and non-production landholders reported similar lifestyle and wellbeing circumstances. Both production and non-production landholders stated they were in good health (n=44, 97%) and believed they were accepted within and felt a part of their community (n=40, 89%), and most respondents were satisfied with the balance between time spent working and personal time (n=39, 90%). Production landholders (n=12, 55%) were more likely than non-production landholders (n=6, 26%) to have dependent children. Production landholders (50%, n=11) found living on the land significantly more stressful than non-production landholders (9%, n=2) (χ^2=10.2, p<0.01). One landholder's response to this closed-ended question was, "it is not living *on* the land that is stressful, but living *off* the land" (NR36-p[1]).

4.3.5 SOCIAL & PERSONAL NORMS

Social norms were not strongly associated with program participation for production or non-production landholders. For example, over half the production landholders (n=11, 58%) agreed with the statement, "Almost every rural landholder I know wants to improve the quality of their native vegetation." Yet, less than half (n=9, 41%) of non-production landholders agreed with this statement. One-third (n=7, 32%) of production landholders agreed with the statement, "I care what my neighbours think about my involvement in the program," and just over half (n=12, 57%) of non-production landholders agreed with the statement.

Conversely, personal norms were strongly associated with participation. Across all programs, respondents agreed with the following statements: "I feel a strong personal obligation to protect the environment (n=45, 100%)"; "I am willing to put extra effort

[1] See section 5.2 for details on how identifiers have been assigned to each respondent.

into managing native vegetation on my property (n=41, 91%)"; and "I would feel guilty if the condition of native vegetation on my property deteriorated (n=39, 87%)". Although the respondents tended to agree with these statements, there were significant differences in the strength of their agreement. For example, the majority (n=19, 83%) of non-production landholders strongly agreed that they feel a strong obligation, whereas the majority (n=14, 64%) of production landholders agreed (χ^2=10.5, p<0.01). Similarly, the majority (n=12, 52%) of non-production landholders strongly agreed that they would feel guilty, whereas the majority (n=15, 68%) of production landholders agreed (χ^2=6.3, p<0.01).

4.3.6 ENVIRONMENTAL ATTITUDES

Overall, production and non-production landholders held similar environmental attitudes. They did, however, differ significantly in the strength of their response to seven of the 15 attitude items. Non-production landholders tended to express stronger and more pro-environment views; they strongly agreed or strongly disagreed with the environmental attitude items, whereas production landholders agreed or disagreed (Table 4.2).

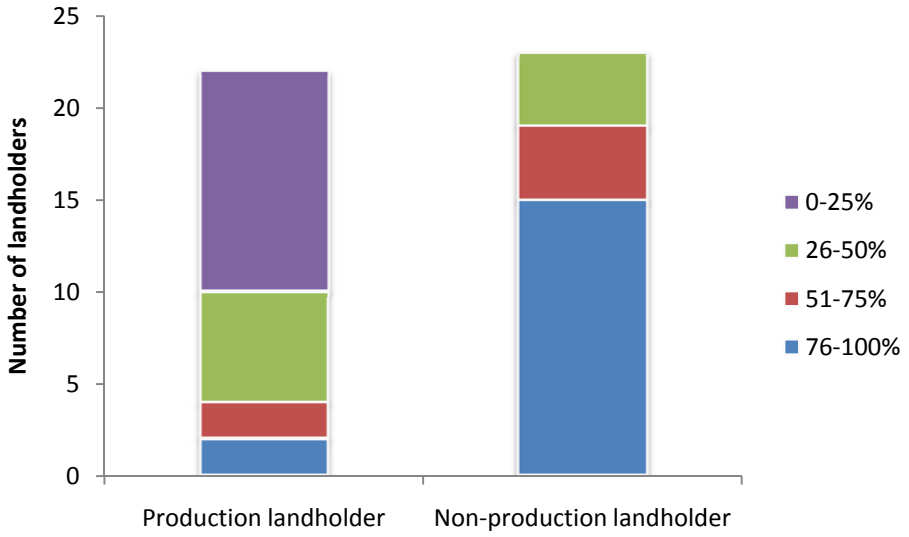


Figure 4.1: Percentage of property that respondents' committed to the conservation agreement/covenant

Table 4.1: Relationship between the demographics of production and non-production landholders[a].

Variable	χ^2	df	*p*-value	Comment
Gender	1.32		0.55	slightly more production landholders were male (n=11; 50%): 3 couples, 8 women; slightly more non-production landholders were female (n=12; 52%)
Age	12.16		0.03[b]	majority of production landholders were younger than 50 years (n=14; 64%); non-production landholders were on average older than 50 years (n=19; 83%)
Land tenure[c]	18.51		<0.01[b]	production landholders held leasehold land (n=13; 59%); non-production landholders held freehold land (n=22; 96%)
Property succession 1[d]	6.32	1	0.01[b]	previous generation of production landholders (n=9; 41%) were more likely to have owned or leased the property than non-production landholders (n=2; 9%)
Property succession 2[e]	1.26	1	0.26	next generation of production landholders (n=13; 65%) were more likely to own or lease the property than non-production landholders (n=10; 48%)
Landcare participant[f]	0.795	1	0.37	fewer production landholders (n=5; 23%) were members of Landcare than non-production landholders (n=8; 35%)

[a] Production landholders use the land to derive an income; non-production landholders do not use the land to derive an income.
[b] Significant: $p<0.05$.
[c] Freehold land: individual or organisation has title and possession; leasehold land: individual or organisation has only possession.
[d] Previous generation of the family owned or leased the property.
[e] Next generation of the family likely to own or lease the property.
[f] Landcare is a national network of community-based groups that aim to repair and viably manage natural resources.

Table 4.2: Items in the new ecological paradigm attitude scale and mean values of production and non-production[a] attitude scores.

Item [b]	Production landholders [c]	Non-production landholders [c]	Fisher's exact test	*p*-value
Humans have the right to modify the natural environment to suit their needs.	2.5	2.3	1.54	0.86
The Earth has plenty of natural resources if we just learn how to develop them.	2.4	2.0	6.04	0.05
Human ingenuity will insure that we do NOT make the Earth unlivable.	2.4	2.2	3.39	0.29
We are approaching the limit of the number of people the Earth can support.	2.7	3.3	7.81	0.04[d]
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	2.0	1.6	6.54	0.03[d]
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	2.4	1.8	6.75	0.06
When humans interfere with nature it often produces disastrous consequences.	2.7	3.3	9.96	<0.01[d]
Humans are severely abusing the environment.	2.8	3.3	8.90	0.02[d]
Humans were meant to rule over the rest of nature.	2.0	1.5	9.25	0.01[d]
Plants and animals have as much right as humans to exist.	2.9	3.3	6.45	0.04[d]
Humans will eventually learn enough about how nature works to be able to control it.	2.0	2.0	0.37	0.91
Despite our special abilities, humans are still subject to the laws of nature.	3.1	3.3	1.33	0.72
The Earth is like a spaceship with very limited room and resources.	2.9	3.2	2.82	0.24
The balance of nature is very delicate and easily upset.	3.0	3.0	0.49	0.91
If things continue on their present course, we will soon experience a major ecological catastrophe.	2.4	3.3	15.33	<0.01[d]

[a] Production landholders use the land to derive an income; non-production landholders do not use the land to derive an income.
[b] From Dunlap *et al.* (2000).
[c] Mean values <2 denote disagreement; the closer the value is to1 the stronger the level of disagreement. Mean values >2 denote agreement; the closer the value is to 4 the stronger the level of agreement.
[d] Statistically significant ($p<0.05$).

4.4 DISCUSSION

There were several key differences and similarities between production and non-production landholders in this study that inform innovation-adoption theory. Production landholders used the land to derive an income, worked longer hours on their properties, had a greater commitment to informal education on land management, experienced higher levels of stress related to their lifestyle; and their properties were significantly larger than non-production properties. They were more likely to participate in short-term programs that offered large incentives, and conserved less than 25% of their

property. Non-production landholders demonstrated stronger personal norms and environmental attitudes regarding their role in conservation. They were more likely to participate in long-term programs that were voluntary or offered small financial incentives, and conserved more than 75% of their property. Both production and non-production landholders had high levels of wellbeing and lifestyle satisfaction, and held similar environmental attitudes.

These revealed preferences may be used to design production-based conservation programs. Financial incentives appeared vital for production landholders to participate in conservation programs. Production landholders are commonly business owners who seek to maximize profit through their production activities (Young, Gunningham *et al.* 1996). Financial incentives can therefore reduce the financial risk and uncertainty these landholders face when committing to conservation programs or activities (Nowak 1987); support adoption of new conservation practices without personal financial outlay (Lambert, Sullivan *et al.* 2007); provide partial compensation for a reduction in the amount of land in agricultural production (Ferraro 2001); and be a cost-effective way for governments to meet their conservation targets (Pence, Botha *et al.* 2003). The Desert Uplands Committee best met landholders' needs in this respect because the landholders were paid an average of $11,650/year in compensation for reducing or modifying stocking rates on a portion of their property. Second, production landholders had pro-environment attitudes, which suggest that threats to native vegetation and species richness did not result from anti-environmental attitudes but perhaps from landholders' personal circumstances. For example, the reduced ability of production landholders to repay their loans, their higher levels of stress, and external factors, such as increasing production costs or drought, may cause land degradation, through intensive livestock grazing, for example, implemented so that landholders could support themselves. Conservation programs that reduce the effects of these stressors, such as programs that are compatible with landholders' existing goals, practices, expertise, resources, infrastructure, and land use, may be preferred by production landholders (Kabii and Horwitz 2006; Pannell, Marshall *et al.* 2006). Third, production landholders' commitment to informal education indicated that programs that include information and short courses on land management may increase landholder participation and conservation outcomes.

Revealed preferences may also inform the design of conservation programs for non-production landholders. The strong pro-environment attitudes of non-production landholders indicated a higher willingness to participate in voluntary or low-cost conservation programs. In the United States, a survey of farmers revealed a significant relationship between low levels of property-derived income and strong conservation attitudes (Petrzelka, Korsching *et al.* 1996). Although voluntary programs can often be delivered inexpensively, low-cost financial incentives, such as tax deductions, can nonetheless provide landholders with essential funds to assist with conservation work (Pannell and Wilkinson 2009). Programs that allow participants to select from a range of incentives may be more appealing to non-production landholders because they had diverse preferences for program incentives. Examples include provision of labour to assist with revegetation activities or advice and guidance on sustainable land management (e.g., erosion control). Given their strong environmental attitudes, it may be possible to engage non-production landholders in perpetual conservation agreements. Non-production landholders, however, had smaller properties than production landholders, so the implementation of any program will likely be met with higher transaction costs, per area protected, because a greater number of landholders will be required to protect the same amount of vegetation (Pannell and Wilkinson 2009). Non-production land, however, may contain higher concentrations of rare or threatened species. Perpetual agreements will support the persistent reduction of threats to biodiversity (Margules and Pressey 2000) and will reduce costs associated with agreement renewals and recruitment of new participants.

Beyond the use of landholder typologies, there is a need to consider the capacity of local and regional agencies to implement and monitor well-designed conservation programs for private lands. For instance, success is often defined by government and researchers as policy outputs, such as regulations, programs, and expenditure, rather than the on-the-ground outcomes of those policies (Press 1998). Moreover, many monitoring regimes are expensive and complex and the metrics that are used to monitor program success can fail to measure biodiversity in an objective and repeatable manner (Jack, Kousky *et al.* 2008). Nevertheless, rigorous measurement and monitoring frameworks are required to assess whether outcomes are achieved, and when outcomes are not achieved, enforcement may be necessary (Kroeger and Casey 2007). A need also exists for collection, coordination, and communication of environmental

information and development of information systems at local, regional, and national levels (Dovers 1995). In countries such as the United States, where private (freehold) land management decisions are often controlled and regulated by local government, access to information can be limited, site specific, and geographically dispersed; also, there is often a disparity between the information required by local and regional government for land-use planning and the information produced by scientists (Theobald, Hobbs *et al.* 2000). Tools to build capacity should provide information, education, and resources that enable individuals, organisations, and agencies to make decisions and carry out relevant conservation activities (Broderick 2005). There may also be a need to extend strategies so that they include non-landholding citizens and groups (Schneider and Ingram 1990), and to engage civil society in collective action (Press 1998). Building relationships between agencies and landholders is essential to successful conservation of biodiversity on private land.

4.5 SUMMARY

The purpose of this chapter was to understand how the social characteristics of conservation program participants differed. Participants' social characteristics differed mostly according to whether they used the land for production or non-production. Production landholders revealed a preference for programs that offered financial incentives, were compatible with their land management practices and personal circumstances and that provided informal education. Non-production landholders revealed a preference for voluntary, perpetual conservation programs and were interested in receiving a range of low-cost incentives as part of their participation. Non-production landholders committed a greater proportion of their property to the conservation agreement.

CHAPTER 5
WHAT MOTIVATES AND LIMITS INVOLVEMENT OF PARTICIPANTS[1]

In this chapter, I outline what motivated and limited the involvement of conservation program participants. I present the results of qualitative data analyses, which revealed four main motivations to participate that influenced how landholders selected land to conserve. This chapter complements Chapter 4 by providing insights into landholders' decision-making processes and how those processes determine the extent of conservation outcomes derived from program participation.

5.1 INTRODUCTION

There is an extensive literature on what motivates landholders to adopt conservation programs and participate in conservation programs. Less consideration is given, however, to whether participation in a conservation program reflects a commitment to biodiversity conservation *per se*. For example, schemes that have relatively easy entry conditions to enlist enough landholders to 'make a difference', may only require landholders to make minimal changes to their land management practices. While this approach may generate high participation rates, environmental additionality may be low (Lobley and Potter 1998). That is, proxy indicators, such as participation levels, that are commonly used to measure program success (Morris and Potter 1995) may not be indicative of landholders' actual commitment to conservation.

The examination of external and internal sources of control may provide useful information on landholders' conservation commitment. External controls (e.g., financial incentives) may cause landholders to change their land management practices while they are receiving program incentives. But once the incentive is removed, they will likely revert back to their original behaviours (Frahm, Galvin *et al.* 2001). While participation in programs that offer external incentives may indicate a willingness to improve the natural environment, it could just as likely represent a 'goodness of fit'

[1] Moon, K. and Cocklin, C. (in press). Participation in biodiversity conservation: motivations and barriers of Australian landholders. *Journal of Rural Studies.*

between the program objectives and landholder's land management practices (Lobley and Potter 1998). Production landholders, for instance, may seek to find the right balance between conservation and income objectives (Claassen, Hansen *et al.* 2004). Essentially, high participation rates in programs that offer incentives may actually conceal extensive discrepancies in landholders' commitment to conservation (Morris and Potter 1995). Therefore, participation that is motivated by external controls does not necessarily indicate a commitment to conservation: conservation programs that offer incentives may successfully achieve short-term behaviour change but fail to engender a long-term commitment to conservation or land management practice change (Dwyer, Leeming *et al.* 1993). Social pressure, or norms, can represent another form of external control that may motivate participation in conservation programs, but which does not sustain conservation commitments, for example, when a highly influential conservation-proponent leaves the community (Cook and Berrenberg 1981; Black and Reeve 1993; Rogers 1995).

In contrast, internal control (e.g., attitudes, values) is predicted to have a stronger and more long-term influence on behaviour (Lepper, Greene *et al.* 1973). Strong pro-environmental attitudes have been correlated with participation in voluntary conservation programs (Black and Reeve 1993; Luzar and Diagne 1999; Beedell and Rehman 2000; Ewing 2001); a formal voluntary commitment is considered to be a central aspect of internal control (Katzev and Pardini 1987). Voluntary participation, then, may represent a greater commitment to conservation because there is no external reward and so it is more likely that enduring behaviour will result from the activation of internal controls. There is a risk, however, that program administrators who rely on engaging landholders who are motivated by internal controls will only serve to provide minimal additionality to biodiversity conservation on private land, because these landholders would probably have conserved the area in the absence of the program (Race and Curtis 2009).

Ultimately, participation in conservation programs does not necessarily imply a commitment to biodiversity conservation. Thus quantitative assessments of what motivates landholders to participate in biodiversity conservation program should be complemented by qualitative assessments of landholder motivations, to understand their *relative* commitment to biodiversity conservation. Such approaches may "lead to a re-

assessment of the value of different policy instruments" (Race and Curtis 2009, p. 2413).

5.2 Overview of methods

Qualitative data were used in this analysis for respondents who participated in the Cassowary Coast, Desert Uplands and Nature Refuge programs. The dominant land use of respondents was divided into two categories: production and non-production. These categories broadly reflected landholders' reliance on the land for income which can influence their decision to participate in conservation programs (Chapter 4).

Initially, memos and codes were developed separately for each of the three case studies. Many of the memos and codes, however, were the same across all three programs, and so the responses were combined. To aid in understanding the responses provided by the participants in the different programs, identifiers were been assigned to each respondent. A unique number was assigned to each respondent; *CC* denotes a respondent in the Cassowary Coast program; *DU* denotes a respondent in the Desert Uplands program; and *NR* denotes a respondent in the Nature Refuge program. Identifiers were also provided to denote the dominant land use of the respondents: *p* denotes a production landholder and *np* denotes a non-production landholder (see section 4.2 for details on the distinction between production and non-production landholders).

Refer to Chapter 3 for full details of the methods used in this research.

5.3 Results

5.3.1 Landholders' considerations for participation

Respondents were asked: *What is the single most important consideration you would make before applying to join a land management/conservation program?* Their main considerations were perpetual protection mechanisms of conservation agreements, property rights and property values, production and personal benefits, and program objectives.

5.3.1.1 Perpetual protection of biodiversity

Several Cassowary Coast non-production respondents stated they would consider how binding any agreement or covenant would be and whether it would provide perpetual protection for habitat on their property. These respondents wanted a covenant that would "preserve [nature] for future generations in a pristine condition" (CC5-np) and "oversee that no one cuts the trees down" (CC6-np), so that the "land would be protected, for the future generation to know what bushland is" (CC7-np).

5.3.1.2 Property rights & property values

Respondents across all programs, in particular those landholders in the Nature Refuge program, were concerned about how their participation may impinge upon their right to use and manage their land in the future. Respondents were not interested in participating in programs that "take away the landowner's rights to their place, [but that] they still have the final decision on how they manage the place because it's theirs" (DU45-p). Of course, "some people might consider the property would be devalued because of all the strings that are attached to it" (CC11-np). This view arises because you need to know "what you want to do with the land in the future and very carefully consider if you want to develop it. You have to think about resale and viability" (NR31-np). So before agreeing to participate, landholders want to know "what the implications are for the long-term management of the property, and the long-term outcomes" (NR36-np).

One respondent reflected on the risks of program participation and the negative experience of some neighbours and friends:

> "People down the road got involved in some program, the fella from the university came out and did some research. The government got a hold of it and decided this is a bit of a special spot and they just took a whole heap of land off them. And they had all sorts of trouble getting around it, it was a big drama" (DU17-p).

5.3.1.3 Production & personal benefits

Production respondents in the Desert Uplands and Nature Refuge programs were interested in the cost-effectiveness of programs and the benefits to the landholder. They were also interested in the ability of a program to deliver benefits to both their property

and production business; that is, whether the program "will improve the longer term health of the land and hence the business" (NR15-p), because:

> "benefits to us and the environment are one and the same" (NR39-p).

Some respondents would prefer programs that supported their own land management objectives:

> "that what it's [the program] trying to achieve is what I want to achieve" (DU20-p).

Or, as expressed by one landholder:

> "I'd just have to look at the story and see how real it seemed to my situation at the time" (DU21-p).

Several respondents were primarily concerned about whether the program would generate a return on their investment. These respondents wanted to ensure that the program was not:

> "purely for conservation; as long as there's something involved to improve the grazing, then it's going to help the environment and us" (DU22-p).

This sentiment was shared among Nature Refuge respondents:

> "what's in it for us? If there's nothing for us, why bother doing it because it's just another thing you've got to do then" (NR44-p).

5.3.1.4 Program objectives

A large number of respondents across all programs were concerned about the objectives and details of the program. Non-production respondents in the Cassowary Coast and Nature Refuge programs said the program had to be "necessary" and deliver "tangible" environmental benefits (CC14-np). They were focused on what the "end result is going to be" (NR29-np), "whether it's in the long term interest of the piece of land" (NR33-np), or something "worthwhile" (CC4-np). In other words: "the level of reporting and administration, the nature of the funding, what it can and can't be used for, and the length of the program" (NR32-np).

Respondents were not interested in programs that had "imposing conditions or rules and regulations" (NR42-p) or that would "interfere in the day-to-day running of the property" (NR42-p):

> "I am a bit frightened of that Big Brother type thing, that's the thing that scares me most with signing up to these things" (DU21-p).

Two respondents stated that they preferred programs that were compatible with their land management practices:

> "you just want it to fit into your everyday life and get paid for it" (DU26-p),
> "like the Landscape Linkages, giving money to people who had land locked up who weren't going to do anything with it anyway" (DU16-p).

5.3.2 MOTIVATIONS TO PARTICIPATE AND LAND CHOSEN FOR CONSERVATION

To understand landholder motivations to participate in conservation programs, respondents were asked: *What was your main reason for joining the program?* The responses to this question generated a range of concepts that correlated with another question: *Why did you choose this piece of land to include in the program?* The linked responses are presented below. The results presuppose that a landholder has one main motivation to participate in a conservation program, however interactions between these and other motivations are likely to exist and drive decision-making for land committed to formal conservation.

Respondents states the percentage of their property they committed to the program. Overall, non-production landholders were more likely to commit larger proportions of their property to the conservation agreement (Table 5.1). Respondents were also asked if they would have managed their land in the same way if they had not participated in the program: the majority (n=40; 91%) of respondents would have managed their land in the same way.

Table 5.1: The percentage (area) of the property that was committed to the conservation covenant or agreement.
Respondents in each program are divided according to whether they use the land for production (p) or non-production (np).

Percentage of property committed to the program	Cassowary Coast		Desert Uplands		Nature Refuge	
	np	p	np	p	np	p
0-25%	0	0	0	5	0	7
26-50%	4	1	0	5	0	0
51-75%	3	0	0	2	1	0
76-100%	5	1	1	1	9	0

5.3.2.1 Conservation-driven respondents

Voluntary and price-based conservation covenants were identified by some respondents as providing them with an opportunity to formalise their commitment to conservation, and which would also bind future landholders. Cassowary Coast and Nature Refuge

respondents cited four conservation-driven motivations to participate in their respective programs that were categorised into four main groups: general conservation, ecosystem and species protection, perpetual protection, and conservation of natural features. These four groups captured slight nuances in the responses provided. Some individuals used the word "conservation" in their answer to this question:

> "to demonstrate that we had a strong commitment to achieve a high level of conservation" (CC14-np).

Often, the respondent did not actually qualify what it was that they were conserving. Other respondents though, did specify their conservation intentions, to "protect endangered species" (NR40-np) and "protect the forest" (NR33-np) because:

> "we'd put all that work in, it's a magic bit of country" (NR29-np).

Some respondents stated that they were particularly motivated by the *perpetual* nature of the conservation agreement and had "specifically bought the property to protect it and put it under a Nature Refuge agreement" (NR32-np). Natural features that were targeted for conservation by Nature Refuge respondents included geologic formations such as volcanic craters and hot springs. These features are prioritised by the Queensland Government for protection as part of the Nature Refuge program.

Conservation-driven respondents selected areas of the property to commit to the program on the basis of their conservation value. Some respondents had placed 100 % of their property under the conservation agreement, or the total vegetated area of the property that was eligible for the program. The respondents explained that they committed the maximum amount of their property to the program because:

> "all we want to do is live here, and the rest of our land is to be conserved for the forest and the wildlife" (CC6-np).

Respondents who had not committed the maximum conservable area of the property had prioritised areas of high conservation value, such as "endangered grasses that were vulnerable and needed protecting" (NR42-p).

5.3.2.2 Production-driven respondents

Market-based financial incentives offered in the Desert Uplands and Nature Refuge programs motivated some production respondents to participate, who intended to use the money to improve their production business. These respondents stated that they were motivated to participate in their respective programs for production reasons.

Many of these respondents said they were motivated by the money offered by their respective program, which they used to "look after degraded areas" (NR15-p), "fence out another paddock" (DU24-p); or "put in some water wells" (DU18-p).

Reasons for selecting areas to conserve were diverse amongst these respondents, but related primarily to production outcomes. Desert Uplands respondents chose areas that would allow them to "improve paddocks" (DU16-p), which was one of the objectives of the program, or they committed land that was "unstocked because there were no fences or waters" (DU18-p). Respondents also committed land that was:

> "some of the better country, to prove that I could still use it as rotation and still make grass grow on it" (DU24-p),

which was:

> "probably a bit of an experiment to us to see if we were sustaining our pastures, and it does work, it's amazing what we got out of it" (DU25-p).

However:

> "we would have been less likely to be involved if we were told we couldn't stock the area at all" (NR15-p).

5.3.2.3 Financially-driven respondents

Financial incentives motivated respondents in all three programs to allow them to give greater priority to conservation activities. A number of respondents commented that although they had a desire to protect a part of their property, it was a low priority, and "would have happened in the long run" (NR35-np), but the financial incentives offered by the program motivated them to conserve the area more immediately. They "probably would have gotten around to it, but it would have been on a long list of other things to do" (NR33-np), so "it would have been a good idea in theory" (NR44-p) but these respondents didn't know if "it really would have happened" (NR44-p) without the financial incentive. Ultimately:

> "we couldn't afford the capital cost. It wasn't that high up our priority list, so by getting the money from somewhere else, it helped. It comes back to affordability. We genuinely do have a desire to preserve it, but if we had $80,000 [the total project cost], we would have thrown the money at something else" (NR38-p).

Some respondents simply stated that money motivated them to participate, without specifying what the money would be used for. Several Cassowary Coast respondents

said that their participation in the program helped to "to pay the rates" (CC13-p), while some Desert Uplands respondents found that participation provided easy money:

> "the fact that we could get money for doing what we already do" (DU22-p),

that is:

> "if I played the game, I thought I can't lose" (DU21-p).

The majority of these respondents committed parts of their property on the basis of conservation value. Responses ranged from providing a vegetation corridor between two National Parks, to protection of areas of high conservation value (e.g., natural spring), or because the program:

> "formalised what was already in our own minds, we grew all these trees to create habitat" (NR31-np).

Other respondents committed all the vegetated land that was not required for their production activities or their housing envelope into the program, because they "had no reason not to" (CC5-np), "it's totally untouched habitat area" (CC3-np) so "it was a sort of natural progression to put some of it aside" (CC13-p). Another respondent said:

> "we are not going to change our management from one paddock to another, keeps us honest if we do the whole place, because people could chew down one paddock just to have their landscape linkages grass" (DU22-p).

One respondent however, "felt that there needed to be a little bit of land that wasn't under the Nature Refuge so there was some value to somebody" (NR35-np) if they had to sell the property.

5.3.2.4 Experimenters

Program conditions that provided participants with an opportunity to experiment with their land management activities with minimal financial risk motivated several respondents, all participants of the outcomes-based Desert Uplands program. These individuals were motivated by the anticipated direct environmental outcomes of their changed or experimental land management practices, as required as part of their participation in the program. For example, respondents believed it "was worth seeing whether there was any difference, whether [the land] changed a great deal, from when [the program] started" (DU41-p). There was a "curiosity, to see how pastures do improve over time with the different management" (DU45-p). The program provided

respondents with the ability to "demonstrate that you can still operate your rural enterprise with conservation" (DU20-p).

These respondents selected the area to commit to the program based upon production priorities. For instance, one respondent chose a paddock that was covered in heartleaf (*Gastrolobium grandiflorum*), a woody, perennial shrub that is poisonous to grazing animals because it contains high concentrations of monofluoroacetic acid, a poison used in animal baits (e.g., 1080). Another respondent chose land that was unproductive and that was only rarely grazed, while a different respondent chose an area that:

> "was pretty run down and I thought it would be interesting to see how good you could make it" (DU45-p).

One respondent did not commit all of the property to the program because:

> "I was really concerned that I needed to keep some land that I could flog if I had to" (DU20-p),

to ensure that the part of the property committed to the program would meet the program objectives and that they would receive their program payment.

5.3.3 BARRIERS TO FORMAL CONSERVATION

To understand barriers to conservation, respondents were asked: *What prevents you from using more land for conservation and protection?* Key barriers were that the majority of land was formally conserved, the threat of lost productivity, different perceptions of which land management practices best achieve conservation, future land use options, and no identified barrier.

5.3.3.1 Conservation saturation

A number of respondents across all programs had committed more than 75% of their property (n=17; 38%) to the covenant or agreement. Barriers to increase participation for these landholders were that they did not have any more land or could not afford to buy the neighbouring property to use for conservation.

5.3.3.2 Lost productivity

A commitment to conservation represented a threat to production activities for some respondents. These respondents were unwilling to commit more land to conservation because it limited their capacity to generate an income: "it's always this constant

balance between conservation and production" (DU20-p). Respondents stated that they "need the land for production. And to do anything else, would need to have a better economic outcome from the conservation area" (NR36-np). Often, areas that are good for conservation can also be good for production:

> "The fact is that some of those areas fatten the cattle. You want them in there on the springs, you want them eating that grass because they get fat. I don't know that the weaner cattle do a whole lot of damage in it, the bird life is just as strong as ever and there's always wallabies and things about, so I guess you tend to think it's not a big deal" (NR44-p).

Respondents suggested that ongoing government funding, rate rebates, or carbon trading would balance the cost of conservation; short-term, one-off government payments were considered insufficient to balance the long-term cost of conservation. For example, a Nature Refuge respondent said they would increase the Refuge if they were given a rate rebate: "it's mercenary, but probably that's it: production is severely affected by conservation" (NR43-p).

5.3.3.3 Perception of "conservation"

The design and delivery of conservation programs, in particular changes to land management practices, can conflict with landholders' perception of conservation and the broader environmental benefits they believe are derived from their land use. Common amongst production respondents in the Desert Uplands and Nature Refuge programs was the view that the management of the land for cattle grazing also generates conservation outcomes. In other words, "you don't have land that is healthier from total exclusion of grazing; land is being conserved through the management regime. A healthy ecosystem for cattle is a healthy complete ecosystem" (NR15-p). That is:

> "we've got to grow grass first, then you can have cattle. But if you're not growing grass, you're not going to go very far. It's pretty simple" (DU17-p).

Ultimately:

> "if I don't manage it wisely, well, it's going to come back to bite me, that's what it comes down to" (DU21-p).

Production respondents did not believe that their land management practices were contradictory to conservation practices. Fundamentally it "depends on what you call

'conserve', do you want to conserve a piece of land as just a bit of a jungle, or do you want to see it as a productive, viable piece of land?" (DU17-p). Respondents within the desert and rangeland areas believed that "there are two ways to kill land: one is to flog it which is less likely to kill it because plant species can survive, and other is to lock it up, which is the fastest way to kill it [because] a wildfire can rip through and kill off species" (NR15-p). Therefore, "locking land up is not managing the country properly" (DU25-p).

5.3.3.4 Future land use options

Program conditions were perceived to represent a threat to landholders' property rights and their future land use options. Some respondents did not commit all of their property to the conservation program because they wanted to keep their options open for potential future development or changed land use. This point of view was particularly true for non-production respondents in the Cassowary Coast and Nature Refuge programs who had committed to perpetual agreements but wanted to maintain the option to use the land to produce an income, "there had to be something other than just land for conservation" (NR35-NP). Another respondent wanted to maintain the right to "use the cattle to keep the weeds down because cattle are the best way to keep sensitive weeds and grass down" (CC7-NP). Production respondents were concerned about potential changes to their property rights at a later date:

> "the more viable land we lock up, the less earnings or capabilities we have. You have to be a little bit careful because they can change the rules and the goal posts. You would hate to have all your eggs in one basket and have a change in government, you never know where you'd end up" (NR39-p).

5.3.3.5 Nothing

Several production respondents stated that there is nothing stopping them from using more land for conservation and protection. A Desert Uplands respondent said they would commit parts of the property to conservation where "there's nothing for any cattle to eat […], you could do lots of conservation there" (DU18-p). A Nature Refuge respondent said they would put more land into their Refuge but that they "haven't really given it much thought" (NR37-p). A non-production Cassowary Coast respondent said they would allow Council to reassess their property to put more land into the agreement.

5.3.3.6 Comparing motivations with barriers

Correlations were observed between respondents' motivations and barriers to participation. For example, the majority (n=11; 58%) of conservation-driven respondents cited conservation saturation (i.e., all conservable land is conserved) as their main barrier to increasing the extent of conserved land on their property. Similarly, production-driven respondents (n=4; 67%) most frequently cited perception of conservation as a barrier, that is, how programs define conservation can limit their willingness to participate. Financially-driven respondents cited numerous barriers, in particular their future land use options (n=4; 25%). Experimenters also cited different barriers, including lost productivity and perception of conservation.

5.4 DISCUSSION

Non-production Cassowary Coast respondents in this study represented a relatively homogenous group of landholders who lived in coastal tropical rainforest areas of high amenity and conservation significance, occupied small landholdings and did not rely on the land to produce an income to support the household. They had a preference for perpetual conservation agreements; were interested in the environmental benefits of their participation in conservation programs; and were motivated by conservation imperatives or financial incentives to commit large portions of their landholding to conservation. The main barrier to participation of these respondents was the threat of modified property rights and devalued property prices.

Overall, the design of the Cassowary Coast Conservation Covenant Rate Deferral Scheme met the needs of the participants. The program administrators minimised the perceived threat to property rights by allowing participants to decide whether they applied an ongoing or perpetual covenant on the property, and the location and proportion of the property to conserve. One of the main considerations of Cassowary Coast respondents that was not adequately met through their participation, however, was the delivery of environmental benefits, such as improved quality of native vegetation or increased population of rare or threatened species. As part of their participation in the program, respondents were not provided with any ongoing education or training to assist in improving the quality or quantity of native vegetation within the

covenanted areas. Moreover, the council did not prescribe that the landholder must invest any portion of the rate deferral in environmental improvements to the property.

Production Desert Uplands respondents also represented a relatively homogenous group of landholders. In contrast to the Cassowary Coast respondents, the Desert Uplands respondents lived in savannah landscapes on large acreages used for low density cattle grazing, which provided a substantial portion of the household income. These respondents were interested in cost-effective programs that primarily provided production benefits, potentially with simultaneous conservation benefits; were motivated by direct financial incentives and the opportunity to modify and monitor their land management practices to observe changes in the quality and quantity of pasture. These respondents were unlikely to participate in conservation programs that do not offer observable benefits to their production business or direct financial incentives. Accordingly, their major barriers to participation were the threat of lost productivity and a reluctance to commit land solely for conservation, based, in part, on the perception that their cattle grazing operations provide both production and conservation benefits.

The design of the Desert Uplands Landscape Linkages program took direct account of the two barriers identified by the respondents. First, the program was designed to influence land use practices to increase the biomass of native pasture and thereby create production benefits. Second, the monitoring program demonstrated to both participants and other stakeholders that production and conservation activities can co-exist; that is, monitored grazing regimes resulted in an increase in the quality and quantity of biomass, providing multiple benefit streams (Windle, Rolfe *et al.* 2009).

The program, however, did potentially lend itself to perverse environmental outcomes, such as slippage and low additionality. Slippage, movement away from the desired objectives and outcomes of a program (Wu 2000), can arise when outcomes-based financial payment programs make payments only on the monitored conservation area. Producers could understock the monitored area to provide the specified program outcomes and receive their payment. A lack of monitoring on other areas of the property provided landholders with the opportunity overstock, or "flog", those areas that are not committed to the program, which could threaten entire ecological communities (Beeton, Buckley *et al.* 2006). Slippage has been found to occur in other conservation

programs, such as the United States Conservation Reserve Program: for every 100 acres of cropland retired, 20 acres of previously non-cropland was converted to cropland (Wu 2000).

Additionality is broadly defined as the additional benefit that is gained from the implementation of the program, in terms of improved environmental management, reduced or halted environmental damage and the generation of a public benefit, over and above what would have arisen as a consequence of 'business as usual' (Carey, Short *et al.* 2003). Low additionality can occur when a program pays a landholder to undertake an activity they would have otherwise undertaken (Carey, Short *et al.* 2003). The additionality was potentially low, or absent entirely, for those Desert Uplands respondents who stated that they committed unproductive areas of the property or areas not used for production (e.g., due to the presence of heart leaf or inadequate infrastructure), because they would not have stocked those areas anyway, and did not manage them any differently during their participation. Low additionality has been recorded in the English Countryside Stewardship Scheme (Carey, Short *et al.* 2003) and the Costa Rican payment for ecosystem services programs (Sierra and Russman 2006; Sanchez-Azofeifa, Pfaff *et al.* 2007). Respondents from all three programs, including all of the respondents from the Cassowary Coast program, agreed that they would have managed their land in the same way, had they not participated, which suggests that all three programs may have experienced low additionality.

The Nature Refuge respondents represented a more heterogeneous mix of landholders, who may be broadly differentiated according to whether the landholders uses the land for production or non-production. Similar to the Cassowary Coast respondents, non-production Nature Refuge respondents were somewhat concerned about the effect of applying a perpetual conservation agreement on their property rights and values. Some of these respondents, however, had specifically purchased their land to protect the natural values, so the perpetual agreement offered an effective instrument to ensure long-term protection. For those non-production landholders who did not specifically purchase the property for conservation, money provided through the Nature Assist program (see section 3.4.3) was an important incentive. Similarly, production Nature Refuge respondents had an interest in conservation on their property; however, the money provided through the program provided them with the funds necessary to

prioritise their conservation activities. These respondents believed that the application of a perpetual covenant on their property does not necessarily represent a threat to their production activities or property rights because their land management practices simultaneously provide both production and conservation benefits. Production Nature Refuge respondents were accountable for the money provided to them for on-ground works, so did not indicate that the program provided easy money.

The design of the Nature Refuge program attended to the main barriers to participation that respondents identified: threat of participation to property rights and productivity. Each respondent was able to negotiate the conditions of the agreement; the flexible nature of the program provided opportunities for production landholders to maintain a light grazing regime, so long as it did not generate long-term negative environmental outcomes in the protected area, for example. The ability of the participants to have a say in which area of their property to protect also minimised the threat to future land use options. The voluntary nature of this perpetual program suggests that participants had a strong interest in conservation.

In addition to the specific details of each of the three conservation programs, two broad points arise from this analysis that may shed further light on how landholders select land for formal conservation. The first point draws attention to two distinct positions that landholders demonstrated regarding biodiversity conservation on their property: multifunctional and uni-functional landscape perspectives. The multifunctional landscape perspective was held by production respondents in the Desert Uplands and Nature Refuge programs who believed they could deliver both production *and* biodiversity outcomes from their farm management practices. These respondents did not separate biodiversity conservation from other land management practices and found such a distinction meaningless (Vanclay 2004). Yet, these respondents largely discussed their property as a production landscape, which may bias the composition and extent of biodiversity outcomes generated on these properties. For example, biodiversity outcomes, such as the proliferation of native grasses, may only be valued by these respondents insofar as it contributes to production outcomes. Moreover, respondents aligned with this position tended to bias the *formal* conservation of biodiversity on their property towards unproductive and inaccessible landscapes, which

suggests that although the landscape may be viewed as multifunctional, production outcomes may be favoured over conservation outcomes.

The uni-functional landscape perspective was held by both production and non-production landholders. For some production respondents in the Desert Uplands and Nature Refuge programs, their uni-functional perspective related to the belief that biodiversity conservation threatened production and consequently portions of their property could only be assigned to one dominant land use. These respondents often expected compensation for conservation activities undertaken on their land, land that they believed to be of a productive quality that if prioritised for conservation would result in an unacceptable loss of income. Indeed, for South Australian pastoralists, the "unrealistic demands from conservation interests" was identified as their most extreme matter of concern, above other concerns including poor market prospects (Holmes and Day 1995, p. 204). These unrealistic demands were, in addition to a potential loss in production, considered to be associated with interventionist activity, tighter management controls, loss of independence, and sometimes a threat to producers' social identity (Holmes and Day 1995). Consequently, production landholders with a uni-functional perspective may only offer small parcels of land for conservation, if they are willing to participate at all. Respondents in both the Cassowary Coast and Nature Refuge programs, who used the land for production and non-production, demonstrated a uni-functional landscape perspective which presumed that production activities can threaten biodiversity conservation. In several instances, producers recognised that some threatened habitats were sensitive to the pressures of livestock grazing, while many non-production respondents excluded production activities from their entire property. Non-production landholders who hold a uni-functional landscape perspective have been identified as more likely to participate in conservation programs (Beedell and Rehman 2000; Langpap 2004; Winter, Prozesky *et al.* 2007).

The second point is that participation in conservation programs can be perceived to threaten private property rights and associated benefit streams, which, to some extent, represents a misunderstanding of property rights. A property right is a claim to a benefit stream that the state protects by limiting the rights of others to access that benefit stream (Bromley 1992). Benefit streams identified by respondents that may be threatened by participation in conservation programs include the resale value of the

land, future development rights and the capacity to produce an income from the land. Some respondents iterated their need to maintain control over their benefit stream and were unwilling to participate in a program to the extent that it endangered that control. For example, these respondents were unwilling to participate in perpetual programs or were only willing to commit unproductive areas of their property. Comments of those respondents who were concerned about how a change in government may affect their property rights illustrate the point that in Australia, property ownership is commonly viewed as "freedom from the reach of government" and the law as "the embodiment of intrusion by government, not as a legitimate democratic expression of the public interest" (Brasden 1988, p. 3). In actuality, private property rights have always been subject to the public interest because private property is a social institution and therefore dependent on the wider interests of society (Brasden 1988). That is, land ownership has never been absolute; it has always had a social aspect (Honore 1961). Policy makers must strive to find the balance between rights, responsibilities and compensation for landholders; and landholders must maintain flexible values, attitudes and behaviours towards altered property rights regimes.

5.4.1 POLICY & PROGRAM RECOMMENDATIONS

Overall, each of the programs appealed to respondents' motivations and minimised their barriers to participation. While this point may seem obvious given that the respondents had participated in the programs, the findings have provided an important theoretical contribution regarding the relative commitment to biodiversity of program participants. These findings can be used to recommend policy instrument for program design.

Voluntary instruments appealed to non-production landholders who had an intention to conserve vegetation and/or who did not intend to produce an income from their land. These instruments can therefore be useful in the implementation of perpetual conservation covenants because these landholders often have an interest in long-term conservation. Voluntary programs may still need to provide assistance (e.g., environmental education, support for weed and erosion control) to provide the necessary provisions to landholders to improve their land management practices and generate positive long-term environmental outcomes.

Market-based economic instruments should aim to achieve a high degree of additionality. Programs that achieve high additionality ensure that the participants are accountable for public money; that is, some additional public benefit has been provided through their participation (Carey, Short *et al.* 2003). For example, competitive tenders for on-ground works, such as fencing off sensitive areas from cattle grazing and other activities, should require that participants apply a conservation covenant. This approach will ensure that the money has not just provided private infrastructure costs, but that there has been a formal, long-term commitment to protect biodiversity. Price-based economic instruments, such as rate rebates, should also be used to stimulate participation in perpetual programs. Used as an incentive for perpetual agreements, these instruments can reduce transaction costs of contract renewal and renegotiation.

Outcomes-based payment programs may be best suited to production landholders who are already in the habit of managing their land to generate specific outcomes. Producers tinker with their land management practices on a regular basis and may welcome the opportunity to trial different methods and regimes. The offer of money for property improvements may provide an attractive incentive to participate by reducing the financial risk often associated with participation. Changes to land management practices specified in the program, however, should be developed with landholders to ensure that they are achievable and will provide the required ecological outcomes. Payment programs must strive to employ rigorous science, avoid the creation of perverse outcomes and aim to stimulate permanent behavioural change. Observable improvements in land condition can be a powerful stimulus for behaviour change, as discussed by the 'experimenters'; well-designed outcomes-based programs should work towards this aim. Payment programs should also apply a strict monitoring regime to ensure that participants are providing the outcomes for which they are being paid.

The relative homogeneity or heterogeneity of the landholding population should be considered during program design. For example, an assessment of land use in an area can indicate whether landholders are more likely to be oriented towards production or non-production activities. Such a distinction can reveal important differences in the personal circumstances and attitudes of landholders, which may provide useful detail on their preference for policy instruments and thereby inform instrument choice in program design (Moon and Cocklin 2011). Given the correlations between motivations and

barriers, understanding the characteristics of the landholding population may increase participation through the provision of appropriate incentives and removal of barriers to participation. In areas where the landholding population is heterogeneous, consideration may need to be given to the design of two or more distinct programs that include a mix of policy instruments to meet the needs of different landholding groups.

5.5 SUMMARY

The purpose of this chapter was to understand what motivated and limited the involvement of participants in conservation programs. Respondents were motivated by at least one of four motivations: conservation, production, financial and experimentally-based imperatives. These motivations, in addition to respondents' multifunctional and uni-functional perspectives of the landscape, affected how landholders selected land to conserve formally. Landholders were limited in their capacity to increase their conservation area on their property by a perceived loss of productivity and threats to their property rights and values. These qualitative insights reveal that whether a landholder uses the land for production or non-production will influence the quality and extent of land conserved, and the relative conservation benefit generated from their participation, and thereby their relative commitment to conservation.

CHAPTER 6
HOW CONSERVATION PROGRAM PARTICIPANTS AND NON-PARTICIPANTS DIFFER[1]

In this chapter, I provide a direct contrast between the social dimensions of landholders who participated in a conservation program, with those landholders who had not participated. I explain the differences according to the levels of human and social capital of respondents. The chapter highlights the importance of not only an individual's capacity to participate in a conservation program, but the influence of the social context and social networks on participation.

6.1 INTRODUCTION

The concepts of human and social "capital" provide a useful construct for examining individual and social change towards biodiversity conservation (Coleman 1988; Lin 2001; Cocklin and Alston 2003; Pretty and Smith 2004; Knight, Driver *et al.* 2006). Growing or declining stocks of capital - social dimensions that can be measured (e.g., Knight, Cowling *et al.* 2010) - can indicate both the capacity and willingness of individuals and communities to contribute to biodiversity conservation goals.

Human capital refers to the resources possessed by an individual of which they can use , and includes skills and knowledge that enable leadership, problem-solving, and contributions to community life, innovation, and production; financial security; and physical and mental health (Lin 2001; Cocklin and Alston 2003). Human capital is required for individuals to conserve and enhance natural capital[2]; at the most fundamental level, a person must have a basic understanding that human action can improve or degrade the environment (Gowdy 1994). High levels of human capital, such as good health (Kawachi, Kennedy *et al.* 1999), a sense of happiness and life satisfaction (Putnam 2000), low mortality (Kawachi, Kennedy *et al.* 1997) and education, knowledge and wealth (Millar and Curtis 1999; Deressa, Hassan *et al.* 2009),

[1] Moon, K., Marhsall, N. and Cocklin, C. (submitted). The influence of social and human capital on landholder participation in conservation programs. *Biological Conservation.*

[2] The productivity of land, actions to sustain productivity, and natural resources from which livelihoods are derived (i.e., natural and genetic resources; ecosystem services; and aesthetic beauty of nature)

provide individuals with greater capacity to contribute to ecological outcomes and sustainability.

Social capital represents the resources embedded in social relations, and includes relations of trust; reciprocity and exchanges of goods and knowledge; common rules, norms and sanctions; and connectedness, networks and groups (Coleman 1988; Lin 2001; Pretty and Ward 2001). Social capital can improve information access, relevance and quality; influence, power and control; compliance with local customs and rules; and reduce the need for formal controls and regulations (Adler and Kwon 2002). Without social rules and norms, individuals can overuse and under invest in natural capital - what economists refer to as "free-riding"; that is, they derive a benefit without contributing a benefit (Hardin 1968; Pretty and Ward 2001). Long-term obligations between and among individuals (reciprocity) (Platteau 1997) can assist landholders in balancing individual rights and collective responsibilities (Etzioni 1995) and of being convinced that collective approaches generate greater benefits than individual approaches (Pretty and Ward 2001). Examples of environmental outcomes that stem from high stocks of social capital include neighbourhood relationships that increase pro-environmental behaviour (Millar 2001); development and engagement of local groups to develop conservation programs that instil a sense of land stewardship (Pretty and Smith 2004); and landholder groups and associations that focus on land management solutions to environmental degradation, over 50,000 of which were recorded between 1991 and 2001 in Australia, Guatemala, Honduras, Brazil, India, Kenya, Niger, Burkina Faso, and the United States (Pretty and Ward 2001).

Together, human and social capital may explain the capacity and willingness of individuals within a community to contribute towards activities such as biodiversity conservation (Bebbington and Perreault 1999; Sobels, Curtis *et al.* 2001; Cocklin and Alston 2003; Mathijs 2003; Pretty 2003; Pretty and Smith 2004; Schwartz 2006; Gutierrez, Hilborn *et al.* 2011). For instance, human capital provides individuals with safety and security (e.g., investment in production activities that generate food and income), and can, therefore, act as "almost exclusive organizers of behaviour" and shape an individual's worldview and their philosophy of the future (Maslow 1943, p. 376). Landholders' need for this form of human capital can result in neglect for activities that do not expressly provide safety and security (e.g., biodiversity

conservation). Social capital may be of less immediate interest than human capital, because the generation of social capital tends to "rest on the prior satisfaction of another, more pre-potent need" - human capital (Maslow 1943, p. 370). When combined, human and social capital can generate productive activity (Coleman 1988) and, if directed accordingly, can stimulate coordinated participation in conservation programs.

There are several dimensions of human and social capital that can be measured to improve the development of conservation programs and policies. Human capital can be measured through an assessment of individuals' lifestyle and wellbeing; education, knowledge and experience; and financial security, including the incentives landholders would prefer to support their conservation efforts (Curtis, Lockwood *et al.* 2001; Knight, Cowling *et al.* 2010). Social capital can be measured through social networks, norms, trust, reciprocity and common rules (Pretty and Ward 2001). Social networks reveal the social relations that have been developed to deliver expected returns in the marketplace, be it the economic, labour, political or community marketplace (Lin 2001), as revealed by the level of landholder involvement in community institutions and social groups (Knight, Cowling *et al.* 2010). Trust relates to reciprocal exchange of goods and knowledge of similar value, and mutual expectations (Coleman 1988; Marshall 2004). Norms are beliefs about how an individual is expected to act (Ajzen and Fishbein 1970), according to either their own personal beliefs (personal norms) or perceived societal expectations (social norms). Given that norms are influenced by attitudes (Stern 2000), social capital may be more fully understood when norms are examined in conjunction with environmental attitudes, such as through the use of attitude scales (e.g., the New Ecological Paradigm [NEP]) (Dunlap 2008). There is a need to balance the subjective dimensions of social capital (e.g., norms, values) with the social structural dimensions (social networks, organisations and/or linkages between individuals and/or organisations), the latter dimension purportedly representing the "prime focus and central attraction" of the concept but which is often under-represented in the literature (Foley and Edwards 1999).

6.2 OVERVIEW OF METHODS

Quantitative data, of participants in the Cassowary Coast, Desert Uplands and Nature Refuge programs, as well as non-participants, were used in this analysis. Human capital variables included lifestyle and wellbeing (5 items), financial security (5 items), education, knowledge and experience, (3 items) and demographic information (10 items). Social capital variables included social networks (5 items), environmental attitudes (15 items), trust (9 items), and personal and social norms (5 items).

To assist in understanding whether human and social capital were the cause or the result of participation, program participants were asked additional questions relating to their experience of program participation (human capital: 11 items; social capital: 9 items). That is, I wanted to understand whether program participants had, for example, trusted the program administrator *before* they agreed to participate.

Randomisation tests were performed on the data (Manly 2007), using MATLAB software. These tests are useful for small samples because they make no distributional assumptions (e.g., normality) and yet remain as powerful as standard tests (e.g., chi-square tests). Sum of squared differences were used, and 10,000 random tests were conducted on all data sets. All null values were removed from the analyses. Fisher's exact test was used on the data derived from the participant-only survey items (see section 6.3.3 and Table 6.4). Values with a *p*-value less than 0.05 were considered to represent a significant difference.

Refer to Chapter 3 for full details of the methods used in this research.

6.3 RESULTS

There were significant differences found between conservation program participants and non-participants for items within four of the eight dimensions assessed: lifestyle and wellbeing, information and knowledge, environmental attitudes, and trust. For completeness, all eight dimensions are discussed.

6.3.1 HUMAN CAPITAL

Lifestyle and wellbeing

A greater proportion of non-participants found living on the land stressful than did participants (Table 6.1). The majority of participants worked less than 30 hours per week and the majority of non-participants worked more than 30 hours a week (Table 6.2). The majority (n=20; 77%) of respondents who agreed that living on the land was stressful worked more than 30 hours per week on their property and respondents who worked these hours were more likely to use their land for production ($p<0.01$). Overall, respondents stated their family had a good level of health and were satisfied with the balance between time spent working and personal time (Table 6.1).

Information, knowledge and experience

A significant difference was found between participants who were more likely to attend short courses in land management every year, and non-participants who were more likely to never attend short courses (Table 6.2). Differences were found between the levels of formal education between participants and non-participants; however, of five categories of education (secondary, apprenticeship, technical college, undergraduate, postgraduate), participants were more likely to have completed an undergraduate university degree (n=13; 29%) while secondary education was the highest level of formal education of non-participants (n=13; 45%). These differences, however, were not statistically significant. The number of years of land management experience was similar between participants and non-participants: the mode was the same for both groups: 21-30 years. The mode for age was also the same for both groups: 51-60 years.

Financial security

Respondents had similar levels of financial security. The majority of respondents did not believe that the income from their land was sufficient to support the household; however, they did not find it difficult to make their loan repayments (Table 6.1). This finding may be attributed to the low levels of income generated from the property: 43% (n=32) of respondents did not derive any income from their property; a further 14% (n=10) derived less than 50% of their income from their property. There was no difference between whether respondents used the land for production (participants:

n=22; non-participants: n=18) or non-production (participants: n=23; non-participants: n=11).

Preferred incentives

No significant differences were found between participants' and non-participants' preferred incentives (Figure 6.2). The most preferred incentive of both participants (n=21; 49%) and non-participants (n=13; 46%) was money. Participants' other most preferred incentive was on-ground advice (n=11; 25%). In contrast, on-ground advice was non-participants' (n=9; 50%) second least preferred incentive, and monitoring was their least preferred (n=11; 61%).

Table 6.1: Per cent of participants and non-participants' responses to health & wellbeing, trust and attitude items.
(D - strongly disagree and disagree response; A – strongly agree and agree responses; *n* –number of respondents).

Dimension	Item	Participants			Non-participant			*p*-value
		D	A	*n*	D	A	*n*	
Lifestyle & wellbeing	Living on the land is emotionally stressful	0.71	0.30	44	0.52	0.48	27	<0.01*
	My family generally has a good level of health	0.02	0.98	45	0.03	0.96	29	0.537
	I am dissatisfied with my life-work balance	0.88	0.11	44	0.80	0.21	29	0.118
Security	The income from my land is sufficient to support the family/household	0.73	0.27	44	0.59	0.41	29	0.079
	I sometimes find it difficult to make my loan repayments	0.76	0.25	41	0.84	0.17	24	0.309
Social networks	I feel like I belong to this community/town	0.11	0.89	45	0.18	0.82	28	0.256
	I would like to participate in government consultation about proposed new regulations that may affect the way I manage my land	0.13	0.87	45	0.28	0.72	29	0.03*
Attitude^	The so-called "ecological crisis" facing humankind has been greatly exaggerated	0.70	0.30	44	0.40	0.61	28	<0.01*
	If things continue on their present course, we will soon experience a major ecological catastrophe	0.29	0.72	42	0.50	0.50	28	<0.01*
Trust	I think the government values the opinions of landholders	0.66	0.34	41	0.86	0.14	28	<0.01*
Norms	I do not feel a strong personal obligation to protect the environment	1.00	0.00	45	1.00	0.00	29	0.162
	I am willing to put extra effort into managing native vegetation on my property	0.09	0.91	45	0.14	0.86	29	0.340
	I would not feel guilty if the condition of native vegetation on my property deteriorated	0.87	0.13	45	0.89	0.11	27	0.689
	I am motivated to encourage friends and family in the region to participate in this program	0.14	0.86	43	-	-	-	-
	I do not think my involvement in the program contributes to regional conservation goals	0.98	0.02	45	-	-	-	-

^ Not all attitude items are listed here. Refer to the NEP for a full list of the items.
* statistically significant

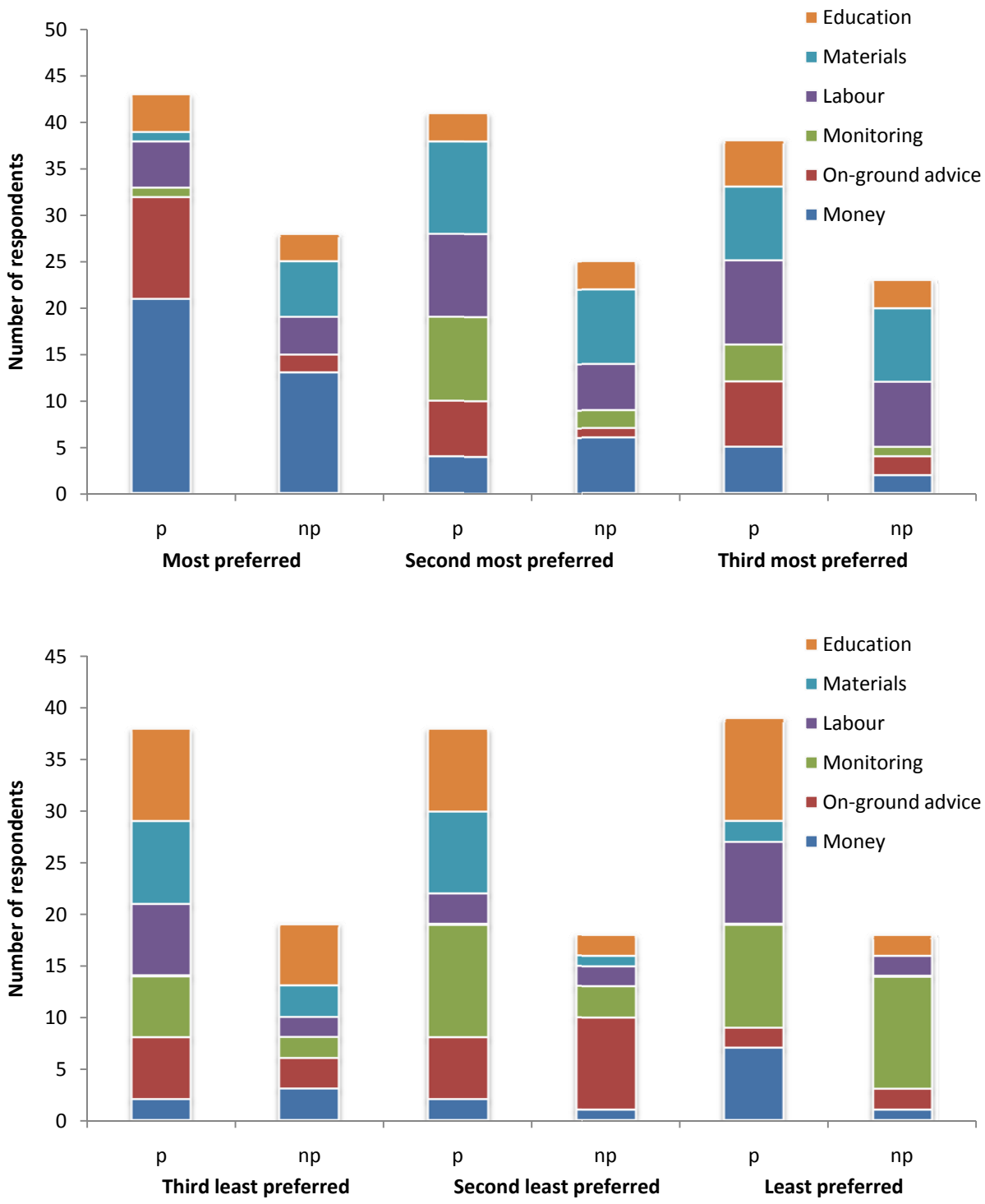


Figure 6.2: Participant (p) and non-participant (np) preferred program incentives. Not all respondents ranked each incentive.

6.3.2 SOCIAL CAPITAL

Social networks

Both participants and non-participants felt like they belonged to their community (Table 6.1). Only 23% (n=17) of respondents were members of a Landcare[1] group, although 76% (n=13) of these respondents were conservation program participants. Similarly, for Natural Resource Management groups[2], only 27% (n=20) of respondents were members, 65% (n=13) of whom were participants; and for other environmental and land management group memberships, participants constituted 65% (n=17) and non-participants 35% (n=9). The majority of respondents wanted to be consulted by government on new land management regulations, non-participants significantly more so (Table 6.1).

Environmental attitudes

There were significant differences between the attitudes of participants and non-participants regarding whether humankind is facing an eco-crisis or ecological catastrophe, as revealed in responses to two of the three related items of the NEP scale (Table 6.4). For the other 12 items, respondents agreed that humans are not exempt from the constraints of nature, that nature does not exist solely for human use and has inherent value, that nature is balanced, complex and highly interrelated and can be affected by human interference, and that nature provides limited resources that humans depend on for survival.

Personal and social norms

The majority of participants and non-participants had strong personal environmental norms: they felt a strong obligation to protect the environment; were willing to put extra effort into managing native vegetation on their property, would feel guilty if the condition of native vegetation on their property deteriorated, and did not ignore new regulations on land management (Table 6.1). Participants demonstrated strong social norms in relation to their participation: participants were motivated to encourage

[1] A Landcare group is a group of people interested in sustainable production, land, water and biodiversity issues who want to work together to improve the health of the land in their area.
[2] A Natural Resource Management region is a catchment or bioregion, represented by a non-for-profit group that works with landholders and the government to deliver management outcomes.

friends/family in the region to participate in their respective programs, and believed that their involvement in the program contributed to regional conservation goals (Table 6.1).

Trust

Participants and non-participants demonstrated significant differences in their willingness to trust government and other information sources. Non-participants were less likely than participants to believe that the government values the opinions of landholders (Table 6.1), and were less trusting of different agencies and information sources (Table 6.3). Some participants and non-participants, however, were willing to participate in a conservation program administered by an agency whom they did not trust (Table 6.2). There were no significant differences between levels of trust towards landholders who they deemed successfully manage their land (n=66; 89%), neighbours (n=44; 59%), or industry representatives (n=32; 43%).

Table 6.2: Significant differences between the per cent of participants (n=45) and non-participants' (n=29) working hours and attendance at short courses.

Dimension	Item		Participant	Non-participant	*p*-value
Lifestyle & wellbeing	Hours	Minimal time (0-20 hours per week)	0.36	0.24	<0.01*
		Part time (20-30 hours per week)	0.20	0.03	
		Full time (>30 hours per week)	0.44	0.72	
Knowledge	Short courses	At least every year	0.58	0.31	<0.01*
		Once in 2-4 years	0.20	0.21	
		Less than every 4 years	0.04	0.10	
		Never	0.18	0.38	

* statistically significant

Table 6.3: Significant differences between the per cent of participants (n=45) and non-participants (n=29) who trusted agencies and information sources.
Figures represent the proportion of respondents who stated they would trust the agency or participate in a conservation programs with offered by them. (p=participant; np=non-participant)

Dimension	Item	Trust for information		*p*-value	Would participate		
		p	np		p	np	*p*-value
Trust	Natural Resource Management Groups	0.76	0.52	<0.01*	0.84	0.62	0.102
	Department of Primary Industries	0.69	0.45	<0.01*	0.70	0.62	0.762
	Environmental Groups^	0.64	0.41	<0.01*	0.69	0.41	0.164
	Environment Protection Authority	0.69	0.24	<0.01*	0.80	0.48	0.004*
	Field days	0.87	0.62	<0.01*			
	Newsletters	0.80	0.55	<0.01*			
	Courses	0.80	0.41	<0.01*			
	Information evenings	0.73	0.34	<0.01*			
	Internet	0.56	0.31	<0.01*			

^ Respondents were asked if they would participate specifically with Greening Australia, a not-for-profit environmental organisation
* statistically significant

6.3.3 PROGRAM PARTICIPATION

The following results relate to conservation program participation, and so pertain only to program participants only (Table 6.4).

6.3.3.1 Human capital

Lifestyle and wellbeing

Overall, the effect of program participation on respondents' lifestyle and wellbeing was minimal. The majority of respondents did not find the application process too time-consuming and found it easy to commit time to the program (Table 6.4). None of the Desert Uplands respondents performed work, as a part of their participation that did not form part of their day-to-day management practices, while approximately one quarter of Cassowary Coast and Nature Refuge respondents stated that they did (Table 6.4).

Information, knowledge and experience

Generally, respondents had extensive land management experience and knowledge prior to their participation (Table 6.4). The majority of respondents across all programs had more than 20 years of land management experience. The respondents of the Desert Uplands and Nature Refuge programs kept up-to-date with land management practices, innovation and information through attendance at short courses annually, while the Cassowary Coast respondents were less likely to attend short courses annually (Table 6.4). Most respondents did not require assistance to complete the program application documentation. Generally, respondents did not alter their land management practices as a result of participation in their respective programs (Table 6.4).

Financial security

Largely, participation in a conservation program did not diminish respondents' financial security. Money was typically provided to participants when they needed it; respondents did not fear that their property values would decrease; and they did not believe they had made a significant financial contribution through their involvement in the program (Table 6.4). Approximately one third of Cassowary Coast and Desert Uplands respondents had underestimated the cost of participation, whilst the majority of Nature Refuge respondents had underestimated the costs.

6.3.3.2 Social capital

Reciprocity and exchanges

Respondents did not believe there had been a sufficient exchange of knowledge (Table 6.4). Essentially, the majority of respondents did not believe they were actively involved in the design of the program. Moreover, a number of respondents, particularly in the Cassowary Coast programs, did not believe that the program was adequately tailored to individual landholders and properties.

Common rules and norms

Generally respondents felt confident that the program administrator was interested in the outcomes of the program on their property, and valued the time and effort they put into the program. Respondents were in disagreement about two items (Table 6.4). First, while all of the Desert Uplands respondents believed that the program administrator had a good idea of what happened on the ground, one third of Cassowary

Coast and Nature Refuge respondents did not. Second, the majority of Cassowary Coast and Nature Refuge respondents agreed that participants represented those landholders who had managed their land sustainably in the past, while the majority of Desert Uplands respondents disagreed.

Trust

Respondents tended to trust the program administrator. The vast majority of respondents clearly understood all of the obligations of participants when they committed to the program; were not concerned that the program administrator wanted to take away the rights to some or all of their property; and had a good relationship with the program administrator (Table 6.4).

Table 6.4: Per cent of participants in each of the three programs (n=45) that agreed with the items relating to their experience of participation.
(A – strongly agree and agree responses; CC – Cassowary Coast; DUC – Desert Uplands Committee; NR – Nature Refuge.)

Dimension	Item	CC	DUC	NR	*p*-value
Lifestyle & wellbeing	I found the application process too time-consuming	0.07	0.14	0.19	0.027*
	It is/was easy for me to commit time and effort to the program	0.71	1.0	0.71	0.305
	As a participant in the program, I am/was expected to do work that does not form part of my day-to-day land management	0.29	0.0	0.24	0.042*
Knowledge	I have more than 20 years of land management experience	0.64	0.71	0.59	0.923
	I attend a short course on land management at least every year	0.36	0.79	0.59	0.072
	I needed help to put the application together because it was too complicated	0.21	0.23	0.25	0.136
	I have altered my land management practices following my involvement in the program	0.43	0.43	0.41	1.00
Security	Money provided to me by the program never arrives at the time when I need it most	0.0	0.08	0.13	0.750
	I thought the value of my property may decrease through my involvement in the program	0.14	0.0	0.18	0.042*
	I underestimated the costs of participating in the program	0.14	0.0	0.24	0.117
	I believe I have made a significant non-financial contribution, such as labour, through my involvement in the program	0.36	0.31	0.12	0.589
Reciprocity & exchanges	I feel I was actively involved in the original design of the program	0.50	0.43	0.38	0.435
	I do not think the program is/was adequately tailored to individual properties and landholders	0.36	0.07	0.19	0.128
Common rules & norms	I think that the program administrator has a good idea of what happens on the ground	0.62	1.0	0.65	0.008*
	I do not feel confident that the program administrator is interested in the outcomes of the program on my property	0.14	0.0	0.18	0.159
	I do not believe the program administrator values the time and effort I put into the program	0.17	0.0	0.27	0.292
	I believe that landholders who have managed their land well in the past, have a better chance of being successful in the program	0.14	0.42	0.88	0.076
Trust	I understood clearly all of my obligations as a participant when I first committed to the program	0.93	1.0	1.0	0.476
	I was concerned that the program administrator wanted to take away my rights to some or all of my property	0.14	0.0	0.24	0.216
	I have a good relationship with the program administrator	1.0	1.0	0.93	0.094

* statistically significant

6.4 DISCUSSION

6.4.1 THE INFLUENCE OF CAPITAL ON PARTICIPATION

The results have revealed similarities and differences between the two groups. Both groups, for example, had strong pro-environmental norms, felt like they belonged to their community, wanted to be consulted on changes to land management regulations, and did not derive an income from the land that was sufficient to support the household. Significant differences, in terms of human capital, were observed: non-participants worked more hours on their property per week, than did participants and experienced higher levels of stress related to living on the land. They attended fewer short courses on land management and had lower levels of formal education. Regarding social capital, non-participants were less likely to be members of land management or environmental groups, had lower levels of trust in government and other agencies compared to participants, and rejected the idea that humankind is facing an "eco-crisis".

These findings suggest that non-participants' had lower levels of human capital, which may have reduced their capacity to participate in conservation programs. For instance, non-participants worked long hours on their property and so may have considered themselves to have insufficient time to participate in programs. This reason for non-participation may be more pervasive when participation requires that landholders learn new ways of managing the land (Vanclay 2004; Pannell, Marshall *et al.* 2006). Non-participants' higher levels of stress may also have reduced their willingness or capacity to participate in conservation programs, and reminds us that the problems or concerns landholders have at any particular time may be completely unrelated to conservation or other aspects of land management (Pannell, Marshall *et al.* 2006). In extreme cases, high levels of stress can result in the ultimate loss of human capital: suicide. In both the UK and Australia, for example, farmers are two and two-and-a-half times more likely than other citizens to commit suicide, respectively (Kelly and Bunting 1998; Pretty and Ward 2001; Page and Fragar 2002). Due to their low attendance at short courses and low levels of formal education, non-participants may not have believed they had the necessary skills to participate in conservation programs. Informal education may be necessary, in some circumstances, to guide landholders' effective decision-making, provide the capacity for change and assist landholders to alleviate technical concerns

(Cary, Webb *et al.* 2002). Education can also allow landholders to cope with and manage ongoing challenges and threats to land management, such as climate change, changes to property rights and increasing environmental legislation (Hamblin 2009; Marshall 2010).

The lower stocks of social capital of non-participants that were observed in this research suggest that, in addition to a low capacity, this group had a low willingness to participate in conservation programs. Take, for example, non-participants' disagreement that an ecological catastrophe was looming. This attitude was likely formed on the basis of their land management experience. Landholders regularly observe change and variability in the landscape (Marshall 2010) and so non-participants may believe that the landscape is resilient to dramatic change, can cope with threats and can avoid undergoing major functional change. Such an attitude may act as a barrier to participation and stall urgent conservation efforts. This example serves to highlight the interactions between human and social capital: knowledge and experience influence attitudes, and attitudes affect landholders' trust of agencies who promote conservation programs that conflict with landholders' own knowledge and experience of the landscape. Indeed, non-participants had low levels of trust in many agencies, which affected their willingness to participate in conservation programs. That some respondents were willing to participate with an agency they did not trust, however, suggests that the decision to participate in a conservation program did not depend on trust alone. Participation may be related to other factors such as the characteristics of conservation programs (e.g., program complexity, flexibility, profitability, risk, uncertainty), and how the program objectives affect human capital (e.g., landholders' property management goals, and personal and economic circumstances) (Vanclay 2004; Pannell, Marshall *et al.* 2006).

In contrast to these differences, respondents did demonstrate similar personal and social norms relating to the environment and their community. These shared norms could contribute to the formation of a shared vision for biodiversity conservation. When group interests are placed above individual interests, individual investment in collective actions increases because each individual will have greater confidence that other individuals will contribute or participate (Pretty and Ward 2001).

A final point is the relationship between dimensions of human capital and respondents' preference for program incentives. The majority of respondents did not derive sufficient income from their property to support the household. Correspondingly, their most preferred program incentive was money. This finding suggests that landholders will try and boost their stocks of human capital through their participation in conservation programs. In contrast, non-participants were uninterested in the provision of monitoring or on-ground advice through program participation, despite their low attendance at short management courses. One explanation is that non-participants were actively choosing not to participate in education activities, rather than being unable to do so because of personal constraints. Non-participants may have perceived that the priorities of agencies that offer education and advice, including conservation program administrators, were misaligned with their own experience and direction and so chose not to be involved. The provision of program incentives, therefore, may be most effective when the program administrator understands the nature and extent of, and reasons for, existing stocks of human capital in the community.

6.4.2 THE INFLUENCE OF PARTICIPATION ON CAPITAL

The results suggest that financial security may have been slightly diminished through participation: a number of respondents in the covenant programs stated they underestimated the associated costs incurred in establishing and maintaining a conservation covenant. But, overall, participation appears to have had little influence on the measured dimensions of human capital. For example, the majority of program participants had extensive land management experience, and did not change their land management practices as a result of participation. They did not need assistance with the program application and could comfortably commit time and effort to the program. These findings suggest that, generally, program participants had high stocks of human capital prior to their participation, which provided them with the capacity to participate.

If the participants already had the capacity to meet their program obligations, and if the majority of them did not change their land management practices, a pertinent question to ask then is whether engaging landholders who have high pre-existing stocks of human capital will generate any additional conservation benefit. That is, if participation provides landholders with resources to generate ecological outcomes (i.e., human

capital, e.g., money, education), but to which they already have sufficient access, perhaps there is a need for program administrators to target landholders who have lower stocks of these resources. Of course the flipside of this approach is that if incentives are viewed by landholders as a "reward", this approach may be seen to reward complacency rather than equip under resourced people. Correspondingly, providing resources to the better equipped participants may also reinforce the conservation commitment of those participants.

Higher levels of pre-existing social capital of participants, observed in this research, may have influenced respondents' willingness to participate in the program. Most respondents were confident in the information provided to them by the program administrator before they agreed to participate, which suggests that respondents trusted the administrator prior to participation. Levels of trust may have further increased during the period of participation, given that the majority of the respondents stated they had a good relationship with the program administrator and believed the administrator was interested in the outcomes of the program on their property. Pre-existing common rules and norms may have also positively influenced participation, particularly of the Desert Uplands respondents. These respondents were more likely to believe that the Desert Uplands Committee, a locally-based non-government agency comprised of local community members, had a good idea of what happened on the ground and was interested in the outcomes of the program on landholders' properties. The Desert Uplands respondents were more likely than respondents in the other program to agree or disagree unanimously with the survey items, a finding that suggests that a high degree of social capital exists within this community.

Yet, participation in conservation programs may not always strengthen social capital. Many respondents did not feel they were adequately consulted on the design of the program, or that the program was sufficiently tailored to individual properties. These experiences of participation may reduce landholders' confidence that program administrators can offer programs that will support the necessary land management changes and generate positive conservation outcomes within a local context. Similarly, in the Desert Uplands, respondents believed that some landholders who demonstrated unsustainable land management practices had been accepted into the program. This result may be explained by the different land management regimes practiced in the

region, such as fire management. Fire is considered by some land managers to control woody plants, but not by others; whether fire is a 'friend or foe' as a management strategy is a 'puzzling and contentious' issue in the bioregion, which may be valid in some landscapes and circumstances, but not others (Fensham and Fairfax 2007, p. 3). The inclusion of landholders in the program who practiced fire management may be viewed as poor land managers by those who do not use fire, and vice versa, which may serve to deplete social capital because program implementation exacerbates differences of opinion within the community. Nonetheless, the fact that a space has been created for the debate on land management practices demonstrates high levels of social capital in this region (i.e. reciprocity and exchange).

Although I proposed that human and social capital would be important dimensions to consider in understanding participation in conservation programs, and indeed the results have demonstrated the value of using this concept to improve biodiversity conservation on private land, there remain limitations in applying the concept of 'capital' in this context. Attempts to itemise different forms of capital, such as was done in this research, may obscure important connections between and among them (Miller and Buys 2008), and some forms of capital will be intangible and may only be measured by the services they generate (Cocklin and Alston 2003). Moreover, forms of social capital that enables certain actions may disable or be harmful for others (Coleman 1988), most commonly when capital is used by individuals or organisations to maintain or enhance a position of power, usually through fear (Knight 1992; Ostrom 1998). Another consideration for the design, implementation and success of conservation programs is the rise of contemporary 'network societies'; that is, societies as networks, rather than bounded groups, which display observable systems of interaction, reliance, resource allocation, integration and coordination (Craven and Wellman 1973; Castells 2000; Newman and Dale 2005). This rise has created a-spatial and transnational communities to which individuals have a greater attachment, rather than to their spatially explicit local community. Therefore, research and engagement efforts that focus on local or regional involvement may generate an incomplete picture of landholders' goals and attachments.

6.4.3 POLICY & PROGRAM RECOMMENDATIONS

Human and social capital can have an influence on, and be influenced by, program participation. Program design and implementation can either strengthen or diminish capital. Although high stocks of capital do not guarantee that conservation goals will be pursued, it is unlikely that such goals will be achieved in the absence of a certain level of human and social capital. Where possible, therefore, programs should be designed to build capital when there is a shortage, and to strengthen existing capital where it exists (Table 6.5). Methods to build human capital should focus on: the provision of support services and infrastructure; awareness of the influence of cumulative stressors on landholders (e.g., financial circumstances); the influence of markets on landholders' land management priorities; and the nature and delivery of information and short courses. Human capital may be strengthened through the delivery of conservation programs that are flexible, provide a range of incentives, are compatible with landholders' practices and delivered at convenient times of the year, and offer property-level advice. Methods to build social capital should focus on understanding and respecting different landholder attitudes, building relationships, and providing opportunities for the expression of social norms. Social capital may be strengthened through the delivery of conservation programs that are designed to appeal to landholders' attitudes, incorporate landholders' visions for biodiversity conservation, and to provide medium to long-term programs with associated support. Such an approach will reduce the implementation of panacea solutions that fail to account for the different forms of capitals, including individual perceptions, circumstances and preferences, which commonly fail to deliver on conservation promises (Ostrom, Janssen *et al.* 2007). Finally, policy reform should be a necessary component of any conservation effort, to shape the wider context and to favour the emergence and sustenance of local groups (Pretty and Ward 2001).

Table 6.5: Examples of methods to build capital and types of program characteristics to strengthen capital.

	Methods to build human capital	**Program characteristics to strengthen human capital**
Lifestyle & wellbeing	• Understand & limit the effect of cumulative stressors • Minimise out-migration/increase in-migration to increase the labour pool • Provide necessary health care facilities • Ensure availability of healthy lifestyle opportunities (e.g., sports facilities)	• Reduce the administrative burden of program participation • Provide labour as an option in program participation • Offer flexible programs that accommodate landholders' short- and long-term property goals
Information, knowledge & experience	• Provide sufficient property-level extension • Offer free/affordable short courses at times & locations convenient for landholders • Provide opportunities for two-way learning between government & landholders • Connect landholders who have different levels of land management experience & education to learn from one another	• Develop property level program objectives, in consultation with landholders • Design monitoring programs to generate information that can improve participants' day-to-day land management practices
Financial security	• Monitor the economic climate of primary industries in a region to ensure that programs do not increase the financial vulnerability of landholders • Explore possibilities to increase opportunities for landholders to earn off-property income • Understand the differences between the financial security of producers & non producers	• Determine the effect of participation on landholders' ability to generate an income • Explore the use of economic incentives to support landholders with activities that provide public goods that go beyond their property right obligations/duty of care
	Methods to build social capital	**Program characteristics to strengthen social capital**
Attitudes	• Understand & respect landholders' attitudes towards the landscape • Determine the effect of landholders' attitudes on their land management practices	• Measure landholders' attitudes to determine the nature of programs that may appeal to them • Design programs to modify attitudes, when attitudes are deemed to influence unhealthy land management practices
Trust	• Create & foster relationships between policymakers, landholders & scientists • Support community building activities & projects	• Deliver medium- to long-term programs • Invest in programs that support ongoing relationship building • Increase retention of program staff to build long-term relationships & trust
Norms	• Encourage landholders to share their personal & social norms • Look for opportunities that allow expression of social norms within communities	• Design small-scale programs that appeal to individuals' personal norms • Design large-scale programs that appeal to broad social norms • Engage landholders in program design to develop a shared vision for biodiversity conservation

6.5 SUMMARY

The purpose of this chapter was to reveal any differences in the social dimensions of participants and non-participants. Human capital provides landholders with the resources (e.g., skills, knowledge) to participate, and social capital provides landholders with the opportunities (e.g., shared norms, trust) to work with others to achieve conservation outcomes. Program participants demonstrated higher stocks of human and social capital than non-participants, and these stocks appeared to be largely in existence prior to their involvement in a program. Non-participants demonstrated significantly lower levels of human and social capital than program participants within four of the eight dimensions assessed: lifestyle and wellbeing, information and knowledge, environmental attitudes, and trust. There were no significant differences for the other four dimensions. When offered a range of potential program incentives, respondents preferred those incentives that aligned with their human capital needs. These findings illustrate that non-participation in conservation programs may not necessarily demonstrate resistance or disinterest in conservation goals, but may reflect diminished levels of human and social capital.

CHAPTER 7
WHY SOME LANDHOLDERS CHOOSE NOT TO PARTICIPATE IN CONSERVATION PROGRAMS[1]

In this chapter, I outline why some landholders choose not to participate in conservation programs. I explore how the relative potency of landholders' barriers to participation results in two distinct groups of non-participants: those who may participate in a program, 'conditional' on its characteristics and objectives, and those who are 'resistant' and unwilling to participate in any conservation program. Although these distinctions have been made elsewhere, this chapter reveals the importance of understanding the context-specific drivers of non-participation. The chapter complements Chapter 6 by providing insights into non-participant landholders' decision-making processes and expectations of conservation programs.

7.1 INTRODUCTION

Adoption theory, which "concentrates on understanding the stages of the social process of adoption, the dynamics of adoption and psychological motivation to act" (Crabtree, Chalmers *et al.* 1998, p. 308), can be used to explore landholder non-participation in land management programs. This body of work has come to include technological, economic (i.e., rational choice) and socio-psychological approaches to explain and predict landholder behaviour. Initially, uptake of innovations and new practices was examined by estimating uptake rates at different levels of payment; "respondents were assumed to be profit maximising agents responding in an uncomplicated way to the financial incentive on offer" (Morris and Potter 1995, p. 54). While economists continued to examine the economic barriers to participation (i.e., inability to adopt) (Colman, Crabtree *et al.* 1992), rural sociologists began to take a more descriptive research approach, and examined the fit between the program and landholders' personal circumstances (i.e., willingness to adopt) (Morris and Potter 1995). This research trajectory, combined with Bowler's (1979) identification of socio-economic 'resistance' to agricultural schemes, led to the development of the 'participation spectrum' (Morris

[1] Moon, K. (under revision). Why some landholders choose not to participate in formal conservation programs. *Land Use Policy.*

and Potter 1995), which classifies landholders into four groups: 1) *active participants* who are willing to participate in land management programs because they view them as a legitimate use of their time and resources; 2) *passive participants* who are motivated by financial incentives and will participate at minimal cost and inconvenience; 3) *conditional non-participants* who may be persuaded to participate if the program criteria and incentives are commensurate with their personal circumstances; and 4) *resistant non-participants* who will not participate, irrespective of the program conditions and administrator.

The theory, largely in response to criticism (e.g., Marsden, Munton *et al.* 1986; Bowler and Ilbery 1987; Marsden 1988; Wilson 1996; Falconer 2000), has evolved to account for the interactions between structural, external and internal dimensions of participation (Battershill and Gilg 1997; Burton and Rob 2004; Defrancesco, Gatto *et al.* 2008), which each play a crucial role in non-participation. Structural variables that influence participation include property variables (e.g., non-farm capital, land size, tenure, property transaction costs, program eligibility) and institutional variables (e.g., the role of the state and its policies) (e.g., Bowler and Ilbery 1987; Marsden 1988; Marsden, Munton *et al.* 1989; Falconer 2000). For example, the structure of land management programs can result in high transaction costs for both the program administrator and the landholder, creating a significant barrier to landholder participation (Falconer 2000).

External sources of control relate to program characteristics, finances and resources. With respect to participation in market-based incentive programs, for instance, landholders remain concerned about the extent of administrative work; whether programs have the potential to achieve the stated ecological goals; the likelihood of receiving funding; the financial outlay and tax implications; time, labour and other resource costs; program funding, duration and the potential that participation will generate long-term gains in production and profitability (Rolfe, Windle *et al.* 2006; Morrison, Durante *et al.* 2008). More generally, program characteristics that can limit participation include a lack of flexibility, profitability, excessive complexity, incompatibility with personal and property objectives, perceived or actual inability to meet the program requirements, insufficient provision of information and concern that participation will result in future government control and regulation of landholders' properties (e.g., Vanclay and Lawrence 1994; Lobley and Potter 1998; Vanclay 2004;

Fielding, Terry *et al.* 2005). Common financial barriers to participation include insufficient returns on landholders' investment, long-term or intangible pay-backs, and the inappropriate use of artificial incentives, such as subsidies, that reduce land management costs only for the duration of the program (Bunch 1999). Landholders who rely on the land for income may be unlikely to engage in conservation activities when the private costs of conservation are greater than the private benefits (Doremus 2003; Greiner and Lankester 2007).

Internal sources of control (e.g., attitudes, values) are predicted to have a stronger and more long-term influence on behaviour (Lepper, Greene *et al.* 1973). Strong pro-environmental attitudes have been correlated with participation in voluntary conservation programs (Black and Reeve 1993; Luzar and Diagne 1999; Beedell and Rehman 2000; Ewing 2001); a formal voluntary commitment is considered to be a central aspect of internal control (Katzev and Pardini 1987). Landholders who are motivated by internal controls, however, may provide only minimal additionality (i.e., the extra benefit that is gained from the implementation of the program) because they would probably have protected the local ecology in the absence of the program (Race and Curtis 2009). When landholders' attitudes and values are more anthropocentric, they may be less willing to participate in programs and need external incentives to do so (Raedeke, Rikoon *et al.* 2001; Vickery, Bradbury *et al.* 2004; Maybery, Crase *et al.* 2005). The provision of external incentives, however, rarely affects long-term attitude change (Morris and Potter 1995).

Understanding the interactions between structural, external and internal dimensions of participation can bring legitimacy to landholders' decision not to participate in market-based land management programs, and provides a foundation from which to increase the relevancy and value of these programs to landholders. Importantly, understanding creates an opportunity for program administrators to move on from the view that those landholders who chose not to participate are "ignorant, short sighted, recalcitrant and laggards" and explore the notion that landholders "may be carefully choosing *not* to adopt, or that their reluctance to adopt may have a rational basis" (Vanclay and Lawrence 1994, p. 74). Low participation rates, for example, may be explained by landholders' view of economic instruments as "temporary bribes, shallow in operation and transitory in their effect" (Morris and Potter 1995, p. 52). Identifying landholders'

basis for non-participation can expose their context-specific experiences, needs and fears (Fjellstad, Mittenzwei *et al.* 2009), which can inform the selection of policy instruments to increase participation rates and improve ecological outcomes (Moon and Cocklin In Press, Corrected Proof).

7.2 OVERVIEW OF METHODS

Qualitative data were used in this analysis from interview with respondents who had not participated in one of the three case study programs. Respondents were divided into two categories: conditional and resistant non-participants. Conditional non-participants (*n*=17), were those respondents who demonstrated a clear willingness to participate in a land management program, such as through the provision of practical suggestions for program improvement or through an expressed desire to be involved. Resistant non-participants (*n*=12), in contrast, explicitly stated, at least once during the interview, that they had no interest in being involved in a land management program.

Refer to Chapter 3 for full details of the methods used in this research.

7.3 RESULTS

7.3.1 REASONS FOR NON-PARTICIPATION

Respondents were asked to explain their main reason for choosing not to participate in one of the three case study programs. Several conditional and resistant non-participants stated they were "way too busy" (NP3) to participate in a land management program, and that they "have enough work without participating" (NP1). Others stated that they did not believe they would qualify for the program, for example, that their property was of an insufficient size to qualify for the Nature Refuge program, or that in the Landscape Linkages program "it wouldn't have been viable" in terms of cattle production for landholders to commit relevant areas (NP21).

Conditional non-participants offered three common reasons for non-participation. First, they did not believe there was a need to participate in a formal land management program, they did not "need to participate because the land is protected" (NP19), "it's

all part of the [wildlife] corridor without being part of the program" (NP26). That is, the respondents believed they protected the land sufficiently on their own. For example, one respondent stated:

> "We've got a scrub up there, a lot of other people would have gotten rid of it. I fenced that into different paddocks so that it's manageable. And it will always be there, it's beautiful. I think the whole of the property, we've more or less made it a conservation area. When my son takes over from me, it will be managed the same. It's beautiful, it's perhaps 10-15,000 acres but we've just left it as it is. We just leave it" (NP 12).

Second, some conditional non-participants did not "even know about the various land management programs" (NP14), or didn't "really know what they're about" (NP27), that is, there was a lack of information about the programs. Third, other respondents wanted to maintain their autonomy: "I want to decide for myself" (NP4); "we don't want to lose control of our own land" (NP18).

In contrast, resistant non-participants provided a range of reasons as to why they did not want to participate in land management programs (Table 7.1). Crucially, they harboured a deep mistrust of government agencies and believed they had different attitudes to agencies who administered land management programs. Respondents stated that "the government is all politics and the rainforest comes second, politics comes first", and, therefore, their legislation and policies "do the opposite to what they set out to do" (NP15). One respondent said:

> "I think they're pathetic. You see them on television, make a big noise, look pretty, run around with bit of paper from the computer, that doesn't feed cattle. Computers don't feed cattle and they don't do the work either" (NP23).

Some respondents suggested that government have different attitudes towards land management than landholders. For instance, land management programs were believed to be "too herbicide-oriented. [The government] has this attitude that they can't change from grassland to forest without herbicide, and you can. It just takes a little more time" (NP7). This sentiment of misaligned attitudes was shared by other respondents: "basically, they're not in the real world, where they want you to be and what they want you to do and say. The government want us to go down their path, and be on their wavelength, but a farmer that gets that close to their wavelength, it's going to be a waste of time. It's just so much crap that you have to go through and it's not credible stuff" (NP8).

Table 7.1: Respondents' justification for why they are not interested in participating in land management programs

Conservation programs…	Landholder response
…are not on the agenda	• "It doesn't cross my mind. I don't see the degradation, it doesn't need fixing up. There are no problems here, the only thing I have is weed problems and I am at them all the time" (NP1).
…are not necessary	• "If something needs to be done, we just get it done. It might take a bit longer, but you get there" (NP11). • "In our case it doesn't matter if we don't participate because we can't clear [the vegetation] anyway" (NP8).
…are not necessary because the environment looks after itself	• "The rainforest looks after itself, regardless of what the smart people tell us to do. We saw that after Cyclone Larry. Now you look in and it's all recovering again. The big trees have fallen over and the little ones are all back and they are already up" (NP1). • "The environment can look after itself" (NP15).
…are not profitable enough	• "I'm not going to plant my pastures up with trees because there is no money in it" (NP1).
…are too complicated	• "There are so many hoops to jump through and they're not really in the real world, where they want you to be and what they want you to do and say. So it's easier to do it off your own back. And the government systems are so inefficient; where I see grant money being used, there would be much more useful environmental stuff that could be done" (NP8).
…are too political	• "The government is all politics and the rainforest comes second, politics comes first" (NP15).
…are of no interest	• "I would have nothing to do with them" (NP23). • "I do too many things for myself to be worrying about it. Not interested. There are too many people with different opinions and no proper practical experience" (NP2).
…are a threat to property rights	• "I don't trust what future governments would do if the land was taken completely out of our hands. The whole thing could be taken off us, taken away from us and then we'd have no control at all" (NP17).
…are unable to improve what we do	• "If someone can tell me how to run more cattle and make them fatter, then I'm all ears. I'm waiting for them to come through the gate. Come here with something that we can use, and something sensible, I think every landholder is willing to listen but they haven't got the answers, I know they haven't" (NP23).
…are not the landholders responsibility	• "Once again, the government demand landholders to do something and they do nothing, making themselves look more green, instead of putting the onus on them, managing their environmental bad practices properly" (NP7).

7.3.2 SUGGESTIONS TO IMPROVE PARTICIPATION RATES

Respondents were asked how program design could be improved to increase the likelihood of their own participation. Conditional non-participants offered constructive suggestions as to how programs could be improved. They were interested in flexible programs that would allow them "to add or remove clauses" (NP4) so that programs would better suit their needs. They wanted negotiable conditions, particularly given climate variability that necessitates that they adopt a flexible management regime.

Inflexible programs were considered to inadequately cater to landholders' needs, which equated to government "expecting you to basically *donate* your land for the beauty of the area and for the good of the future" (NP4-np).

Conditional non-participants also discussed the need to increase "public awareness and local advertising" (NP16) of land management programs. "Sometimes the advertising doesn't filter down to local areas, say Federal Government programs; nobody gets the information unless it's in the local newspaper or the Country Life magazine that the local landholders do get. Put it down in clear English for people to understand" (NP16). Other respondents wanted "emails that are easy to read and not drawn out" (NP27) that outline programs on offer, although some respondents did not have access to the internet or found that it was only intermittently available in their area.

Resistant non-participants stated that land management programs did not adequately accommodate local and regional ecological differences, which compromised program outcomes, particularly because the practical advice of landholders was not sought or incorporated in program design. For example, respondents stated that different land management regimes were required in desert and rainforest landscapes, but which were often overlooked during program design, particularly in state-wide programs. Programs that were implemented in desert landscapes, which required landholders to exclude grazing animals, were considered by some respondents to be a greater threat to the local ecology than the effects of grazing practices. Respondents in the desert country believed that "if the country's not improved it won't feed a wallaby. You clear this country, and if you don't follow it up, the bush comes back and there's no grass. A happy medium is with your timber still there, but keep your grasses in there too" (NP24). In contrast, some of the respondents in the Wet Tropics rainforest region believed that the presence of grazing animals in rainforest ecosystems was detrimental to the local ecology. Moreover, they believed that there was no need for active management or intervention in rainforests because for the most part, "the rainforest looks after itself" (NP1). Aside from weed control, these respondents considered that rainforest communities were largely self-restoring.

Resistant non-participants also believed there was no cohesion of the principles of land management between agencies or offered through land management programs. They

stated that “there are too many people with different opinions and no practical experience” (NP2), and that “the government demand us to do something and they do nothing themselves” (NP7). They said “there are single entities everywhere and if they combined their efforts they might be able to show a better result. Have the whole lot working together and you might come up with a better solution” (NP21).

7.3.3 Opportunities for programs to provide support

Respondents were asked how land management programs could be designed to support their land management practices or land management business. Almost half of the conditional non-participants would have appreciated support for weed management, including education, labour and materials “things likes sprays, they’re so expensive” (NP13). Respondents discussed “noxious weeds taking over in the rivers” (NP12), and that “it’s not just declared weeds, it’s woody weeds that are growing and taking over country that was once bare” (NP26). Weed management was a heavily discussed topic. A similar number of respondents were interested in general education and information on land management, including one-on-one advice (e.g. “better advice about the individual property, NP25), monitoring (e.g. “nutrient and soil testing”, NP16) and best practice trials (e.g. “where they trial different stocking rates on different country”, NP27). Other suggestions included reimbursement for monies spent on biological diversity conservation, community involvement in tree planting days on private property and social recognition of landholders who demonstrate good land stewardship. In regards to this final point, however, one respondent spoke of a landholder who was chosen by council as a good land steward but whose property was covered in weeds and who was not locally known as a good steward. The respondent stated that the reason council chose this landholder “is that they don't know the difference! If you do recognition well, it's a very powerful tool, if you do it wrong, the community knows” (NP4).

The vast majority of resistant non-participants were not interested in receiving any support. They said that “if something needs to be done, we just get it done” (NP13), that “I can manage the property on my own quite well” (NP21). One respondent wanted “permission to clear regrowth timber because the vegetation is just taking over”

his productive land (NP24). It is illegal to clear certain stands of regrowth vegetation in the State of Queensland.

7.3.4 MOST IMPORTANT CONSIDERATION TO PARTICIPATE

Respondents were asked what was the most important consideration that they would make before applying to join a land management program. A significant concern for non-participants in both groups was the effect of participation on their property rights, how it "locks your land up" (NP19). Respondents said: "The departments try and take over the control and we do have to be very careful, it's our income, our livelihood. You hear of things where the people sign up to these things and then it comes back to bite them. So you really need to know there aren't going to be repercussions" (NP26). And: "it's natural to fear this sort of thing, because I've seen people lose their properties to National Parks and not have a choice. They just decide on how much it's worth, and see you later" (NP29). So, "you'd have to know the clauses of the program, and even then you can't trust the government to honour those" (NP17). Respondents wanted to maintain their autonomy: "we'd join them, but we'd have to have a cast iron guarantee that they weren't going to tell us what to do" (NP4). One respondent questioned:

> "How much power are they going to have over your land? It's the power. This [Nature Refuge] covenant they want you to put on, you are a joint landowner, you don't own the land by yourself anymore, you own it with the government. And I don't like that, I like to be my own boss. Once they have a foot in, they make new laws down the track, you don't know what powers they want, and if you have already signed, there is nothing you can do about it. You have to be very careful, I don't trust them. The government changes the laws all the time" (NP1).

Both conditional and resistant non-participants also stated that program administrators had to be trustworthy, credible and practical. "You'd have to make sure it was a reliable source, you've got to read the fine print on everything" (NP13). Respondents wanted to work with people who "were down-to-earth about what they were doing, walking their talk" (NP27). They expected programs to have a "demonstrated focus and relevance" (NP9), and that programs were "practical and that the people involved were practical people" (NP15), that "it was not just another way to create employment for people" (NP8).

Conditional non-participants, who used the land for production, stated they would consider the effect of participation on the viability of their business, that is, "how it's going to affect the running of your property" (NP10). Respondents were only willing to participate "so long as production's still viable" (NP25). Other respondents feared that if they voluntarily agreed to put a conservation covenant on their property that they would be unable to benefit from incentives offered as part of future programs, such as carbon trading or rate rebate schemes. They believed the program administrators would say "you've already done it, you can't clear yours, so we're not going to give you money not to clear it" (NP19). They were also concerned that a covenant may "put them at a bit of a disadvantage, if a lot of land was left for conservation" (NP13), particularly a reduction in the asset value of the property that may result when covenants restrict land use options.

7.4 DISCUSSION

Just over half of the respondents were categorised as conditional non-participants, who stated that they had not participated in one of the three programs because they did not have time or believed they were ineligible to participate in the program. They saw participation as a threat to their autonomy, but were willing to participate in flexible programs that supported their land management activities through the provision of appropriate incentives. In contrast, resistant non-participants demonstrated a strong preference not to be involved in any land management program. They had a deep mistrust of government, were dubious about what motivated government to develop certain policies, and were concerned about the effects of those policies on their family and business. They believed that they had fundamentally different attitudes to the government on how the landscape should be managed and identified this misalignment as a major barrier to participation. They stated that land management programs inadequately accommodated landholder knowledge and often recommended sub-optimal, or even threatening, land management practices. Conditional and resistant non-participants both stated that their most important considerations before applying to participate in any management program was how participation would affect their property rights, now and into the future, and whether the program administrator was trustworthy, credible and practical. Conditional non-participants said they would also be concerned about the effects of participation on their production business.

What is evident from these findings is that while conditional non-participants were influenced by particular external sources of control (e.g., incentives, program design) and farm structure variables (e.g., eligibility), resistant non-participants were strongly influenced by internal sources of control. Resistant non-participants' internal sources of control were represented by anti-government attitudes, rather than anti-environmental attitudes. In fact, they demonstrated strong pro-environmental attitudes, through commitments to organic farming and a willingness to engage in ecological improvement and protection activities on their property, as has been recorded elsewhere (Vanclay 2004; Greiner and Gregg 2011). But they were opposed to the philosophy of land management programs and the need for them, and as observed by other scholars, resented the intrusion of program administrators into their private decision making (Lobley and Potter 1998). Therefore, although there is an expectation that landholders can be 'pushed' along the participation spectrum (Morris and Potter 1995), these strong internal sources of control, which can be difficult to change, may present a much greater gulf between resistant non-participants and other groups of the spectrum.

Resistant non-participants also appeared to be influenced by the structural nature of institutions, which created a barrier to participation, particularly in government-led programs. For example, respondents' stated that in desert and savannah landscapes, trees compete with grasses for water and sunlight, resulting in sparse ground cover under trees that contributes to water erosion, an experience of similarly situated landholders in Queensland (Seabrook, McAlpine *et al.* 2008). A failure of program administrators to consider and, where necessary, accommodate such information reflects the structural nature of policymaking and program design, which is often based on complex political processes rather than strictly ecological imperatives. The result can be "rushed and ill-considered choices based on immediate electoral advantage, rather than a long term 'public' or 'national' interest" (Davis, Wanna *et al.* 1993, p. 158). The consequences of this reality, when observed by resistant non-participants, may reinforce their mistrust of, and unwillingness to depend on, government. Their preference then, may be to favour programs that rely on the private sector to reduce or avoid dependency on the government, rather than consider government-led programs that that require landholders to make certain investments that lead to lock-in effects and the concomitant enforcement of government rules (Jongeneel, Polman *et al.* 2008).

Coming back to the external sources of control that influenced conditional non-participants, their decisions were driven by a perceived lack of program practicality and credibility, more so than by a lack of explicit program incentives. While some respondents stated that they would appreciate, or require, financial incentives to guarantee their participation, few respondents had this expectation. This finding is reflected in the literature: although financial incentives are a major motivating factor for some landholders, they are of little importance to many (Smithers and Furman 2003; Ruto and Garrod 2009; Boon, Broch *et al.* 2010). That is, economic interests in land management programs may be important in some instances, but are unlikely to be the determining factor in landholders' decision making (Siebert, Toogood *et al.* 2006). Respondents' desire for practical and credible programs, however, was pervasive. This finding makes sense: landholders need to be sure that they can implement the program on their property, that they can generate the desired program outcomes as specified, and that they are interested in achieving those outcomes on their property. Participation is therefore more likely when landholders can clearly understand, and agree with, the obligations of participants (Wossink and van Wenum 2003).

The characteristics of, and differences between, conditional and resistant non-participants can be used directly to inform the adoption of economic policy instruments in land management program design. The preferences of conditional non-respondents made it clear that economic policy instruments will not save an otherwise poorly-designed program. That is, the overall design of the program needs to practical, achievable and relevant to landholders. Program administrators can most easily overcome poor design by engaging landholders in the design phase of the project. The anti-government sentiment of resistant non-participants, however, reminds us that economic instruments can be employed by a range of organisation and within different sectors, to increase ecological outcomes on private land. It may be more worthwhile, for instance, to explore market-based mechanisms that can evolve within the private sector, largely independent of government, in areas where there are high levels of mistrust in the government and their partners.

The assumption underlying this research is that the design and implementation of the three conservation agreement programs offered in the study region must have failed on the points raised by the conditional non-participants, otherwise would have participated.

Of course, there were some respondents who did not participate because they believed they were ineligible and others who made an informed decision not to participate on the basis that the program criteria were incompatible with their land management practices. There was undoubtedly, however, another group of respondents whose non-participation was based more on perception rather than fact. For instance, the Queensland Government Nature Refuge program has, in addition to standard conditions that apply to all refuges, non-standard customised conditions that can be applied to individual properties to create flexibility in program implementation. These customised conditions can be tailored to particular land use activities and include those activities related to production (e.g., allowing light grazing activities and using heavy machinery on stable soils), and activities related to conservation (e.g., developing an ecosystem management plan and encouraging the recovery of threatened species). Therefore, respondents who were concerned about the effects of participation on production and future land use benefits may perceive rather than know that the Nature Refuge program creates those barriers. Nevertheless, perceptions of land management programs can act as a significant barrier and therefore, whether correct or not, must still be considered by policymakers and program designers.

7.5 SUMMARY

These findings presented in this chapter support the clearly-defined distinction between conditional and resistant non-participants that have been discussed within the adoption theory literature. Moving beyond this distinction, the research has revealed different drivers of non-participation in land management programs of these two groups. Conditional non-participants were influenced largely by external sources of control, namely program characteristics and to a lesser extent financial incentives, and by farm structural variables, which affected their eligibility, both real and perceived, to participate. In contrast, resistant non-participants were influenced by internal sources of control, primarily their strong anti-government attitudes and the politics of land management, which stems from the structure of institutions and, in their opinion, reduced the efficacy of land management policies and programs. The participation spectrum continues to offer a useful classification to policymakers and program designers, and when combined with context-specific information about the landholding population, can be used to guide the use of economic policy instruments.

CHAPTER 8

HOW TO IMPROVE CONSERVATION PROGRAM DESIGN[1]

In this chapter, I outline how conservation programs may be designed to enlist non-participants. I explore the multitude of conflicting and competing interests that program administrators may need to account for during program design, and non-participants perceptions of how well those interests are balanced. This chapter complements Chapter 7 by providing explicit detail on landholders' expectations of conservation programs and the practical and political constraints on meeting these expectations.

8.1 INTRODUCTION

In 1925, Lawrence Frank published an article titled "Social Problems", in which he imagined a man from Mars visiting Earth and offering some insight into ongoing human problems. After having the various problems on Earth explained to him, the Martian mused:

> "every social problem you describe seems to have the same characteristics as every other social problem, namely, the crux of the problem is to find some way of avoiding the undesirable consequences of your established laws, institutions, and social practices, without changing those established laws etc." (Frank 1925, p. 467).

The Martian's remarks reflect the fundamental nature of social problems: the need for some action to be undertaken or avoided without interference to the rights, activities and interests of those involved (Frank 1925).

Thirty-one years later, the Martian was imagined again, this time by William Brueckheimer, who was interested in his perspectives on environmental problems. The Martian was satisfied that humans indeed had the know-how to solve many of their environmental problems, so was confused that the problems remained. Until, of course, the conditions for solving the problems were stipulated: as a society, "we must not infringe upon anyone's rights of private property or freedom to make a profit, and that what we want is to find a way to accomplish our ends without interfering with anyone's customary way of doing things" (Brueckheimer 1956, p. 199). These remarks

[1] Moon, K**.** (in review). The perspectives of non-participating landholders on biodiversity conservation program design. *Journal of Environmental Management.*

demonstrated the irrationality of trying to achieve physical landscape change, without changing social relationships and economic conditions (Brueckheimer 1956).

Both of these narratives illustrate that environmental problems, such as increasing biodiversity conservation on private land, are, in fact, fundamentally social problems. Social problems exist when there is either a conflict of values, a failure to agree upon values, or a threat to existing values; or disagreement on how outcomes should be achieved (Wirth 1940 in Brueckheimer 1956). Given that values, interests and resources of individuals, groups and organisations are typically translated by the state into environmental objectives and policies (Davis, Wanna *et al.* 1993), the solving of environmental problems becomes an inherently political process (Cortner and Moote 1999). Therefore, participation in conservation programs should be examined by "focusing on the multiple interests and actors within communities, on how these actors influence decision-making, and on the internal and external institutions that shape the decision-making process" (Agrawal and Gibson 1999, p. 629). According to Escobar (1998, p. 55), from a discursive perspective, "biodiversity does not exist in an absolute sense. Rather, it anchors a discourse that articulates a new relation between nature and society in global contexts of science, cultures, and economies".

There are several dominant social facets of environmental problems that challenge the development and implementation of a solution. First, many environmental problems require collective action, which is necessary when one individual's contribution to a problem or a solution is only a small part of a much bigger whole. Since each contribution is small, individuals make decisions on the basis of their own preferences and needs. This point is most comprehensively explored in the Tragedy of the Commons (i.e., common pool resources) which states that "ruin is the destination to which all men rush" because they each pursue their own interests and aim to maximise their personal gain, rather than pursuing the interests of society as a whole (Hardin 1968, p. 1244). The result is that "each man is locked into a system that compels him to increase his [resource consumption] without limit – in a world that is limited" (Hardin 1968, p. 1244). The consequences of such tragedies are most acutely exemplified in the case of global climate change (Ostrom, Burger *et al.* 1999). Rational choice theory explains human behaviour in this context: humans choose the most efficient, effective

and economical means to achieve their goals (Mueller 1989; Herrnstein 1990; Becker 1993; Ostrom 1998).

Second, environmental problems are at the mercy of social interest cycles. Social interest in environmental problems often follows the issue-attention cycle which involves five stages: 1) the pre-problem stage; 2) alarmed discovery and euphoric enthusiasm; 3) realising the cost of significant progress; 4) gradual decline of intense public interest; and 5) the post-problem stage (Downs 1972). Essentially, public and political interest waxes and wanes subject to the fortunes of fashion and interest, which increases the likelihood that any response to an environmental problem may only be symbolic in nature (Connelly and Smith 2003). Yet, although the initiation of action to redress environment problems may be followed by a period or inaction, it may also be followed by stages of organisational succession (i.e., replacement of the original institutions or organisations by new ones that focus on the same problem) (Peters and Hogwood 1985). Organisational activity is often related to the most prominent environmental problem of public concern (Peters and Hogwood 1985). A 'cycle of influence' may also be at play, which is initiated when major political parties inadequately respond to environmental problems. This situation can provide electoral success to a minor or 'third' party that then draws the attention of the major parties, and the wider public, to the importance of the problem (Pinard 1975; Rüdig, Franklin *et al.* 1996). Economic cycles will also influence political agendas and the electoral success of government and opposition parties (Nordhaus 1975; Rüdig, Franklin *et al.* 1996).

Third, policymakers' rationality is bounded by their knowledge and capacity, and the culture of their organisation, an idea explored within administration behaviour theory (Simon 1950; Simon 1997). Environmental problems often become embedded in institutions; once they are embedded, the institution's inherited methods and techniques of problem-solving limit the efforts to only those that are amenable to the institution's administrative and technological responses (Connelly and Smith 2003). Moreover, the scale of organisations can limit their effectiveness in solving environmental problems. For example, biological process transpire at small, medium and large scales, which necessarily requires governance arrangements to be arranged at similar scales to accommodate this complexity (Ostrom 1995). Failure to recognise the need for design

complexity, that involves effective linking between institutions, can significantly debilitate any environmental improvement action.

Fourth, responses to environmental problems can be the result of the relative power and influence of an individual, group or organisation (Armitage 2002). The exercise of power can be covert, overt or latent (Lukes 1974). In overt conflicts, the tangible effects of the power of one over another can be observed (e.g., party politics); in covert conflicts, the effects of power are immediate but not observed (e.g., non-decision making by one party against another); and in latent conflicts, the effects of the power of one over another is observed at a later date (Connelly and Smith 2003). The influence of power can create a 'mobilisation of bias' whereby successful actors can organise their interests into politics and organise the interests of other actors out; once established, reversing the political agenda can be extremely difficult (Connelly and Smith 2003). Yet, "politics finds its sources not only in power but also in uncertainty - men collectively wondering what to do […] Governments not only 'power' […] they also puzzle. Policy-making is a form of collective puzzlement on society's behalf […]. Much political interaction has constituted a process of social learning expressed through policy" (Helco 1974, p. 305-6 cited in Hall 1993).

It may be crucial to consider non-participation within the broader context that recognises biodiversity conservation as a social problem, to bring legitimacy to landholder barriers to participation.

8.2 OVERVIEW OF METHODS

Qualitative data were used in this analysis from interviews with respondents who had not participated in one of the three case study programs. Respondents were divided, according to their dominant land use, into two categories: production and non-production, which broadly reflect landholders' reliance on the land for income. These categories can influence landholders' preference for program incentives (see Chapter 4). Production landholders relied on the land for more than 50% of the household income and/or used more than 50% of their property for beef grazing (n=14), fruit production (n=1), or dairy farming (n=1). Non-production landholders derived no income from production-related activities and either left the land vegetated (n=7) or used the land for

private conservation (n=5) or hobby farming (n=1). Codes were assigned to each respondent: *p* denotes a production landholder; *np* denotes a non-production landholder. A number was also assigned to each respondent and *NP* denotes that the landholder was a non-participant.

Respondents were asked to discuss how conservation programs could support their land management practices or business, and how well programs meet the needs of landholders.

Refer to Chapter 3 for full details of the methods used in this research.

8.3 RESULTS

8.3.1 SOCIO-POLITICAL CONTEXT

The socio-political context in which a conservation program is being offered was commonly discussed by landholders as a barrier to participation. In particular, respondents discussed their lack of trust in government (see also section 7.3.2.1). For example, some respondents believed that "the government is all politics and the rainforest comes second, politics comes first. If a program was from people with practical knowledge, which has nothing to do with politics then [landholders] would think about working with them" (NP15-np). That is, there needs to be "practical men at the top making the decisions. And that's been the problem all the way along; the people at the top just don't know what's going on" (NP15-np). Respondents stated that although they had seen some good programs, they believed others were mere gestures used by politicians to pretend that they were doing something for biodiversity, but in fact, these programs "just paid lip service" to the environment (NP26-p), that is, there were no environmental gains. A further concern identified by the respondents was that the government "doesn't trust the landowners: they're far too heavy on the penalty clauses and far too light on delegating responsibility. The vast majority of landowners will do the right thing by their land, but you need to give them the power to do so" (NP4-np). In other situations, respondents were frustrated that "the government tells landholders what to do but won't do it themselves" (NP7-p).

Respondents also discussed the contradictions that exist between government departments. For example, the Department of Primary Industries "make it that you can run more cattle. But by running more cattle, we're over-using our land" (NP12-p). Meanwhile, the Department of Environment and Resource Management has a much stronger conservation stance and "has come along in the past and just drawn on a map and said, we're taking this land for conservation, which was over one third of the property" (NP25-p). This respondent stated that to commit that land to conservation and exclude cattle grazing would cripple their production business. Respondents thus questioned, "how can you trust a system that says one thing and then goes around and does another thing? It doesn't matter if it's a different government department, it's still the government" (NP7-p). One respondent reflected: "management is very dependent on the personality of regional directors" (NP28-np).

Responses also highlighted the legacy of past policies on landholders' current views of government, which had instilled a deep mistrust in the government and thereby a reduced or non-existent willingness to participate in government programs. For example, one respondent reflected on how government policies have altered since the implementation of the Soldier Settlement Scheme (see section 2.3.1) introduced after WW2:

> "Our first bit of land we got in a ballot and we had to clear it; we had no choice. But there were a lot of places we didn't want to clear, there were some beautiful places we wanted to keep, but the government forced you, you had to clear the land or you lost it. It is the same government today that will fine me if I go out and cut a tree down, which they think they own, that forced me to cut all those trees down and burn that land" (NP2-np).

8.3.2 PROGRAM CRITERIA

8.3.2.1 Practical, property-level objectives

Common among respondents was the desire for programs that had practical, property-level objectives. Respondents reported that conservation programs, and land management programs in general, remained impractical and inadequately tailored to local conditions or individual properties. One suggestion as to why programs were unpractical was because they are "put out by people down south and they think that we have the same conditions here in the north and they don't understand the difference" (NP18-p). One respondent discussed his involvement in a pilot program for restorative

environmental work that relied on estimates and "recommendations that were way out, based on what is usually recommended for the rest of Australia, which aren't practical at all" for tropical regions where his property was located (NP18-p).

The suitability of a conservation program to any landholder "depends on the circumstances, it depends on what vegetation you've got on your land too" (NP22-np). Respondents discussed their preference for programs offered by local non-government natural resource management agencies that "have been tailor-made by locals to suit local areas. While you get the information from the [state] departments to back it up and carry it through, they still have that local flavour that suits the area" (NP26-p). Respondents believed they know what works on their own property and have the machinery and know-how, and therefore the capacity, to implement on-ground works on their property so they can get the best value out of their participation.

8.3.2.2 Flexible objectives

Flexible objectives were considered important; respondents wanted the option to modify programs to suit their needs. They wanted negotiable conditions, particularly given climate variability that necessitates a flexible management regime. Inflexible programs were considered to equate to government "expecting you to basically *donate* your land for the beauty of the area and for the good of the future" (NP4-np). That is, inflexible programs were not deemed to account for the needs of the landholder, but rather required them to provide a public benefit at a private cost.

8.3.2.3 Clear outcomes & benefits

Respondents expected clear outcomes from their participation, in particular, programs that aimed to provide local environmental benefits. Instead, conservation programs were viewed as a mechanism "to create employment for the people who run them", so it is "rare to see actual on-ground benefits" (NP8-p). For example:

> "the $400 million to save the [Great Barrier] Reef, I'd be very surprised if anything actually gets done. From what I've seen, it will provide vehicles, there will be a lot of people on salary to talk about it, and brochures. It's a snake eating its own tail: government funding for land management basically devours itself; there are no environmental gains" (NP8-p).

Respondents were interested in programs that provide on-ground outcomes, rather than having to fill in application forms with "wording and terminology that you have to use to impress people" (NP8-p). Instead, "it would be nice to have people who can relate to the landholder and can assess people on their practicalities and integrity of doing the right thing" (NP8-p).

8.3.2.4 Less bureaucracy

Respondents wanted programs that did not have onerous administrative components because usually "there's too much red tape" (NP24-p) and they "often find it comes with strings attached" (NP22-np). One respondent asked "why invite a bureaucrat, which is drama, into your life and onto your land" (NP7-p) when you can do the work yourself? Another respondent reflected that in the past:

> "a lot of programs wouldn't get started, because the money wouldn't flow. I can remember everyone committed to one program when the price of diesel [used in combination with herbicide] was pretty low. But by the time the money come through for the poison, people decided that because the price of diesel had doubled, they weren't going to go ahead with it. If they just handed out some herbicide, people could get straight away into it, but they go and have a yarn to everyone, and fill in forms and after six months, they get back to you. Six months is a long time if you have bad cattle prices or wool prices, or whatever" (NP21-p).

8.3.3 PROGRAM INCENTIVES

8.3.3.1 Education

Respondents wanted one-on-one education, founded on local knowledge, to provide "better advice about the individual property" (NP25-p); the reintroduction of "extension officers would be a good idea" too (NP16-p). For example, "if someone could demonstrate a rational way to control the encroachment of weeds" (NP26-p) or offer best practice trials that provide "research into what can be done to utilise the natural grass that you grow" (NP27-p). "More educational resources available for landholders, in terms of actually managing your property" (NP5-np) were considered beneficial, as well as providing "different ideas" (NP14-p) for land management.

8.3.3.2 Materials & labour

Trees were also considered a valuable incentive to assist with biodiversity conservation. One landholder was eager to be given seedlings so she could "fill half the cow paddock with trees, especially around the springs" (NP19-np). However, one respondent who was provided with free seedlings was told to plant them immediately because the government officer would be back "in 3-4 weeks to see how they've been planted." The respondent told the officer:

> ""I won't be planting them in 3-4 weeks; I won't be planting them till April-May next year. If I plant these trees now", which was October, "by the end of January, they will be all dead. The heat of this place will kill them". See, they bring in someone that hasn't had the practical experience and it doesn't help" (NP2-np).

Labour was welcomed by some respondents because "any hands you get would be great" (NP3-np). Other respondents felt that "a lot of people might not like somebody they don't know on their property" (NP13-p).

8.3.3.3 Weed control support

Of particular interest to respondents was support for weed control, including labour, spray packs, chemicals, and education. Respondents commented that the cost of herbicide is increasing, which makes it more difficult to control weeds. And "weeds are going to be our biggest killer of all time, particularly noxious weeds. Government bodies need to be more strong and motivated towards this, help the landholder and help him control it" (NP12-p). But "it's not just declared weeds; it's woody weeds that are growing and taking over on country that was once bare" (NP26-p). Yet, despite the efforts of landholders to control weeds such as prickly acacia (*Acacia nilotica*), a weed of national significance, described by the Australian Government as "one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts" (Department of the Environment and Heritage 2003), local councils were seen as ineffective in assisting landholders to manage the species:

> "I killed some prickly acacia along the road. I have asked and written to the council and they've done nothing about it. It gets too late: the seeds get going, they hit the water course and they're gone" (NP12-p).

8.3.3.3 Money for on-ground works

Money for fencing and other on-ground works was also seen as a valuable program incentive, which encourages participation "without the landholder having to pay for the all the ongoing works" (NP16-p). Usually when financial incentives are provided though, "it's in dribs and drabs and the paper work and the on-costs are just too prohibitive to do the work" (NP18-p).

8.3.3.4 Economic incentives

Rate rebates represented a popular incentive "for the rainforest areas that you're not allowed to touch" (NP1-p). Some respondents believed it was inequitable that lower council rates (property taxes) were applied to land used for primary production, and higher rates applied to rural-residential land where remnant vegetation, maintained by the landholders, often constitutes a significant proportion of the property. Respondents stated that if you cannot use the conserved area for grazing, then "it's totally closed up, so the rates are just money down the drain" (NP18-p). Respondents emphasized that council rates are a "big deterrent" to accepting the establishment of a "small national park" on the property (NP18-p). Sometimes "the costs [of conservation] jeopardise your ability to stay on the land into the future to look after it" (NP17-np).

Carbon credits were also mentioned by respondents as an attractive financial supplement for biodiversity conservation on their property, but many were unwilling to make any changes to their title deed, or in their words, "sign the deed away", to be involved in such programs (NP2-np). Respondents felt that:

> "we have existing trees here on the land, which take carbon out all the time, we don't get paid. I get no benefit whatsoever, yet I'm paying land rates on it, which I am a bit bitter about" (NP1-p).

8.4 DISCUSSION

Respondents believed that conservation programs inadequately attended to local environmental conditions, the social and economic priorities of landholders, and the value of landholders' time and expense in participating in formal conservation activities. They perceived conservation programs to be impractical, irrelevant, inflexible, ineffective and bureaucratic. They did not feel that conservation programs

offered incentives that were relevant to conservation activities, such as education, material and labour and economic incentives.

We can compare these 'conditions for program non-success' quite neatly with 'conditions for program success', detailed by Cocklin *et al.* (2007). These authors held workshops with landholders in Victoria Australia, to understand landholders' expectations of conservation programs and their preferred policy instruments. The conditions for success identified by the landholders included program objectives that: incorporate practical (on-farm) components, are tailored locally, are realistic, are targeted to achieve environmental outcomes, provide visible benefits, offer flexible rules and timelines for funding, recognise prior work completed, and are not administratively onerous (Cocklin, Mautner *et al.* 2007). They wanted to receive carbon credits (e.g., payments) for existing vegetation, not just new plantings, the opportunity to opt-out of programs, and administrators to consider different strategies to achieve the same outcomes. The purpose of this comparison is to suggest that when these conditions for success are not met, non-participation does indeed appear to result.

Respondents' recommendations to improve program design and delivery were realistic, reasonable and familiar. So, why do conservation programs continue to fail to meet landholders' needs? Two broad answers may be provided. First, competing and conflicting interests seem to influence program design and delivery, which results in the perceived disproportionate and unfair consideration of landholders' need and expectations. Second, national and international policies impede the use of certain policy instruments, in particular economic and regulatory instruments, which may be crucial to the delivery of conservation outcomes. In this discussion, I am going to focus on these two limitations to program design because they represent highly impermeable barriers to participation.

8.4.1. THE EFFECTS OF COMPETING AND CONFLICTING INTERESTS ON PROGRAM DESIGN

When landholders choose to invest in biodiversity conservation activities, those activities have successfully competed for the landholder's time and money over other activities. Similarly, when an organisation invests in the design and delivery of a biodiversity conservation program, they have chosen to prioritise those particular

activities and investments over others. To illustrate, expected outcomes from one hectare of land may be the extraction of 50 tonnes of pineapples, support of 3 head of cattle, or successful establishment of 2,500 tree seedlings. Therefore, *competing* interests may be thought of in terms of the *outcomes* that individuals or organisations expect or require from different land uses. When individuals or organisations assign different *values* or importance to these competing interests, conflict can arise, which I refer to here as *conflicting* interests.

Interests can compete and conflict in such a way that they influence conservation program design and cause some landholders to refuse to participate. Landholders stated that conservation programs were inadequately tailored to their social, economic and biophysical conditions; they believed the interests of other actors, which compete or conflict with their own interests, were prioritised. Perhaps program designers simply do not understand the priorities of landholders. Either way, decision-making processes that fail to balance these competing and conflicting interests can result in dysfunctional program design that can "as effectively cripple a conservation effort as can a major biological catastrophe" (Kleiman, Reading *et al.* 2000, p. 356).

Perpetual conservation covenants provide a good example to illustrate the idea of competing interests. Conservation covenants are legally enforceable documents that are attached to a land title. They allow the landholder to retain possession but restrict certain land uses to ensure the protection of biodiversity (Kabii and Horwitz 2006). Despite the often flexible nature of perpetual covenants, landholders may be unwilling to commit to a covenant and instead prefer a short-term program that does not restrict their future land use options. They may decide that long-term programs will limit their ability to respond effectively to changing climatic, market and legislative systems (Vanclay and Lawrence 1994). Take for instance, an ecosystem that provides habitat for a number of rare native species. During optimal environmental conditions a grazier may not stock this sensitive area, but during winter or drought conditions, when planted pastures fail to meet the dietary needs of livestock, they may feel forced to use the area if it allows them to remain profitable (Winter, Prozesky *et al.* 2007). So while the area may be amenable to a covenant, the grazier may choose not to covenant the area because it reduces the flexibility of their management. Yet, while short-term flexible programs may meet the interests of landholders, programs that are too flexible may fail

to meet the long-term interests of biodiversity conservation. While the goal is to devise ecologically and socially accountable programs that balance the competing interests between individual landholders and the broader community (Kleiman, Reading *et al.* 2000), over-accommodating particular interests can jeopardise program success (Clark 1996). That is, a commitment to 'fairness' may lead to unnecessarily complex programs or opportunities for overexploitation (Healey and Hennessey 1998).

Conflicting interests are also relevant to program design, where they can be expressed as ill-defined or inappropriate program objectives. Ill-defined objectives can result from the influence of cognitive biases and value interests, which result in 'implied' rather directly-stated objectives because consensus cannot be achieved on the specific conservation outcomes (Clark 1996). Similarly, when program designers are forced to accommodate particular political and socio-economic concerns, inappropriate objectives may be set that are not contextually relevant (Scott, Tear *et al.* 1995). The consequence of ill-defined or inappropriate program objectives is that while ecological goals may be achieved, they may simultaneously generate undesirable secondary effects, such as loss of regional support or conflict between organisations and groups. Alternatively, while some programs may generate social gains, such as increased social capital and shared learning, they may fail to achieve their ecological goals (Kleiman, Reading *et al.* 2000). The expression of conflicting interests can directly point to explicit reasons for the success or failure of a particular program (Scott, Tear *et al.* 1995).

Respondents discussed at length their frustration with the conflicting interests between government departments. They explained how inter-governmental conflict can undermine their perceptions of conservation program integrity and reduce or eliminate their willingness to participate. Often, government agencies have multiple mandates, for example when one agency is responsible for mining or primary production *and* ecological conservation (Ascher 2001; Armitage 2004). The agency must deliver multiple and sometimes contradictory environmental objectives (Wilson and Buller 2001), and when environmental objectives are less consistent with the agency's main function, those objectives may be neglected. Individual ambitions of senior staff can also thwart the delivery of conservation outcomes (Ascher 2001), as identified by one respondent. Rarely, if ever, do program designers make explicit the implicit value judgements of individuals involved in program design (Mullen 1996), which can leave

landholders with the job to resolve resource conflicts through their land management decisions.

Nevertheless, government agencies remain politically accountable for program delivery, which respondents understood and accepted. What they did not accept though, was that program 'outputs' were measured, rather than program 'outcomes'. Program output indicators are politically useful indicators because they are easily measured (Press 1998). They include the number of programs implemented, program expenditure, number of program participants, and total area conserved. Respondents viewed program funding, for example, an inadequate measure of program success because they did not perceive that the amount of conservation funding is proportional to the ecological benefits that are generated. They preferred program outcome indicators, such as an increase in the recorded numbers of a threatened species that they considered more adequately demonstrate whether or not, in this example, a conservation program has increased the population of the threatened species. Decision-making processes that include landholders' suggestions to measure policy outcomes will increase the relevancy of the program to them (Fraser, Dougill *et al.* 2006). Yet, program outcome indicators tend to be more difficult to measure because of ecosystem complexity (Wilson and Buller 2001), and so proxies are often used, such as the increase in extent of habitat for a threatened species, rather than the population of the threatened species, for instance. Proxies, however, can limit the collection of meaningful ecological information because they commonly act as "a vehicle for summarizing, or otherwise simplifying and communicating information about something that is of importance to decision-makers" (Moxey, Whitby *et al.* 1998, p. 265). The active involvement of landholders in the development and implementation of a monitoring regime may reduce the need for proxies.

Some scholars have argued that beyond measuring outputs and outcomes, there is a need also to measure 'actors' and 'procedures'. These performance indictors would measure the effect of participation on landholders' attitudes, knowledge, and social action (actors); and the role of institutions, the efficiency of decision-making and the effects of regulations (procedures). These indicators may identify shifts in the cognitive and institutional responses among actors, organisations and juridical regimes. Importantly, they may measure the changes in conflicting interests and values that are

important in achieving behavioural change (Muller 1998; Wilson and Buller 2001), and be used to assess whether policy is set in a useful direction (Lowe, Ward *et al.* 1999).

8.4.2 THE EFFECTS OF POLICIES ON POLICY INSTRUMENT CHOICE

Government, like landholders, must prioritise its investments in conservation activities. Government gives preference to strategic priorities, set out in local and regional management plans, and provides incentives to landholders when doing so will reduce threats to the nation's economic, social and environmental values. For example, the Australian Plague Locust Commission was established to assist landholders with chemical control of the nymphal infestations and swarms of plague locusts (Department of Agriculture Fisheries and Forestry 2010). Losses to agriculture of $55.5 million were avoided in 2004-5 from an investment of $6.8 million in the operating costs of the control program, a benefit-cost ratio of 8:1 (Love and Riwoe 2005). Although pest plant and animal control is the statutory responsibility of the landholder, environmental problems that occur over vast areas, such as species that can form plagues or are capable of widespread migration, can be more effectively controlled via group action that is stimulated with government support and incentives (Vanclay and Lawrence 1995). Such approaches are environmentally and economically rational.

The provision of incentives for landholders to perform statutory duties, however, can build landholders' expectations that they will be provided with support to perform other statutory duties. Indeed, respondents stressed a need to have more pest plant and animal control support, and rate rebates to offset the opportunity costs of vegetation retention: both statutory duties. But the message associated with the provision of many incentives is often that the activity is voluntary and not an expectation of ownership (Gunningham and Young 1997; Freyfogle 2006). Although "farmers cannot live on appreciation from society" (Ikerd 1990, p. 21), the provision of economic incentives in inappropriate situations reduces the likelihood of a discussion about what activities society might reasonably expect from landholders, and for which activities society (i.e., taxpayers) should pay (Freyfogle 2007).

One approach that sets out the conditions for the appropriate distribution of economic incentives is the concept of an environmental duty of care. Unlike regulations that

require landholders to undertake certain actions and prohibit others, an environmental duty of care sets the 'outcomes' landholders are required to achieve, for example, preventing harm to biodiversity or river health (Young, Shi *et al.* 2003). Landholders are left to determine what action they will take to provide those outcomes, which provides the flexibility that the respondents desired. From an economic perspective, the duty can be used to identify the junction between the 'polluter pays principle' and the 'beneficiary pays principle' (Young, Shi *et al.* 2003). That is, the landholder pays if the quality of their land management falls below socially acceptable levels, or society pays when they demand the landholder to deliver public benefits beyond the minimum required as part of their duty (Bromley and Hodge 1990). For example, rate rebates could be provided to landholders who were actively involved in restoring native vegetation on their property; a council levy could be imposed on those landholders who obtain a permit to clear their vegetation (Davis and Cocklin 2001). This type of mechanism would provide landholders with the incentives they require to support their conservation efforts, but would not have provisions to pay landholders for activities that would have arisen as a consequence of 'business as usual' (Carey, Short *et al.* 2003).

Even when payments for activities that extend beyond an environmental duty of care are deemed reasonable, the provision of economic incentives can be restricted by national government policies. In Australia, economic activities have been deregulated: to provide less government intervention and a greater reliance on market forces to generate economic transparency, efficiency and accountability (Dibden and Cocklin 2005) (see section 2.3.2). The use of regulations or the provision of government incentives to support landholders to conserve biodiversity is incompatible with such a policy position (Dibden and Cocklin 2005). One way around this dilemma is for the government to provide a regulatory framework that assigns market values to biodiversity (Costanza 1987). Appropriate mechanisms include polluter pays systems, wetland and biodiversity banking, and certification schemes (Doremus 2003). Respondents did indicate that they would be interested in carbon trading programs that provided some income for carbon storage in native vegetation and soil.

A further consideration for the use of economic policy instruments relates to compliance with international agreements. For instance, Australia is a signatory to the Cairns Group coalition of 19 agricultural exporting countries, including Argentina,

Brazil, Canada, Indonesia, New Zealand and South Africa, which aims to create a fair and market-oriented agricultural trading system. These countries have made a commitment to cut tariffs, eliminate trade-distorting domestic subsidies and eliminate export subsidies (Cairns Group 2010). The problem for signatory nations who want to provide economic incentives to landholders to assist with environmental problems that arise from agricultural activities, is that the incentives may be considered as a "thinly disguised non-tariff barrier" that would contravene World Trade Organisation rules (Potter and Burney 2002; Cocklin and Dibden 2005, p. 250). A shift from production to multifunctional agricultural landscapes that deliver a range of social and ecosystem goods and services, without the use of economic policy instruments will present a significant challenge to policymakers and program designers (Dobbs and Pretty 2004).

There are two additional considerations that may explain why conservation programs appear to fail to meet landholders' needs. First, respondents may have held incorrect assumptions about the nature of conservation programs. Few respondents were actually aware of the specific details of conservation agreement programs available in their region and instead relied on second-hand information, or their experience of past policies and programs, which can be a strong determinant of landholder willingness to participate in future programs (Karppinen 2005). Second, individuals may have erected psychological barriers to justify why they should not change their behaviour, either individually or collectively, even when they are alarmed about the consequences of irresponsible environmental behaviour (Stoll-Kleemann, O'Riordan *et al.* 2001). These denial mechanisms cause individuals to heighten the cost of behaviour change, blame others for inaction and reject uncertain science that projects future, not immediate, problems (Stoll-Kleemann, O'Riordan *et al.* 2001).

8.5 SUMMARY

The purpose of this chapter was to reveal how conservation programs may be designed to enlist non-participants. Non-participants would improve conservation programs by designing them to be practical, flexible and to deliver clear environmental outcomes. Their preferences for incentives to support their conservation efforts, included education, materials, weed control support and economic incentives. Yet, non-participants believed that programs failed to meet their needs because they were not

adequately balanced with other competing and conflicting interests of other individuals and agencies during program design. These findings demonstrate that non-participants do not have unrealistic expectations of conservation program design, implementation and incentives; in fact, their expectations are similar to those of participants. Rather, non-participants appeared less willing than participants to compromise on their expectations, primarily due to a lack of trust in government.

CHAPTER 9
CONCLUSION

> Conservation is a state of harmony between man and land.
>
> (Leopold 1949, p. 207)

I set off on this research journey with the intention of understanding how the social characteristics of landholders influence their conservation behaviour, in support of improved use of policy instruments in the design and implementation of conservation programs. While my findings make a contribution to the literature on innovation-adoption and behaviour theory, more fundamentally, the research has provided insight into the deeper meaning of land ownership and associated implications for program design. In this concluding chapter, I will present a summary of my findings as they relate to the research objectives, and then reflect more generally on the significance of the findings.

The social characteristics of conservation program participants differed mostly according to whether they used their land for production or non-production purposes. Production landholders calculated the effect of participation on their production activities; when they anticipated a threat to their production as a result of participation, financial incentives were considered necessary to motivate them. Non-production landholders were less likely to require external incentives to participate; their internal sources of control (e.g. attitudes) were, in many instances, sufficient to motivate them.

This simple distinction, whilst ostensibly intuitive, is also deep and complex. Production landholders' personal circumstances are intimately linked to the capacity of the land to produce food and fibre. Drought, flood, plagues, cyclones: these events can profoundly shape production landholders' personal circumstances, often in an instant. Nature's variable and unpredictable temperament means that production landholders' personal circumstances may also be extremely variable. Their expectation that conservation programs will provide them with financial incentives for their involvement does not necessarily represent opportunism or disinterest in conservation, but perhaps a necessary trade-off to maintain or enhance their social resilience. Non-production landholders' personal circumstances, in contrast and according to this logic, are not

directly linked to the land's capacity to provide. Therefore, their personal circumstances may be more stable through time, and they may see no real need to augment their social resilience with external incentives offered by conservation programs. These findings suggest that landholders' revealed preferences for policy instruments correlated with their land use, which provides a straight-forward typology that may be adopted by program administrators to assist in the selection of policy instruments.

Participants' motivations to participate in conservation programs, as revealed in this research, were driven by conservation, production, financial and experimentally-based imperatives. Production landholders represented all four motivations, while non-production landholders were only motivated by conservation or financial imperatives. These motivations, along with landholders' perspectives of the landscape (i.e., uni-functional and multifunctional), influenced how they selected *what land* they would allocate to conservation. For example, land selected on the basis of production imperatives, within a uni-functional perspective that posits that conservation activities threaten production activities, were biased towards unproductive and inaccessible landscapes (i.e., 'slippage' from program objectives). Participation of production landholders in conservation programs, therefore, does not necessarily equate to a commitment to conservation, and may in fact threaten the persistence of biodiversity, in some instances. Many non-production landholders, in contrast, conserved the entirety of their property and excluded all production activities from the land, and it is likely that they would have informally conserved that area in the absence of the program (i.e., low or no additionality). Yet, a number of non-production landholders sought land management advice and education, which suggests that although they had a strong commitment to conservation, that commitment may not necessarily have translated into biodiversity gains. That is, their lack of ecological knowledge may have limited their capacity to improve the processes and functions of ecosystems on their property. These findings suggest that when researchers combine qualitative and quantitative assessments, greater insight can be gained into program effectiveness, which may be used to design programs that reduce slippage and increase additionality.

Program participants and non-participants differed in terms of their human and social capital. High levels of pre-existing capital increased the likelihood of landholder

participation in conservation programs, while low levels of human capital reduced the likelihood of participation. Non-participants demonstrated significantly lower levels of human and social capital than participants for four of the eight dimensions assessed: lifestyle and wellbeing, information and knowledge, environmental attitudes and trust. Significant differences were not observed for the other four dimensions. Non-participants' high expectations of conservation programs to deliver money, labour, weed support etc. suggests they looked to incentives that would build their human capital and, thereby, their social resilience. Similarly, they wanted program objectives to align with their land management goals and obligations. These findings suggest that uptake of conservation programs and practices is partially dependent on pre-existing levels of human capital, which demonstrates a need to build and strengthen human capital, independent of program delivery.

There were two primary barriers to participation of non-participants. First, non-participants believed that conservation programs did not fit with their personal needs or circumstances. Non-participants had clear expectations of conservation programs: they expected them to be practical, flexible and to deliver unambiguous environmental outcomes, and to have provided education, materials and money. Unfortunately, and perhaps inevitably, the way in which government and other agencies balance their environmental, social and economic priorities can impede the delivery of these expectations. Non-participants believed that program administrators' commitment to political obligations, implicit in program design, confounded the relevance of conservation programs to their personal needs and property conditions.

Second, non-participants harboured a deep mistrust of previous and current governments, which represented an impermeable barrier to participation. In particular, non-participants believed that their interests were inadequately accounted for during program design (e.g. delivery of generic state or national programs instead of regionally-based programs that were relevant at the local level). Also, these respondents feared that participation would have directly or indirectly reduced their property rights and the economic value of their property. Depending on their potency, these barriers made landholders' participation conditional on the fit between the program characteristics and their property goals (i.e., conditional non-participants), as

well as the program administrator and their primary mandate. Alternatively, these barriers completely inhibited their willingness to participate (resistant non-participants).

Improved social capital may be required as a pre-condition to landholder participation in conservation programs. Production landholders undoubtedly face many of the same threats to their production business (e.g., increased production costs, reduced market prices, weed infestations), which in a sense unite these landholders as they endeavour, individually and collectively, to survive in their production business, thereby creating social capital. Attempting to create social capital between production landholders and the government, however, may be more challenging, especially given that many government policies, such as policies that prohibit tree clearing, are considered to be one of the threats to viable production. Non-production landholders, on the other hand, may support policies that prohibit tree clearing, for example, because they do not represent a threat to their lifestyle and may in fact align with their pro-environmental attitudes. As a consequence of different land uses, more substantial levels of social capital may exist between production landholders and government agencies that have a mandate to support production activities, and more substantial levels of social capital may exist between non-production landholders and government agencies that have a mandate to protect and conserve the environment. These findings highlight the importance of including the politico-historical context in innovation-adoption research, especially in determining which agency is best placed to administer a conservation program.

9.1 REFLECTIONS ON THE RESEARCH FINDINGS

I would now like to reflect on these findings, in particular to explore further the significance of land use (i.e., production and non-production) as a variable by which to distinguish landholders and understand participation. There are three relationships of importance that may influence participation in conservation programs: the relationship between land use and landholders' experience of the landscape; their landscape perspective (i.e., uni-functional or multifunctional); and their expectations of landscape goods and services.

The first relationship exists between land use and the landholders' experience of the landscape. Each landholder's choice to purchase or take on custodianship of a parcel of land is different, but what is common among them is that they each acquire land for a reason. That reason, whether it is for production or non-production purposes, will be based on previous life choices (or the choices of their forbears) and experiences, as well as their pre-existing attitudes towards the environment. It will shape their experience of, and interaction and intimacy with their landscape, and will influence who they connect with in relation to that landscape, how they acquire and assimilate information on land management, and how much of their time, or lives, they will spend on that land. The reason that they acquired the land will influence their land management aspirations and their lifestyle. How well conservation programs allow them to fulfil their aspirations and fit with their lifestyle will influence their willingness to participate. Non-participation in a program is likely to occur when the landholder and the program administrator's aspirations for the landscape are misaligned.

The second relationship exists between land use and landholders' perspective of the landscape. It is important to consider what drives these views. Perhaps when a landholder sees a single role for themselves, they may see a single role for the landscape. For example, if the landholder views themselves as a provider, they may view the landscape in terms of its capacity to provide food. The production of food, therefore, validates their presence in the landscape. Alternatively, if the landholder views themself as an ecological caretaker or steward, they may view the landscape in terms of its capacity to sustain biodiversity. The preservation and enrichment of biodiversity validates their presence in the landscape. According to this reasoning, when a landholder views themself as both a provider and a caretaker, they will likely have a multifunctional perspective of the landscape. Landholders' landscape perspective, then, will influence how they see their role in the landscape and whether participation in a conservation program will allow them to fulfil that role, or reduce their capacity to do so.

The third relationship exists between land use and landholders' expectations of landscape goods and services. Landholders, either implicitly or explicitly, expect to be provided with certain goods and services from their land. Producers, for instance, may prioritise regulating (e.g. flood mitigation, climate regulation) and supporting (e.g.

nutrient cycling, photosynthesis, soil formation) goods and services. They may also have strong values in terms of land use options (i.e. the value of goods the land could potentially be used to produce). Non-producers, in contrast, may prioritise provisioning (e.g. genetic resources, food, natural medicines) and cultural (e.g. spiritual enrichment, aesthetic beauty) goods and services. They may have strong existence values (i.e. the value that a species or ecosystem exits) and bequest values (i.e. the value of conserving natural ecosystems for future generations). The goods and services landholders expect from their land will likely be considered when they make a decision to participate in a program and whether participation will increase the capacity of the land to provide their preferred goods and services. For instance, production landholders may not respond to programs that limit their land use options; that is, programs that threaten their option values. Similarly, non-production landholders may favour programs that allow them to apply a perpetual covenant to the property, which aligns with their bequest values.

These three relationships may interact to influence landholders' perception of private property rights. The extent to which a landholder expects property rights to be absolute and utilitarian, that is, static and protecting private interests, may relate to their dependence on the land for income. This dependence may limit their willingness to accept private property as representing a bundle of rights that were established to flex to the needs of society as a whole (i.e., to generate public benefits), rather than to the needs of individuals (i.e., to generate private benefits). Landholders who purchased their land with the express intention of providing public benefits, (e.g., biodiversity conservation) may welcome changes to property rights that support them in those efforts (e.g., changes to tree clearing legislation), while those who are more interested in private benefits may not.

Ultimately, landholder participation in conservation programs relates to the essence of land ownership, the connection that a landholder has to the land, their sense of place, and their perceived responsibilities as a landholder. The spiritual dimensions of land ownership means that conservation programs or program administrators that do not fit with the landholder's 'religion' may be rejected. Although landholder categories and heuristics based on statistical models are important in providing quick and easy advice to program administrators, such approaches should not be ignorant of the deeper significance of land ownership, including for example, sense of place (Tuan 1979;

Ryden 1993; Jorgensen and Stedman 2001), identity (Hitlin 2003; Allan 2005; Burton and Wilson 2006), value orientations (Holmes and Day 1995; Frost 2000; de Groot and Steg 2008), social resilience (Adger 2000; Carpenter and Brock 2004; Folke 2006; Marshall 2010) and traditional knowledge (Tsosie 1996; Berkes, Colding *et al.* 2000; Turner, Ignace *et al.* 2000).

The relationships between participation and social capital are also worthy of comment as to the role they play in conservation. The qualitative results of this research suggest that low levels of social capital, namely distrust of government, limits participation. There appears to be a mismatch between how landholders and government agencies believe that the landscape should be managed to conserve biodiversity, and who should be responsible for that management. We may say that the 'ethics' of landholders and government agencies[1] differ. Perhaps one component of building social capital, therefore, should be to define and instil a 'land ethic[2]' (Leopold 1949) for a particular landscape or catchment. As Aldo Leopold (1949, p. 225) said over 60 years ago:

> "Conservation is paved with good intentions which prove to be futile, or even dangerous, because they are devoid of critical understanding either of the land, or of economic land-use. I think it is a truism that as the ethical frontier advances from the individual to the community, its intellectual content increases."

That is, if the people who are involved in land management work collectively to cultivate a land ethic, then their approaches to land management, policy instrument choice, and program design, implementation and monitoring are more likely to be aligned and generate the intended outcomes. As a result, the likelihood that the landscape can be transformed into a space, where providers and stewards can co-exit or fuse, increases. Once an ethic becomes instilled, the mechanism of operation may be the same for any ethic: "social approbation for right actions: social disapproval for wrong actions" (Leopold 1949).

Finally, I would like to consider the relationships between participation and politics. First, we must understand the effect of policy change on the socio-economic circumstances of landholders, in particular production landholders. Government

[1] In so far as government agencies can *have* an ethic. Certainly their policies and programs appear to represent the manifestation of an ethic.
[2] A land ethic reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity (Leopold 1949, p. 221).

policies can directly or indirectly operate to deplete human capital. Depleted human capital can contribute to the erosion of family and community support, domestic violence, isolation and helplessness, resulting in out-migration, depression and rural suicide (Hall and Scheltens 2005). These grave and unintended consequences of policy implementation must be further explored, not only to increase landholders' capacity to conserve biodiversity, but crucially to strengthen rural communities and ensure their healthy, long-term survival.

Second, government and researchers may be operating within a "bounded rationality" and fail to consider what mechanisms are available beyond the existing set of policy instruments. For example, in my own research I asked landholders to rank their preferred policy instruments from a given list, rather than simply asking them how they would design a conservation program. There may be an, as yet undeveloped, range of alternative instruments that might be suitable for landholders, which may generate increased biodiversity outcomes; yet government and researchers are 'bound' or restricted to adopting common policy instruments in program design and may miss out on opportunities to design more effective and useful programs.

Third, government must strive, as much as possible, to have a clear position on private land conservation. Political cycles, conflicting government mandates and international policies can all constrain the design of conservation programs and the realisation of conservation outcomes. For example, in Queensland, mining and extraction rights still apply to land that has a State Government Nature Refuge applied to it. Ecosystems that a landholder has sought to formally conserve may be cleared and the land used for open-pit or underground mining activities. Such contradictory policy positions may only serve to erode social capital and stymie the development of a pervasive land ethic over time.

This research has provided novel insight into the depth and complexity of private land conservation by assessing program design in relation to landholder attitudes and behaviours. It is my hope that these findings can improve the manner in which conservation programs are designed, with greater sensitivity to landholders' personal and social circumstances, and implemented so that each can genuinely preserve the

extent of natural habitat and populations of native species on the private land to which they are targeted.

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APPENDICES

APPENDIX 1: SURVEY INSTRUMENTS

APPENDIX 1A: CONSERVATION PROGRAM PARTICIPANT SURVEY

I am exploring the various conservation programs that are put in place by different organisations, such as state government agencies, local governments and Natural Resource Management groups. I want to understand:

- how well these programs meet your expectations and ideals;
- how they fit with your own ideas and ambitions for your land;
- how easy or difficult it is for you to meet the program requirements; and
- what your barriers are to increasing your conservation commitment.

I also want to explore the social and economic constraints that you face and understand how they influence your participation. I would also like to talk with you about your involvement in the program. I hope that these questions will provide insight into how government and other agencies can better design conservation programs that reflect your needs as a landholder.

If there are any questions that you don't want to answer or that you feel uncomfortable about, please just say "pass" and we will move along to the next question. If you want to stop the interview at any time, please let me know.

Date:_____

Location:_____

Length of interview:_____

Name of file:_____

Landholder:_____

Program:_____

Interview type: phone/at the property/at another location

		Strongly Disagree	Disagree	Agree	Strongly Agree
	Situational circumstances				
	Financial circumstances I would like you to think of the last 5 years when answering these questions about your financial circumstances.				
S1	The income from my land is sufficient to support the family/household				
S2	When necessary, I find it easy to access additional labour in the region to assist with land management				
S3	I sometimes find it difficult to make my loan repayments				
S4	I have a formal business plan for my property				
S5	If my current business were to fail, I have planned for how to use my land				
	Social circumstances				
S6	My family generally has a good level of health				
S7	I feel like I belong to this community/town				
S8	I am dissatisfied with my life-work balance				
S9	Living on the land is emotionally stressful				
S10	I feel nervous if I have to change my land use practices				
	Environmental circumstances				
S11	I do not feel a strong personal obligation to protect the environment				
S12	I am willing to put extra effort into managing native vegetation on my property				
S13	I would not feel guilty if the condition of native vegetation on my property deteriorated				
S14	Almost every rural landholder I know wants to improve the quality of their native vegetation				
	Government regulations of land management practices				
S15	Government regulation of native vegetation clearing is unfair and shows little awareness of people living on the land				
S16	I tend to ignore new regulations				
S17	I would like to participate in government consultation about proposed new regulations that may affect the way I manage my land				
S18	I think the government values the opinions of landholders				

		Strongly Disagree	Disagree	Agree	Strongly Agree
	Participation in the conservation program				
	Compatibility				
I1	I feel I was actively involved in the original design of the program				
I2	It is/was easy for me to commit time and effort to the program				
I3	I do not think the program is/was adequately tailored to individual properties and landholders				
I4	As a participant in the program, I am/was expected to do work that does not form part of my day-to-day land management				
I5	I would have managed my land in the same way if I was not a participant in the program				
I6	I believe I have made a significant non-financial contribution, such as labour, to the program				
	Risk				
I7	I understood clearly all of my obligations as a participant when I first committed to the program				
I8	I underestimated the costs of participating in the program				
I9	I was concerned that the program administrator wanted to take away my rights to some or all of my property				
I10	I thought the value of my property may decrease through my involvement in the program				
	Trust				
I11	I have a good relationship with the program administrator				
I12	I think that the program administrator has a good idea of what happens on the ground				
I13	I do not feel confident that the program administrator is interested in the outcomes of the program on my property				
	Assistance				
I14	I needed help to put the application together because it was too complicated				
I15	I found the application process too time-consuming				
I16	Money provided to me by the program never arrives at the time when I need it most				
	Social recognition				
I17	I do not believe the program administrator values the time and effort I put into the program				
I18	I am motivated to encourage friends and family in the region to participate in this program				
I19	I care what my neighbours think about my involvement in the program				
I20	I do not think my involvement in the program contributes to regional conservation goals				
I21	I believe that landholders who have managed their land well in the past, have a better chance of being successful in the program				

	Demographics. In this section, I would like to ask you some questions about 'you'. Please only tick ONE of the options unless indicated otherwise		
D1	What is your land used for?	Beef Cattle Dairy Sugar Fruit Vegetables Sheep/goats Hobby farm Conservation Vegetated Forestry Other	% % % % % % % % % % %
D2	What is the land tenure of the property?	Freehold	
		Leasehold	
D3	Are you an owner-manager or are you a manager for a company?	Owner	
		Manager	
D4	What is the size of your property?	Acres	
		Hectares	
D5	How often do you work on the property per week?	Minimal-time (0-20h)	
		Part time (20-30h)	
		Full time (>30h)	
D6	What percentage of your (gross) family's income comes from your land?		%
D7	Would you please tell me the average (gross) annual income of your land?	$0	
		$0-$50K	
		$50K-$100K	
		$100-$250K	
		$250-$500K	
		$500K+	
D8	How many dependant children do you have?	Number	
D9	Would you please tell me within which age range you fit?	21-30	
		31-40	
		41-50	
		51-60	
		61-70	
		71+	
D10	Approximately, how many years of land management experience do you have? (If lived on the land your whole life, minus 10 years from your age)	1-5	
		6-10	
		11-20	
		21-30	
		31-40	
		41-50	
		51+	
D11	Have you ever worked in another industry? If so, what was it?		
D12	How often do you attend short courses, field days or conferences on land management?	At least every year	
		Once in 2-4 years	
		Less than every 4 years	
		Never	

D13	What is your highest level of formal education?	Secondary	
		Apprenticeship	
		TAFE	
		University	
		Post-graduate	
D14	Did the previous generation of your family own or manage this land?	Yes	
		No	
D15	Do your children/family plan to own or manage the land in the future?	Yes	
		No	
D16	Are you a member of any land management organisation? If so, which organisations?	Landcare	
		Local NRM	
		Other	
D17	Is your property next to a national park or other government protected area?	Yes	
		No	
D18	If yes, do you have problems with the encroachment of:	Weed species	
		Feral animals	
		Native animals	
D19	What is the *average* agricultural productivity of the land that is committed to the program?	Unproductive	
		Low productivity	
		Moderate productivity	
		High productivity	

	Motivations & decision-making				
	In this section, I would like to ask you about your experiences with the program				
	Native vegetation				
D20	Native vegetation can: (can tick MULTIPLE answers)	Protect wildlife			
		Provide shelter from wind and weather			
		Make my property more attractive			
		Reduce soil erosion			
		Maintain healthy waterways			
D21	Landholders like me: (can select ONE answer)	Increase the amount of native vegetation on my property			
		Retain tracts of existing native vegetation on my property			
		Prefer to clear most native vegetation on my property			
	Information				
M1	I tend to trust information on land management from (can tick multiple answers):	Myself		EPA*	
		Successful landholders		DPI*	
		Radio		NRM* groups	
		TV programs		CSIRO*	
		Internet		Industry reps	
		Books		Courses	
		Newsletters/ magazines		Information evenings	
		Neighbours		Field days	
		Environmental groups		Other (please specify)	
M2	I would consider participating in a land management program if it were offered by (can tick multiple answers):	Local government		Landcare	
		State government		NRM group	
		EPA*		Industry	
		Greening Australia		DPI*	
		Other (please specify)			
M3	What land management challenges do you experience on your property (can tick multiple answers)?	Variable climate		Water availability	
		Increasing production costs		Ongoing management of weed species	
		Ongoing management of feral animals		Weather damage from extreme events	
		Erosion		Pollution management	
		Other (please specify):			
M4	As a participant in a land management program, I would MOST like to receive (please RANK relevant items):	Money		Labour	
		On-ground advice		Materials	
		Monitoring		Education & training	

* EPA: Environment Protection Authority (now Department of Environment and Resource Management); DPI: Department of Primary Industries; NRM: Natural Resource Management groups; CSIRO: Commonwealth Scientific and Industrial Research Organisation.

	Program Involvement
M5	How many years have you been involved in the program?
M6	What percentage of your property is/was committed to the program?
M7	What was your main reason for joining the program?
M8	Why did you choose this piece of land to include in the program?
M9	Have you altered any land management practices following your involvement in the program? If so, which ones?
M10	Have you experienced any problems as part of your participation in the program? If so, what?
M11	What is the single most important consideration you make before applying to join a land management program?
	Your property
M12	Have you been involved in any other land management programs in the last 5 years? If so, which?
M13	What prevents you from using more land for conservation and protection?
M14	What is the single most important issue for you as a landholder?

		Strongly Disagree	Disagree	Agree	Strongly Agree
What is your world view?					
A1	Humans have the right to modify the natural environment to suit their needs				
A2	The Earth has plenty of natural resources if we just learn how to develop them				
A3	Human ingenuity will insure that we do NOT make the Earth unliveable				
A4	We are approaching the limit of the number of people the Earth can support				
A5	The balance of nature is strong enough to cope with the impacts of modern industrial nations				
A6	The so-called "ecological crisis" facing humankind has been greatly exaggerated				
A7	When humans interfere with nature it often produces disastrous consequences				
A8	Humans are severely abusing the environment				
A9	Humans were meant to rule over the rest of nature				
A10	Plants and animals have as much right as humans to exist				
A11	Humans will eventually learn enough about how nature works to be able to control it				
A12	Despite our special abilities, humans are still subject to the laws of nature				
A13	The Earth is like a spaceship with very limited room and resources				
A14	The balance of nature is very delicate and easily upset				
A15	If things continue on their present course, we will soon experience a major ecological catastrophe				

APPENDIX 1B: NON-PARTICIPANT SURVEY

I am exploring the various conservation programs that are put in place by different organisations, such as state government agencies, local governments and Natural Resource Management groups. I want to understand:

- how well these programs meet your expectations and ideals;
- how they fit with your own ideas and ambitions for your land; and
- what your barriers are to increasing your conservation commitment.

I also want to explore the social and economic constraints that you face and understand how they influence your willingness to participate in conservation programs. I hope that these questions will provide insight into how government and other agencies can better design conservation programs that reflect your needs as a landholder.

If there are any questions that you don't want to answer or that you feel uncomfortable about, please just say "pass" and we will move along to the next question. If you want to stop the interview at any time, please let me know.

Date:_____

Location:_____

Length of interview:_____

Name of file:_____

Landholder:_____

Interview type: phone/at the property/at another location

		Strongly Disagree	Disagree	Agree	Strongly Agree
	Situational circumstances				
	Financial circumstances I would like you to think of the last 5 years when answering these questions about your financial circumstances.				
S1	The income from my land is sufficient to support the family/household				
S2	When necessary, I find it easy to access additional labour in the region to assist with land management				
S3	I sometimes find it difficult to make my loan repayments				
S4	I have a formal business plan for my property				
S5	If my current business were to fail, I have planned for how to use my land				
	Social circumstances				
S6	My family generally has a good level of health				
S7	I feel like I belong to this community/town				
S8	I am dissatisfied with my life-work balance				
S9	Living on the land is emotionally stressful				
S10	I feel nervous if I have to change my land use practices				
	Environmental circumstances				
S11	I do not feel a strong personal obligation to protect the environment				
S12	I am willing to put extra effort into managing native vegetation on my property				
S13	I would not feel guilty if the condition of native vegetation on my property deteriorated				
S14	Almost every rural landholder I know wants to improve the quality of their native vegetation				
	Government regulations of land management practices				
S15	Government regulation of native vegetation clearing is unfair and shows little awareness of people living on the land				
S16	I tend to ignore new regulations				
S17	I would like to participate in government consultation about proposed new regulations that may affect the way I manage my land				
S18	I think the government values the opinions of landholders				

	Demographics. In this section, I would like to ask you some questions about 'you'. Please only tick ONE of the options unless indicated otherwise		
D1	What is your land used for?	Beef Cattle Dairy Sugar Fruit Vegetables Sheep/goats Hobby farm Conservation Vegetated Forestry Other	% % % % % % % % % % %
D2	What is the land tenure of the property?	Freehold	
		Leasehold	
D3	Are you an owner-manager or are you a manager for a company?	Owner	
		Manager	
D4	What is the size of your property?	Acres	
		Hectares	
D5	How often do you work on the property per week?	Minimal-time (0-20h)	
		Part time (20-30h)	
		Full time (>30h)	
D6	What percentage of your (gross) family's income comes from your land?		%
D7	Would you please tell me the average (gross) annual income of your land?	$0	
		$0-$50K	
		$50K-$100K	
		$100-$250K	
		$250-$500K	
		$500K+	
D8	How many dependant children do you have?	Number	
D9	Would you please tell me within which age range you fit?	21-30	
		31-40	
		41-50	
		51-60	
		61-70	
		71+	
D10	Approximately, how many years of land management experience do you have? (If lived on the land your whole life, minus 10 years from your age)	1-5	
		6-10	
		11-20	
		21-30	
		31-40	
		41-50	
		51+	
D11	Have you ever worked in another industry? If so, what was it?		
D12	How often do you attend short courses, field days or conferences on land management?	At least every year	
		Once in 2-4 years	
		Less than every 4 years	
		Never	

D13	What is your highest level of formal education?	Secondary	
		Apprenticeship	
		TAFE	
		University	
		Post-graduate	
D14	Did the previous generation of your family own or manage this land?	Yes	
		No	
D15	Do your children/family plan to own or manage the land in the future?	Yes	
		No	
D16	Are you a member of any land management organisation? If so, which organisations?	Landcare	
		Local NRM	
		Other	
D17	Is your property next to a national park or other government protected area?	Yes	
		No	
D18	If yes, do you have problems with the encroachment of:	Weed species	
		Feral animals	
		Native animals	
D19	What is the *average* agricultural productivity of the land that is committed to the program?	Unproductive	
		Low productivity	
		Moderate productivity	
		High productivity	

	Motivations & decision-making				
	In this section, I would like to ask you about your experiences with the program				
	Native vegetation				
D20	Native vegetation can: (can tick MULTIPLE answers)	Protect wildlife			
		Provide shelter from wind and weather			
		Make my property more attractive			
		Reduce soil erosion			
		Maintain healthy waterways			
D21	Landholders like me: (can select ONE answer)	Increase the amount of native vegetation on my property			
		Retain tracts of existing native vegetation on my property			
		Prefer to clear most native vegetation on my property			
	Information				
M1	I tend to trust information on land management from (can tick multiple answers):	Myself		EPA	
		Successful landholders		DPI	
		Radio		NRM groups	
		TV programs		CSIRO	
		Internet		Industry reps	
		Books		Courses	
		Newsletters/magazines		Information evenings	
		Neighbours		Field days	
		Environmental groups		Other: (please specify)	
M2	I would consider participating in a land management program if it were offered by (can tick multiple answers):	Local government		Landcare	
		State government		NRM group	
		EPA		Industry	
		Greening Australia		DPI	
		Other (please specify)			
M3	What land management challenges do you experience on your property (can tick multiple answers)?	Variable climate		Water availability	
		Increasing production costs		Ongoing management of weed species	
		Ongoing management of feral animals		Weather damage from extreme events	
		Erosion		Pollution management	
		Other (please specify)			
M4	As a participant in a land management program, I would MOST like to receive (please RANK relevant items):	Money		Labour	
		On-ground advice		Materials	
		Monitoring		Education & training	

* EPA: Environment Protection Authority (now Department of Environment and Resource Management); DPI: Department of Primary Industries; NRM: Natural Resource Management groups; CSIRO: Commonwealth Scientific and Industrial Research Organisation

	Program Involvement
M5	Do you consider yourself an environmentally responsible landholder? If so, why?
M6	Have you been involved in any land management programs in the last 5 years? If so, which?
M7	If not, why haven't you participated in land management programs?
M8	How could land management programs be improved so that you would consider participating, if at all?
M9	How could land management programs support your land management practices or land management business?
M10	How well do you think land management programs meet the needs of landholders, such as yourself?
M11	What is the single most important consideration you would make before applying to join a land management program?
M12	What is the single most important issue for you as a landholder?

		Strongly Disagree	Disagree	Agree	Strongly Agree
What is your world view?					
A1	Humans have the right to modify the natural environment to suit their needs				
A2	The Earth has plenty of natural resources if we just learn how to develop them				
A3	Human ingenuity will insure that we do NOT make the Earth unliveable				
A4	We are approaching the limit of the number of people the Earth can support				
A5	The balance of nature is strong enough to cope with the impacts of modern industrial nations				
A6	The so-called "ecological crisis" facing humankind has been greatly exaggerated				
A7	When humans interfere with nature it often produces disastrous consequences				
A8	Humans are severely abusing the environment				
A9	Humans were meant to rule over the rest of nature				
A10	Plants and animals have as much right as humans to exist				
A11	Humans will eventually learn enough about how nature works to be able to control it				
A12	Despite our special abilities, humans are still subject to the laws of nature				
A13	The Earth is like a spaceship with very limited room and resources				
A14	The balance of nature is very delicate and easily upset				
A15	If things continue on their present course, we will soon experience a major ecological catastrophe				

APPENDIX 2: ETHICAL CONDUCT OF RESEARCH

This research was conducted in accordance with the National Statement on Ethical Conduct in Human Research (NSECHR) 2007 and according to James Cook University (JCU) Ethics Approval[1]. Ethics approval was granted on the basis of the survey design and the significance of the research. The research was classed as Experimental Category 1: "Research or teaching projects with no, or insignificant, psychological distress or physical discomfort. No deception involved and no invasion of privacy" (James Cook University 2007, p. 5). This category includes non-intrusive questionnaires.

A2.1 ENGAGEMENT

Once programs were selected as potential case studies for this research, the program administrators were contacted to provide further information on the program. This information allowed me to determine whether the program they administered would provide a suitable case study for the research project. If the program was deemed suitable, I asked administrators if they were willing to invite program participants to be involved in the research. All three of the programs were suitable and all program administrators who I contacted agreed to be involved in the research.

During February to June of 2009, program administrators sent invitations to a total of 58 landholders, distributed almost evenly across the three programs (see section 3.4). Invitations were sent to participants at the discretion of the program administrators. The administrators aimed to send the invitations to as many participants as was feasible, with the intention that landholders with different views on the program were included. The names and contact details of landholders who were contacted and who agreed to participate in the research were sent by the administrator to me. Attempts were made to contact all of the landholders whose details were provided by the program administrators, however, after several attempts, some landholders remained un-contactable. A total of 45 participants across all three programs were able to be contacted and all agreed to be involved in the research.

[1] Approval granted on 30 July 2008, reference: H3054.

Snowball sampling was used to identify potential non-participants (Bryman 2008). Non-participants were engaged by asking the respondents who were involved in the research to contact any neighbours or friends in the area who were not involved in the program who may have been willing to be involved in this research. Once the participant had obtained agreement from their neighbour or friend to participate in the research, they contacted the researcher with their details. A total of 29 non-participants were recruited in this way.

A2.2 VOLUNTARY PARTICIPATION

An invitation letter was sent to program participants by the program administrator on behalf of the researcher. The letter invited participants to be involved in the research and included the following information:

- the researcher and institute conducting the research
- the main aims of the research
- the duration and location of the interview
- the nature of the interview questions
- the confidentiality of research results
- the availability of research results to participants
- the contact details of the researcher and institution

Participants' provision of contact details to the program administrator was accepted as consent to participate in the research, in accordance with section 2.2.5 of the NSECHR. The invitation letter provided sufficient information for the participants to understand the purpose, methods, risks and benefits of the research (section 2.2.2 of the NSECHR).

A2.3 INFORMED CONSENT & CONFIDENTIALITY

Informed consent was obtained from participants. Participants who provided their details to the program administrator had agreed to be involved in the research (section 3.1.17 of the NSECHR). At the beginning of the interviews, individuals were asked if they were happy for the interview to be recorded on a dictaphone. Individuals were assured that only I would listen to the audio obtained during the interview. Individuals were also told that they did not have to answer a question if they did not want to, and

that they could terminate the interview at anytime (section 2.2.6 (g) of the NSECHR). Individuals were told that the information obtained from the interview would be stored in a way that would not contain any of their personal information.

No questions were assumed to cause emotional distress to the interviewee. Nonetheless, the researcher did have contact details for local organisations that could assist, for example, with stress or depression.

A2.4 DISSEMINATION OF RESULTS

Individuals were asked at the end of the interview if they wanted to receive a copy of the research results once they were collated. Seventy-three of the 74 individuals (99%) wanted to receive the research summary. Summary results were provided to pilot interviewees, main study interviewees and program administrators in December 2009 and February 2011.

APPENDIX 3: CONSERVATION PROGRAM ASSESSMENT CRITERIA

APPENDIX 3.1: CASSOWARY COAST REGIONAL COUNCIL ASSESSMENT CRITERIA

Table A3.1: Rate deferral calculations for the Cassowary Coast Conservation Covenant Rate Deferral program (% deferral on eligible component of general rate).

Habitat classification	% deferral
Critical habitat	60
Important Habitat	55
Important Corridor/linkage	50
Potentially Critical/Important	45
Natural Habitat/Corridor and Linkage Corridor/Habitat	40
Potential Linkage Corridor/Habitat	20

APPENDIX 3.2: DESERT UPLANDS COMMITTEE ASSESSMENT CRITERIA

Table A3.2: Major design features and assessment criteria of the Desert Uplands Committee Landscape Linkages program.

Feature	Criteria
Design features	• sealed bid; • discriminatory price; • three bidding rounds with information feedback between rounds. Current bids remained live unless amended; • a reserve price was not specified but the right to reject bids was reserved; • no cap was placed on bid amounts; and • multiple bids were encouraged.
Metric	• linkage assessment score (LAS), maximum score of 100 points = 44.4% of the total score; • biodiversity assessment score (BAS), maximum score of 75 points = 33.3% of the total score; and • condition assessment score (CAS), maximum score of 50 points = 22.2% of the total score. For each proposal submitted by a landholder, a specific environmental benefits score (EBS) was calculated by the following equation: EBS = Area1 x (LAS1 + BAS1 + CAS1) + Area2 x (LAS2 + BAS2 + CAS2)….
Linkage assessment score	• bid submitted in cooperation with other landholders (joint bid bonus); • number of direct connections with other bid areas; • number of indirect connections; and • strategic placement (potential to make a key corridor contribution). The width, length and area of each bid were included in the assessment, but proposals only received a score for each component if the area offered was: • over 100 m in width; • over 500 m in length; and • over 500 ha in area
Condition assessment scores	• perennial ground cover; • pasture biomass (adjusted for different vegetation communities); • presence of buffel (an introduced pasture species); and • presence of weeds.

Biodiversity scores	The BAS was based on selected criteria in the Queensland Environmental Protection Agency's biodiversity assessment and mapping methodology. • habitat for EVR taxa: Criteria A; • ecosystem value: Criteria B; • ecosystem diversity: Criteria F; and • special biodiversity values (wildlife refugia): Criteria Ib
The final assessment of bids was based on the relative bid value which was calculated by dividing the bid price by the EBS: Relative bid value = Bid price ($)/EBS	

(Taken from Windle, Rolfe *et al.* 2009, p. 130)

APPENDIX 3.3: DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT ASSESSMENT CRITERIA

Table A3.3: Eligibility criteria and standard procedure to establish a Nature Refuge.

Eligibility criteria	• areas containing, or providing habitat for, plant and animal species that are rare or threatened; • habitats or vegetation types that are threatened, such as endangered and of concern regional ecosystems; • habitats and ecosystems that are poorly represented in existing reserves; • remnant vegetation; • movement corridors for native animals, especially those linking areas of • remnant vegetation or existing reserves; • significant wetlands, including mound spring communities; and • cultural heritage.
Procedure	Landholders who are interested in protecting the conservation values of their land may approach the EPA about options for protecting these values. Alternatively, the EPA may identify land suitable for a nature refuge agreement and approach the landholder. In both cases, with agreement from the landholder, the local Nature Refuge Officer will explain the process of developing a nature refuge agreement and declaring a nature refuge, discuss any concerns the landholder may have, visit the area to evaluate its conservation value and discuss management issues. If the landholder and the EPA wish to proceed, a draft nature refuge agreement is produced in consultation with the landholder. Each nature refuge agreement is negotiated directly with the landholder and tailored to suit the management needs of the site and the needs of the landholder. Once the details of the agreement are settled, the landholder and the responsible State Government minister sign the agreement.

(Taken from Environment Protection Authority 2009, p. 2)

Table A2.4: Major items of Schedule 4: Customised Conditions for the Nature Refuge program.

Item 2: Natural resource protection	• Ecosystem management and protection (e.g., regional ecosystems, vegetation communities) • Wildlife and habitat protection • Water, watercourses and wetland protection • Soil stability and protection • Protection of significant geological features and landforms
Item 3: Cultural resource protection	• Protection of significant indigenous cultural heritage resources • Protection of significant non-indigenous cultural heritage resources
Item 4: Land protection & threat abatement	• Pest animal management • Pest plant management • Disease management
Item 5: Land use & management	• Fire management • Native vegetation removal/management (i.e., timber, plant) • Built infrastructure management (e.g., roads, tracks, fences, watering points) • Waste and hazardous material management
Item 6: Tenure & zoning	• Domestic zones • Relocatable domestic zones • Infrastructure zones • Relocatable infrastructure zones • Restoration zones • Agriculture zones • Easements • International Union for Conservation of Nature (IUCN) categories
Item 7: Continual improvement	• Monitoring • Restoration/revegetation