

## ABSTRACT

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There has been a significant shift in the institutions through which natural resource governance has been managed in Australia over the last two decades. This has accompanied changes in the relationships between government and the wider community as citizens are provided a greater role in shaping and influencing the direction of natural resource management (NRM) and environmental policy, and are provided with greater opportunities to engage with policymakers. This shift towards 'bottom-up' approaches may result in policies that are more effective, efficient, and focused on the important NRM issues facing a region.

Such changes in the mode of natural resource governance, however, have also been associated with additional costs coupled with disappointing on-ground outcomes to date. The Australian NRM programs of Landcare, Integrated Catchment Management, and the current regional NRM arrangements are revealing that NRM problems such as land degradation continue to persist. Although government policymakers are optimistic that the regional NRM arrangements have gone some way in addressing the issues which contributed to the ineffectiveness and failure of earlier programs, concern still exists that the current institutional iteration for natural resource governance may not be enough to ameliorate on-going problems of land and environmental damage. This may be the result of poorly explained and identified costs and benefits associated with the regional NRM governance model.

Adjusting natural resource governance to the regional level is accompanied by additional upfront costs and benefits. A regional NRM model will typically involve higher transaction costs and administrative costs, reflecting the increased time and administration involved.

There are also several potential benefits of devolved governance models. First, better engagement may address problems of information asymmetry, where local groups and agencies hold different pieces of information and current mechanisms to reveal or coordinate information are not strong. Second, better governance may address principal-agent problems where the incentives faced by government agencies (the agents) do not deliver the outcomes sought by communities (the principal). Giving communities more input into the governance process may help to minimise these discrepancies in incentives.

The third important way in which devolved governance arrangements might generate benefits is through the development of governance capital. The deepening of 'soft' institutions can be very important in the efficient functioning of an economy, because they essentially reduce the transaction costs of achieving certain outcomes. This might occur when a governance model increases the skills and engagement processes within a region, making it more resilient to adverse impacts and more capable of mobilising resources and responding to regional development opportunities.

The aim of this study is to identify different institutional models for pursuing NRM objectives, and to examine the model which characterises the regional NRM arrangements. The focus empirically is on Australian natural resource governance. The first objective in addressing this aim is to review past programs of natural resource governance leading up to the implementation of the regional NRM arrangements of interest in this research.

The second objective is to explore empirically how the regional NRM model can achieve the desired natural resource governance outcomes. To this end, a case study was undertaken of a devolved grants incentive program conducted by the FBA in the Central Queensland region. To address the aims, the research empirically evaluated the factors influencing landholder participation in the program in the Fitzroy Basin catchment of Central Queensland, Australia. Specifically, the regional NRM arrangements in place were examined with respect to three key areas: governance and institutions, transaction costs, and social and governance capital.

A decision support framework was developed based on theoretical and case study analysis and was trialled using the FBA case study in this research. The decision support tool was validated based on FBA case study evidence, and represents a key contribution to knowledge in this thesis.

Results from a survey of landholders involved in the FBA devolved grants program found total landholder costs of participation tend to be higher for those involved in fencing remnant vegetation, and higher for those who did not rate the application process as easy. Costs were also higher for those respondents who thought the FBA had led to increased take-up, and for those who thought participation would lead to increased production. Landholder costs were lower for those who thought that the FBA was flexible and lower for younger respondents. Results also indicated that older respondents, respondents with higher levels of income, respondents with higher levels of off-farm income, and respondents who planned to have the property for longer in the future were less likely to take up future NRM grant programs.

The study outlined implications and recommendations for policymakers to consider in implementing future policies and programs with respect to achieving NRM objectives, combining local knowledge, improved collaboration and public participation, and social capital enhancing strategies. This approach lays the foundation for all policy decisions relating to natural resource governance. By carefully understanding not only the costs and benefits of governance options, but also identifying trade-offs incorporating 'soft' institutions such as social and governance capital, communities and governments can influence the adoption of improved NRM practices. This thesis contributes to the stock of case studies and empirical body of research into understanding the appropriateness of institutional arrangements for achieving collaborative natural resource and environmental outcomes.

# ***NEO-RENAISSANCE?***

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## **An Economic Analysis of Australian Regional Natural Resource Governance**

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## **DECLARATION**

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This work has not previously been submitted for a degree or diploma at any university.

To the best of my knowledge and belief, the material presented in this thesis is original and contains no material previously published except where acknowledged in the thesis itself.

Au Shion Yee  
March, 2009

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This research has been motivated and influenced by my personal and professional experience as a participant in regional and national natural resource management (NRM) processes through working in the Queensland State Government on the development and implementation of programs and policies to incorporate social and economic considerations and impacts on different NRM planning initiatives across Queensland. While appreciation of the importance of financial cost components of various programs is high across government agencies, understanding of the non-financial costs and how to incorporate them into a robust policy and decision framework is low. While it has been recognised that such considerations are important, there has been little research to inform policymakers on how to integrate social and economic factors into NRM policy decisions in a practical manner.

It has become ever more obvious to me that NRM issues, at the end of the day, are people issues. Our landscapes are shaped by what we perceive, what we value, what we aspire to, and what we can imagine. These in turn influence our management and our social organisation. Research is a process of learning, understanding and inspiration; sometimes individually; sometimes in collaboration. It is my sincere hope that this research can contribute in some way towards further institutional and policy learning to inform natural resource and environmental policy in Australia and beyond.

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<sup>1</sup> During the course of the research, the author worked as an economist within the Social and Economics unit in the Community Partnerships group at the Queensland Department of Natural Resources and Water. This research formed part of the work of the unit in identifying and addressing a range of social and economic factors that influenced how regional NRM groups in Queensland developed skills and capacity to undertake regional NRM projects in their respective regions. In the latter part of the research work, an independent assessment of social and institutional foundations of NRM programs across Australian regional NRM organisations found that regional NRM groups in Queensland led their interstate counterparts with “relatively high knowledge of social systems which were attributed to the implementation of a state-level investment project between 2004-2006 focused on developing social and economic research with regional NRM groups” (Fenton and Rickert 2008, p.vii).

## LIST OF PUBLICATIONS

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The research is part of an Australian Research Council Industry Linkage Grant project, *The Engaged Government Project*, and material in some chapters form part of the Economic Research Report published in modified forms under the project's Research Report Series and the Social and Economic State-Level Investment Project SE05 devolved grant evaluation report, listed below:

- Yee, A.S. and Rolfe, J. 2006. 'Institutions for Engaged Governance: Case study findings through an economic lens'. Economic Research Report, November. Engaged Government Project. Central Queensland University, Rockhampton.
- Windle, J., Yee, A.S., and Rolfe, J. 2006. 'FBA Devolved Grant Evaluation Survey Report'. FBA Biodiversity Tender Main Report Attachment 4. Central Queensland University, Rockhampton.

Material in some chapters have also been presented and published in modified forms as conference papers and part of book reviews. These are outlined below:

### *Conference Papers*

- Yee, A.S. and Rolfe, J. 2007. 'Can Regional NRM Arrangements Reduce Net Transaction Costs by Increasing Social Capital?'. Paper presented at the 51<sup>st</sup> Annual Conference of the Australian Agricultural and Resource Economics Society, Queenstown, New Zealand, 13-16 February 2007.
- Yee, A.S. and Rolfe, J. 2006. 'Evaluating the Efficiency of a Devolved Grants Program: A Central Queensland Case Study'. Paper presented at the 50<sup>th</sup> Annual Conference of the Australian Agricultural and Resource Economics Society, Sydney, Australia, 7-10 February 2006.
- Yee, A.S. and Rolfe, J. 2005. 'Evaluating Community and Government Engagement Processes in the Central Queensland Region, Australia'. Paper presented at the United Nations International Conference on Engaging Communities, Brisbane, Australia, 14-17 August 2005.
- Yee, A.S. and Rolfe, J. 2005. 'Institutional Choices for Natural Resource Management: Judging the Efficiency of Natural Resource Management Bodies'. Paper presented at the 49<sup>th</sup> Annual Conference of the Australian Agricultural and Resource Economics Society, Coffs Harbour, 7-11 February 2005.

### *Book Reviews*

- Yee, A.S. 2008. Review of 'Economics for Collaborative Environmental Management: Renegotiating the Commons' by Graham R. Marshall, in the *Australian Journal of Agricultural and Resource Economics*, Vol.52 (2), pp.213-215.
- Yee, A.S. 2005. Review of 'Institutional Change for Sustainable Development' by Robin Connor and Stephen Dovers. 2004, in the *Australian Journal of Agricultural and Resource Economics*, Vol. 49(2), pp.236-238.

## ACRONYMS

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ABS	Australian Bureau of Statistics
ACF	Australian Conservation Foundation
ADB	Asian Development Bank
ANAO	Australian National Audit Office
BRS	Bureau of Rural Sciences
CPR	Common Property Resources
CMA	Catchment Management Authority
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CQSS	Central Queensland Strategy for Sustainability 1 and 2
DAD	Decide-Announce-Defend
DNRM	Department of Natural Resources and Mines (Queensland)
DNRW	Department of Natural Resources and Water (Queensland)
ESD	Ecologically Sustainable Development
FBA	Fitzroy Basin Association
ICM	Integrated Catchment Management
IUCN	International Union for Conservation of Nature and Natural Resources
LWA	Land and Water Australia
MBI	Market-Based Instrument
NAP	National Action Plan for Salinity and Water Quality
NC	Neighbourhood Catchments
NFF	National Farmers Federation
NGO	Non-Government Organisation
NHT	Natural Heritage Trust
NIE	New Institutional Economics
NRM	Natural Resource Management
NSW	New South Wales
OECD	Organisation for Economic Cooperation and Development
OIE	Original Institutional Economics
PMP	Property Management Plan
RIS	Regional Investment Strategy
SWF	Social Welfare Function
UNCED	United Nations Convention on Environment and Development
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WWF	World Wide Fund for Nature

## 1. Introduction

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Economic activities generate environmental losses as unintentional consequences of production and consumption decisions. These losses are particularly evident in agriculture and natural resource management (NRM) and are the direct result of incentives generated that promote increased production. However, many industries and communities also rely on good quality environmental services (e.g. clean air and water), with many populations having values for retaining such environmental assets in good condition. Landholders, communities and governments thus face different complex pressures to both impact on and protect the natural environment. The framework for organising this interface between economic and environmental systems is through institutions – vis-à-vis markets, regulatory and governance mechanisms.

Over the last two decades, there has been a growing trend for governments in many countries to shift the governance bias towards a more decentralised and participatory approach especially in relation to natural resource management and protection of the environment (Knox and Meizen-Dick 2001). The growing interest and move towards decentralised, devolved forms of public governance and civil regionalism in Australia is consistent with an international trend (Lane 2006; Canaleta *et al.* 2004; Smyth *et al.* 2004; Jessop 1997). Natural resource governance in Australia has also seen governments moving progressively away from top-down regulatory prescription towards more collaborative and inclusive approaches to address the “big issues” of land and water degradation (Head and Ryan 2004, p.362). This has been coupled with the recognition that many solutions to NRM problems will rely on a more cooperative and integrated approach. Marshall (2001, p.1) states that such a paradigm shift for environmental governance is based on the belief that:

...fostering collaboration between different civil groups and government agencies with an interest in the outcomes of the governance process would lead them to cooperate with one another more in implementing the decisions arising therefrom.

Such an emphasis on a partnership approach requires the informed involvement and commitment of non-governmental organisations (NGOs). Inclusive processes are

intended to reduce adversarial behaviour among stakeholders, while attempting to keep the remaining tensions within strategic frameworks for achieving long-term NRM objectives. The joint approach is crucially dependent on adequate program funding by government, incorporation of relevant scientific research, skills of participants, and ongoing NGO commitment to the process (Head and Ryan 2004). The management of these major “sustainability” issues is made more complex in Australia through the interplay between three levels of government – federal, state and local (Head and Ryan 2004, p.362), although it is acknowledged this system of government is not unique to Australia.

In Australia, the effects of natural resource degradation as a result of various practices, including land clearing for farming and other related agricultural activities, has long been a major environmental concern, despite the fact that some practices such as land clearing have ceased as a result of regulatory measures<sup>2</sup>. Some commentators argue the Australian rural landscape faces “ecological loss and its communities exist precariously with a high level of uncertainty” (Williamson *et al.* 2003, p.7). The occurrence of environmental degradation continues despite ongoing attempts by Australian governments to address natural resource and environmental concerns by investing in a range of national funding programs over the last two decades. The loss of biodiversity and ecological function, and the implementation of regulatory measures have flow-on social impacts that adversely affect rural communities whose existence is dependent on the health of these natural resources (Coop and Brunckhorst 2000).

A 1984 review by the Senate Standing Committee on Science, Technology and the Environment (Cocks 1984) attributes Australia’s land-use problems to constraints imposed by the federal system of government (fragmented and overlapping responsibilities); the complexity of issues impinging on land use; and the political need to balance social, economic, and resource management considerations in

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<sup>2</sup> In Queensland, which is the focus of the case study context in this research, the enactment of the Vegetation Management Act 1999 (Qld), and Vegetation Management and Other Legislation Amendment Act 2004, 2005 (Qld) has provided a framework for phasing out broadscale clearing of remnant vegetation by the end of 2006.



resolving land-use conflicts. Skitch (2000, p.11) comments that such an observation is probably no less valid now than it was over two decades ago. Development outcomes inevitably represent a loss to natural heritage and involve compromises, so that no interest group is ever completely satisfied with the result.

A core matter of concern relates to the institutional<sup>3</sup> framework through which natural resource policy decisions are implemented, and more importantly, the manner of implementation. In a report of inquiry into the program of Catchment Management in Australia, it was noted that “the problems that beset catchment management at present do not emerge from the approach itself, but rather how it has been put into effect” (Commonwealth of Australia 2000a, p.5). The traditional, top-down, ‘command and control’ approach to governance has been seen to be problematic and no longer appropriate in addressing the complex issues surrounding natural resource and environmental governance. Escobar (1995) and Scott (1998) argue in the context of international development programs that top-down arrangements were both disempowering and ineffective.

In Australia, the “regional” level has been chosen in recent years as the suitable “scale” for NRM planning and program intervention, by both the national and state governments (Head and Ryan 2004, p.362). In order to accommodate “regional” programs in NRM, regional governance has been redesigned or reinvented. Regional NRM groups established under the new governance framework act as intermediaries between government and landholders (and other stakeholders). The idea of a *regional* scale in the context of Australian NRM in this thesis refers to an environmental catchment scale, typically defined by biophysical and geographical landscape characteristics that may cover multiple local government jurisdictions.

Australia has embraced the decentralisation of natural resource governance through the regional NRM arrangements. Pero (2005) notes that the origins of the regional

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<sup>3</sup> Institutions are important as they set the rules that shape the behaviour of organisations and individuals in a society (World Bank 2001). They can be formal (constitutions, laws, regulations, contracts, internal procedures of specific organisations) or informal (values and norms). A detailed discussion on institutions is presented in section 4.5.

approach can be traced to a 1999 Australian Government discussion paper entitled “Managing Natural Resources in Rural Australia for a Sustainable Future” (Commonwealth of Australia 1999). The paper proposed the creation of formalised partnership agreements between regional communities and government, whereby government would provide the regions with block funding to implement NRM plans and strategies developed by them and for which they, the regions, would be held accountable.

Two major national funding programs<sup>4</sup> require community-based regional NRM groups and catchment management authorities (CMAs) to administer funds for regional on-ground projects to manage rivers, coastlines, biodiversity and vegetation. The decentralisation and devolution of authority and resources to these groups is contingent on participatory, representative and transparent engagement processes. Supporters of the regional NRM arrangements (e.g. Whelan and Oliver 2004; Syme 1993) anticipate that the heightened inclusion of community members in decision making will contribute to a holistic and collaborative approach, in stark contrast to adversarial, ‘Decide-Announce-Defend’ (DAD) approaches of the past.

Lane (2006, p.1) asserts that this model of natural resource governance has emerged due to three factors:

- NRM needs to be scaled-down to the regional level so that management efforts can be focused on a single geographic unit;
- Government has failed to secure environmental sustainability (or, at least, government action has proven ineffectual) and so alternative ways of managing need to be found; and
- Citizen participation should be central to the development and implementation of NRM strategies. Instead of being treated like stakeholders, the citizens of any given region should be directly engaged in policy development and implementation.

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<sup>4</sup> The Natural Heritage Trust (NHT) and National Action Plan for Salinity and Water Quality (NAP)

In this thesis, the broad question is posed of whether decentralisation<sup>5</sup> of governance through the regional NRM arrangements represents a *neo-renaissance*<sup>6</sup> in NRM that governments and the community have been yearning for to address the growing concerns over natural resource degradation in Australia. Some of the key questions to be addressed include:

- Can the rhetoric of the regional NRM arrangements deliver what is realistically needed in practice?
- What institutional characteristics and policy interventions are most likely to achieve cost effective sustainable NRM outcomes<sup>7</sup>?
- Are the regional NRM arrangements the solution?

## **1.1 A REGIONAL EXPERIMENT**

The regional NRM arrangements that have been implemented with the establishment of the NHT<sup>8</sup> in 1997, and later in 2000 with the NAP funding programs, are often viewed as a more strategic investment in NRM priorities, representing a shift away from inefficient project-based approaches of earlier NRM investment programs such as Landcare and Integrated Catchment Management. These failed to deliver on expectations due to a lack of regard for systematically learning about what conditions need to be met for its success (Lockie 1999; Martin 1999; Sturgess 1997). The regional NRM arrangements are consistent with the integrated, community-based approach of earlier programs that were aimed at addressing NRM issues in a more participatory and inclusive arena. However, the implementation of the regional initiatives has been largely experimental and continues to pose enormous challenges for both rural

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<sup>5</sup> The concept of decentralisation is discussed in section 4.3.3.

<sup>6</sup> The *Renaissance* typically refers to the cultural movement spanning the 14<sup>th</sup> to 17<sup>th</sup> century in Europe during which an intellectual transformation occurred in various fields of study, including the arts and humanities, and sciences, and was associated with a period of intellectual transformation (e.g. Brotton 2006). A similar vein is adopted in this thesis, where the term ‘neo-renaissance’ is used to posit whether the regional NRM governance arrangements in place represents a “new rebirth” in Australian NRM that can offer a path forward to address the shortcomings of previous programs.

<sup>7</sup> Throughout this thesis, reference is made to the term ‘NRM outcomes’, which relates to improvements in the condition of natural resources, or reduction of threats and pressures on natural resources.

<sup>8</sup> The NHT commenced in 1997, but the strategic focus on regional NRM groups of interest in this research is primarily reflected in the extension of the NHT which commenced from 2002.

communities and responsible government and industry agencies (Paton *et al.* 2003; Pero 2005; Bellamy and Johnson 2000).

In Queensland, a number of initiatives promoting decentralised and collaborative regional NRM planning and service delivery have been established consistent with this philosophy. These include initiatives that are largely within government, initiatives that span both government and community functions, and initiatives that allocate funding and responsibility to independent regional natural resource management groups. Unfortunately, the developments have not been informed by systemic research on the role and value of, or mechanisms for, collaborative natural resource governance.

The changing institutional environment has resulted in a number of factors that have increased the number of actors involved in the NRM policy process, such as the emergence of regional NRM groups and providers, together with a greater emphasis on public participation and increasing role of NGOs, pressure groups, and agencies in the decision making process (Meijers and Stead 2004). This shift to a more collaborative, community-based approach to natural resource governance has been largely driven by government with little or no economic analysis undertaken to evaluate the costs and benefits of the achievements of the regional arrangements to date. Hence, there is little empirical research to guide public managers in determining best value arrangements and strategic investments in NRM programs that can build a region's 'collaborative advantage' (Huxham 1996; Huxham and Vangen 2000) in achieving NRM goals and outcomes.

The key issue of concern is that significant levels of funds are being invested into new institutional arrangements, which are relatively new and untested mechanisms that involve channelling funds and some decision making authority to community-based regional NRM groups, without a clear understanding of the processes critical to developing self reliance of a local group (AACM 1995), and a sense of how programs might be properly evaluated. Rhoades (2000, p.333) observed from a review of participative watershed management programs that the basis for design of many such programs was largely 'anecdotal'. Saleth and Dinar (2004) note with respect to

institutional arrangements governing the water sector that institutional change is path dependent, occurring along a stage-based process which incurs institutional transaction costs, and “deliberate and purposive policies can substantially alter or reinforce the course of institutional change” (Saleth and Dinar 2005, p.8). The question therefore, is whether the benefits of the regional NRM model in terms of cost effectiveness and improved outcomes are high enough to justify the additional governance and administration costs.

A recent review of the regional delivery model (NHT and NAP programs) undertaken by the Australian National Audit Office (ANAO 2008) revealed that there was insufficient documentation and dissemination regarding the economic costs and benefits of investments in regional NRM. Specifically, the Audit (ANAO 2008, p.45) outlined that there was:

...no documentation or guidance to advise regions (or other bodies delivering on-ground actions) as to whether or not particular actions will deliver good value for money results over the longer term. For example, would a tendering process for biodiversity conservation deliver better value for money than a devolved grant program?...This information is vital to the ultimate success of the programs. The absence of information on the costs and benefits of treatment actions leaves substantial residual risks to the achievement of program outcomes at the end of the NHT 2 and the NAP...

Consequently, there is the question of whether the regional NRM arrangements are appropriate for the longer term, given what has been already experienced in earlier NRM programs in Australia with ad hoc programs of funding. In Queensland, the current level of annual investment by the Australian Government in NRM that is channeled through regional NRM groups is approximately \$50 million<sup>9</sup> per year, which is supplemented by an equivalent amount of in-kind<sup>10</sup> support by the state government. This compares to around \$1 billion per annum net additional expenditure on NRM and environmental programs that are already administered by

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<sup>9</sup> This estimate was derived from available DNRM internal unpublished figures and Ministerial Statements for the 2003-04 and 2005-06 financial years (Binney 2005, *pers. comm.*).

<sup>10</sup> In-kind refers to a non-cash resource contribution drawn from state agency programs.

the Queensland Government through their relevant agencies<sup>11</sup> (Binney 2005, *pers. comm.*). Given this significant level of investment in these programs and the uncertainty that surrounds future funding and potential outcomes, indeed a *regional experiment* is well underway in Australia. It is therefore important to review the institutional arrangements and its associated costs and benefits to determine whether the regional NRM arrangements are consistent with achieving desired NRM outcomes, and whether they should be continued, scaled back, or expanded. Although there is an increasing number of empirical case studies on decentralisation in NRM (e.g. Lutz and Caldecott 1996; Secaira *et al.* 2000), there are few applications of theoretical concepts for analysis of the efficiency of reformed or new institutional arrangements (Birner and Wittmer 2004).

Regional communities face a number of barriers in attempting to achieve genuine on-ground change by moving beyond principle and rhetoric to effecting substantive action at the local level (Bellamy and Johnson 2000). Evaluating a particular incentive program can reveal valuable insights into how such barriers can be overcome by understanding landholder decisions relating to the adoption of improved environmental actions. Of critical interest in this research is the link between the institutional changes made at the 'higher', governance level (e.g. institutional arrangement) and corresponding changes at the 'lower', landholder level (e.g. Challen 2000). In turn, these changes are also accompanied by corresponding changes in the level of transaction costs and development of social capital-enhancing processes which may be self-reinforcing.

In this thesis, it is argued that governments need to properly consider the total costs (including the non-financial costs) and benefits (including 'soft' benefits) when implementing such regional NRM programs. These costs include transaction costs and the direct financial costs as part of a shift to regional governance and delivery. Transaction costs<sup>12</sup> include the costs of searching, negotiating, settling and enforcing economic actions (including those governing participants in political and economic

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<sup>11</sup> In Queensland, relevant government agencies involved with environmental and NRM include the Department of Natural Resources and Water, Department of Primary Industries and Fisheries, and the Environmental Protection Agency.

<sup>12</sup> Transaction costs are explored further in chapter 4.

systems). On the benefits side, this research will also demonstrate the critical role and contribution of regional NRM groups in achieving environmental outcomes under these governance arrangements. Outcomes of the research will include recommendations on the appropriate model for natural resource governance based on case study evidence, and development of an institutional decision support tool to guide government policymakers in the planning and design of suitable governance arrangements for achieving desired NRM actions. This is done in two key stages; first: to ensure the 'best-fit' for the region into which it is being encouraged; and second, to ensure that policy decisions are based on appropriate principles justified by social and economic considerations.

Ideally, an analysis of the regional NRM model should include a comparative analysis of the transaction costs of alternative models of governance. This would involve analysing the total costs (e.g. transaction costs and other direct costs) and benefits (e.g. social capital development, improved NRM outcomes) of each model to determine the effectiveness and efficiency of governance under each model. A comparison of costs and benefits across different models in relation to achieving NRM outcomes would provide a basis for justification for adopting a particular model of governance.

However, there are many difficulties in this approach. First, the differences in coordination mechanisms will be very incremental and difficult to identify. The base case for comparison is also not very clear and will be difficult to properly define accurately. Specifying what changes occur between different governance mechanisms also poses challenges. A further complexity lies in the difficulty associated with measuring costs and benefits accurately and consistently enough for comparison. The issues for both costs and benefits can be summarised as follows:

- Identification;
- Specifying what changes occur between different governance mechanism; and
- Measurement.

Given the complexity inherent in the task of conducting a comparative institutional analysis, coupled with limited resources and time constraints in this study, the

institutional analysis in this study focuses on the regional NRM model, and examines the appropriateness of such an institutional arrangement for achieving NRM outcomes based on specific case study evidence. Of interest is how the regional NRM model influences the level of transaction costs in the implementation of NRM programs and on-ground activities, and the identification of indirect benefits. This is a complex undertaking in itself, with a multitude of factors playing a potential role in the resultant institutional transaction cost profile and identification of indirect benefits. Of particular interest is how the regional NRM governance model links to the indirect benefits associated with development and fostering of social processes and 'soft' institutions which are posited to be critical factors in achieving NRM outcomes.

Six key elements of the regional NRM arrangements that may generate benefits and improved NRM outcomes are identified in the research. These include:

1. Tailoring NRM plans to local and regional knowledge
2. Capacity building
3. Improving cooperative behaviour
4. Changing behaviour through improved knowledge
5. Improved take-up and compliance
6. Reduced conflict over resource management

In this research, a case study analysis is conducted on the role of the Fitzroy Basin Association (FBA), the regional NRM group responsible for planning and implementing regional NRM programs across the Fitzroy Basin catchment of Central Queensland, in achieving natural resource and environmental targets in line with the regional NRM Plan developed by the group. An assessment of factors influencing participation in NRM programs and links between *governance capital*<sup>13</sup>, a type of social capital proposed in this thesis, and natural resource management will also be conducted. The role and choice of institutions will have different cost implications and transaction cost profiles, and generate different benefits. The question is

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<sup>13</sup> The concept of governance capital is conceptualised and explored in chapter 5.



whether it is worth investing in a regional model to foster the development of governance capital, a key benefit, as compared to managing service delivery centrally through established government administrative infrastructure which is likely to involve lower administrative costs, but with potentially lower levels of governance capital creation and subsequently achieving poorer levels of natural resource management outcomes.

In this thesis, it will be argued that the regional NRM model, based on the FBA case study, combined with an improved understanding of the attributes that motivate landholder actions, can fundamentally influence the degree to which desired land management practices will be adopted by a regional community. Hence, the knowledge uncovered in this research will be vital in enabling policymakers to better target the critical social and economic attributes and improve the design of NRM programs for cost effectiveness and optimal uptake by landholders to ultimately achieve on-ground improvements in resource condition.

## **1.2 AIM OF THE STUDY**

The aim of this study is to identify different institutional models available for pursuing natural resource governance outcomes, and specifically examine the model which characterises the regional NRM arrangements in the context of Australian regional natural resource governance. The first objective in addressing this aim will be met by reviewing the literature and past programs of natural resource governance leading up to the implementation of the regional NRM arrangements of interest in this research.

The second objective will be met by exploring empirically how the institutional arrangements surrounding the regional delivery model can optimise benefits and reduce costs in achieving the desired natural resource governance outcomes. To this end, a review of case study evidence was undertaken on establishing regional NRM governance arrangements in Queensland, and more specifically, evaluating a devolved grants incentive program conducted by the FBA in Central Queensland. In particular, the research assessed factors influencing landholder participation and program costs and benefits. To achieve these objectives, the research has a number of subsidiary objectives:

- To identify the costs and benefits associated with adjusting natural resource governance to the regional level;
- To evaluate the transaction costs of landholder participation in a devolved grants incentive program and to assess the attitudes of landholders to such regional NRM incentive schemes; and
- To develop and trial a decision support tool which offers advice to policymakers in the design and choice of institutional governance arrangements consistent with achieving regional NRM outcomes and the development of governance capital.

### **1.3 RESEARCH QUESTION**

The core research question to be addressed can be summarised as: What are the net benefits of adopting a regional NRM governance model for achieving NRM outcomes?

To answer this question, two broad areas will be addressed in this thesis. First, regional natural resource governance is examined using institutional economics to determine if an appropriate theoretical base can be identified to understand and evaluate the institutional structure. Specific questions are:

- How have traditional natural resource governance arrangements achieved desired environmental outcomes?
- How have major paradigm shifts in natural resource governance, such as adopting participatory and devolved governance arrangements such as through regional NRM, improved the processes for achieving NRM outcomes?

A second major area of interest concerns the conceptualisation of the social and economic costs and benefits of regional natural resource governance. Questions include:

- What transaction costs and other cost transformations accompany the shift to new institutional arrangements surrounding regional NRM?
- What are the net benefits from re-organising natural resource governance under the regional NRM model?

To increase consideration of social and economic factors, and to meet their triple-bottom-line obligations, policymakers are seeking guidance on how best to integrate social and economic issues into NRM decision making. Therefore, governments are seeking simple models or frameworks to guide decision making; models that do not significantly challenge governance arrangements, but rather work within the limitations posed by bureaucratic boundaries.

By answering these two broad areas of concern outlined above, the thesis will also make a contribution to the stock of lessons towards further understanding the net benefits of a regional NRM approach for collaborative natural resource governance.

#### **1.4 THESIS STRUCTURE**

The descriptive and theoretical background for analysing regional NRM issues is provided in chapter 2, setting the scene for the research. Concepts such as a public participation are introduced, together with its role in involving communities in NRM decisions. A background of environmental and natural resource management programs in Australia over the past two decades is outlined in chapter 3. Different institutions that exist to support the regional NRM arrangements are also explored in this chapter.

In chapter 4, economic theory relevant to the study of natural resource governance is introduced. In particular, a review of the definitions and conceptualisations of the concepts of institutions, governance, and transaction costs is outlined, including a review of relevant literature relating to decentralisation and adaptive management approaches to natural resource governance.

The role that social capital plays in fostering collective action and on-ground change is explored in chapter 5. The emergence and formation of governance capital as a result of the regional NRM arrangements being implemented is also discussed in this chapter.

In chapter 6, different institutional models for natural resource governance are outlined. In particular, the costs and benefits of each arrangement with a particular

focus on the regional NRM model are explored. Analytical frameworks for undertaking comparative institutional transaction cost analysis are also introduced in this chapter, together with a natural resource governance decision support tool developed as a tool to assist policymakers in identifying appropriate models for achieving collaborative natural resource governance outcomes.

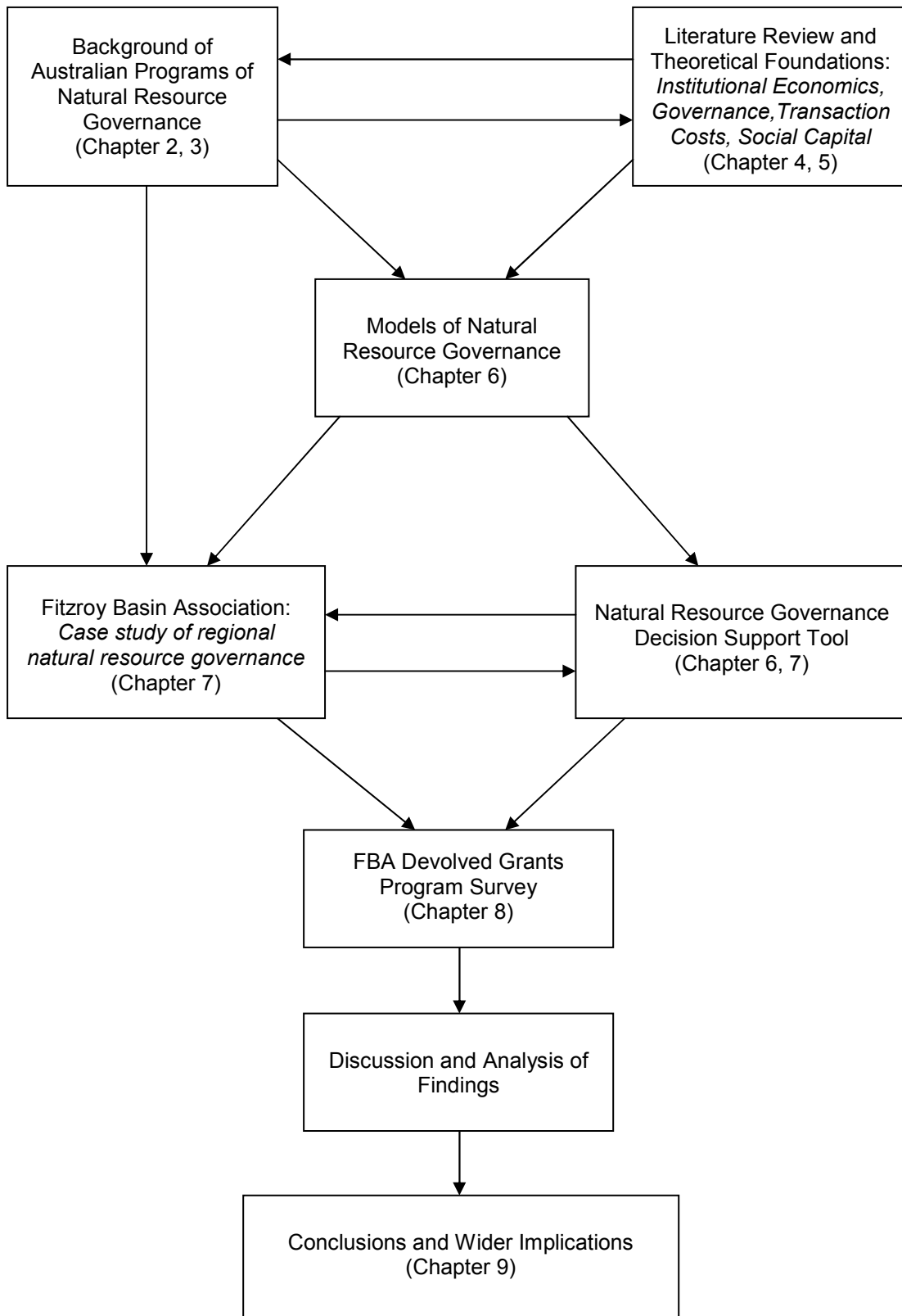
The empirical foundation of the thesis is presented in chapter 7. It is at this point where the regional NRM case study is introduced. An outline of the rationale behind the case study selection is also presented, together with an examination of the FBA and its role in natural resource governance decisions in the Fitzroy Basin catchment in Central Queensland. This is followed by a transaction cost analysis on the regional NRM governance arrangements in Queensland. A particular focus of this analysis is on the establishment of the FBA regional NRM group and the implementation of the FBA devolved grants program. The FBA case study is also applied to the decision support framework in this chapter.

The results of the survey and analysis of findings is presented in chapter 8. A discussion of the implications of the research findings and recommendations for the design and implementation of future NRM programs are also outlined.

A summary of the thesis is presented in chapter 9, which also considers the degree to which the case study findings are consistent with the regional NRM model and theoretical frameworks explored in the study. Broad policy implications in respect to how the regional NRM arrangements could be implemented more effectively are also presented, together with a description of the relevance of the thesis beyond the case study. The empirical and theoretical contributions of the thesis are also summarised.

Figure 1.1 presents an overview of the conceptual framework of the thesis.

**Figure 1.1: Thesis Conceptual Framework**



## 1.5 TERMINOLOGY

It is now pertinent to make some comments on the terminology that is used in this thesis. A multitude of so-called ‘bottom-up’, participatory, and collaborative approaches have been advanced as key mechanisms for achieving natural resource and environmental conservation outcomes. These have been referred to by a range of names, including community (or community-based) NRM (e.g. Kellert *et al.* 2000), community-driven development (e.g. Mansuri and Rao 2004), partnerships for development (e.g. Picciotto 1998), collaborative management or ‘co-management’ (e.g. Yandle 2003; Singleton 2000; Borrini-Feyerabend *et al.* 2000; Kuperan *et al.* 1999), collaborative environmental management (Marshall 2005), and participatory watershed management (e.g. Rhoades 2000).

To simplify terms in this thesis, such participatory and collaborative approaches will be referred to as *regional natural resource management* (regional NRM). This stems from the notion that current natural resource governance arrangements in place refer to natural resource management<sup>14</sup> at the landscape or regional scale. However it must also be noted that there may be an issue of scale involved, where the term ‘regional’ is broader than the smaller, community scale level. The FBA case study outlined in this thesis is an example of such a regional focus.

*Collaboration* is used to describe a process by which different groups who see different aspects of an issue (e.g. natural resource management) can constructively explore their differences and investigate solutions that go beyond their own limited vision of what is possible (Gray 1989, p.5).

The term *governance* broadly refers to the institutional arrangements which shape actors’ decisions and behaviour, including the exercise of authority within groups or organisations (such as firms or nations) (Hatfield-Dodds *et al.* 2007, p.3). It also

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<sup>14</sup> Natural resource management (NRM) includes any activity relating to the management of the use, development or conservation of one or more of the following natural resources: soil, water, vegetation, biodiversity or any other natural resource, including coastal and marine areas, and World Heritage, Ramsar Wetland and other protected areas (DNRM 2003).

encompasses the range of interactions between government and civil society organisations whereby collective problems such as those pertaining to natural resource management can be addressed (Marshall 2001). The concept of governance is further explored in chapter 4. The use of the term *natural resources* refers to those aspects of the natural environment that are of interest to humans (Conacher *et al.* 2000, cited in Marshall 2001). Hence, the term *natural resource governance* will be used in this thesis to encompass the broad notion of government and civil society actors working together to achieve natural resource management outcomes, with regional NRM representing one such form of natural resource governance.

*Institutions* refer to the humanly devised constraints that govern political, economic and social interactions (North 1991). They are shared within a community and act to constrain opportunistic behaviour in human interactions through sanctions for breaches of the rules (North 1990; Ostrom 1990). The definition of the role and relevance of appropriate institutions is further elaborated in chapter 4.

## **1.6 RESEARCH METHOD**

In contributing towards a contemporary understanding of collaborative natural resource governance, a framework for examining the regional NRM model for natural resource governance is applied in this thesis. The framework draws on evidence from the following:

- Review of past programs of Australian natural resource governance;
- Review of existing theories;
- Analysing case study evidence (desktop analysis, and survey data); and
- Developing and testing a decision support tool<sup>15</sup> using case study evidence to inform the design and evaluation of institutional and governance arrangements for NRM.

This section outlines the research methodology and techniques adopted in this study. Howe and Eisenhart (1990, p.6) maintain that clarifying these aspects of the study

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<sup>15</sup> A decision support tool was developed to provide guidance and support to NRM policymakers in the choice of appropriate institutional and governance arrangements for achieving NRM objectives (see section 6.6). It was applied using evidence from the case study to determine appropriateness of the regional NRM model (see section 7.6).

design helps to satisfy research principles that are important for maintaining an appropriate standard of research. This involves: (i) understanding one's values through alertness to, and coherence of, background assumptions; (ii) congruity between research questions and design, and; (iii) the effective use of relevant data collection and analysis techniques.

The research commenced with a desktop analysis and literature review of past programs and policies of Australian natural resource governance, which included the shift to bottom-up, participatory processes in NRM through the experiences of Landcare and Integrated Catchment Management. This provided a basis for comparing incremental changes and shifts in policies with respect to experiences of earlier NRM programs. The study also reviewed economic theories to determine the theoretical frameworks suitable for undertaking an assessment of the costs and benefits of the regional NRM governance arrangements of interest in this study.

The next component of the research involved analysing a case study of regional NRM focused on the FBA regional NRM group in Central Queensland. In particular, an analysis of the FBA devolved grants incentive program was undertaken to review the costs of participation in such a scheme. The primary means of data collection was a survey of landholders who participated in the program. This was the key mechanism for investigating indirect benefits of the regional NRM governance arrangements.

The following sections outline rationale for the case study approach adopted in this study and the focus of the FBA devolved grants survey.

### **1.6.1 Case Study Approach**

The research design in this study is based on case study methodology. The case study of interest is the FBA regional NRM group in Central Queensland (see chapter 7). The research questions were addressed by applying a mixed methodology of qualitative and quantitative analysis of data. Qualitative techniques include semi-structured interviews, process observation and document review. Quantitative techniques were based around the analysis of data from a survey of landholders involved in the FBA devolved grants program. Some contributions to the institutional and governance



theory for achieving NRM outcomes were also addressed using mixed methodology. An important aspect to consider is the fluid nature of the focus of regional NRM funding programs which means that the methodology needed to be flexible to remain relevant and to highlight the scope of the analysis.

George and Bennett (2005, p.5) describe case study research as the “detailed examination of an aspect of a historical episode to develop or test historical explanations that may be generalisable to other events”. It is particularly well suited for theory-building (Lijphart 1971, p.691; George and Bennett 2005, p.20). Case study research is at a scale and depth that favours the identification of causal relationships and the tracing of processes (Gerring 2004, p.348), and is appropriate for collecting evidence to support and contribute to development of contemporary economics theory for collaborative natural resource governance.

The use of case studies is well suited to facilitate the process of adaptive learning<sup>16</sup> which is important for addressing the issues of uncertainty and complexity inherent in NRM and environmental management problems. The use of case study research methods has been a foundation for much of the work in the social sciences (e.g. Eisenhardt 1991) and research into the economics of farm management (Case *et al.* 1957) and is appropriate for this study into regional NRM in Central Queensland.

Mobbs *et al.* (1999, p.131) argued that a priority for the social sciences in relation to collaborative environmental governance is to “isolate elements, strategies or mechanisms within particular experiences with potential for more generic application”. Accordingly, the purpose of applying the case study method in this study is to learn from one particular experiment with regional natural resource governance in order to contribute to and improve theoretical models of such governance systems.

Case study research does not provide the means to definitively confirm theories or hypotheses in the way a traditional multiple-unit study can. This may limit the generalisability of case study findings. Studies that utilise higher numbers of case

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<sup>16</sup> Adaptive learning concepts are discussed in section 5.4.

studies are better suited to confirmatory/disconfirmatory research strategies where hypotheses can be assessed against a larger number of variables and scenarios.

The use of a case study approach also has a number of other methodological issues or concerns that need to be considered, which are outlined below.

- **Subjective Bias**

Case study research and qualitative research in general is seen to be not as rigorous and a less desirable form of inquiry (Burns 1997). This is due to the subjectivity of the researcher in relation to deciding on what evidence to support or refute. Personal views can also influence the direction of the findings and conclusions. Hence, two researchers may arrive at two different conclusions based on the same evidence. However, this is not unique to this type of research as it can also occur in quantitative methods of analysis where interpretation of collected observations can also fall under a subjective lens.

**Generalisations**

Scientific generalisation is also difficult with the case study approach. Generalising from a single case study can prove problematic. However, Yin (1989) asserts that this is not the main goal of a qualitative researcher, which should be to expand on theories that incorporate the complexities of the social environment and not to make statistical generalisations. In this “clean data sanitised by control in experimental techniques are not true to life” (Burns 1997, p.380).

- **Time and Information Overload**

There is also the potential for a large amount of information to be collected which can increase the burden for analysis, which in turn, increases the risk of selectivity bias. This can be overcome however, by choosing a topic that is manageable and focussed that can reduce the risk of collecting peripheral and less relevant data.

- **Reliability**

Reliability is typically related to the degree of replicability of a research outcome. In relation to case studies, reliability is not as related with replicability as it is with dependability, that is, whether the observed results

make sense and are generally agreed upon. To improve reliability, the research can report any personal biases that may exist and document the process of data collection and decisions made about the data. Documenting and detailing the steps and procedures adopted in the research can also assist this.

- **Validity**

Construct validity can be a concern when there is an absence of operation measures and subjective judgement used to select and collect research data. Concerns can be addressed by using multiple sources of evidence to demonstrate the convergence of the data as well as establishing a chain of evidence that links the various components together. Internal validity is concerned with how well the findings fit with reality. The external validity of theoretical propositions arising from a case study is ultimately assessed by whether or not they are corroborated by other case studies. This represents a form of data triangulation, where data is collected at different times or from different sources in the study of a phenomenon (Easterby-Smith *et al.* 1991). As noted by Hussey *et al.* (1997 p. 67), “similar cases will help to show whether your theory can be generalised and dissimilar cases will help to extend or modify any theory”. Yin (1989) notes that corroboration can be achieved by a single project with a research design that includes multiple case studies or can arise less formally as the stock of studies of particular cases accumulates incrementally over time.

The review of literature provides for an interpretive approach where the existing theories provide insights into the analysis of the case study, while the case study provides some degree of confirmation of the theories (Lijphart 1971). Hence, the hybrid methodological approach adopted in this study offers a trade-off between single-unit analysis (with their descriptive detail, depth, emphasis on causal mechanisms, and ‘theory generating’ research strategy) and cross-unit studies (useful for causal inference, breadth of proposition, representativeness, emphasis on causal effect, and ‘theory testing’ research strategy (Gerring 2004, p.346).

The case study analysis in this research aims to contribute to an increased depth of understanding of the mechanisms underpinning regional NRM governance processes in the context of Central Queensland. The research provides empirical evidence to inform the 'regional experiment' of Australian natural resource governance. Dovers (1999, p.101, cited in Marshall 2001, p.237) declares accordingly:

Most cases can yield useable lessons both positive and negative, and the challenge is to build up a stock of these from across our collective experience, and apply these in various combinations to answer our future needs.

The present study seeks to add to this stock of lessons. In particular, the purpose of applying a case study approach was to help inform and validate the theoretical and conceptual underpinnings of the regional NRM governance model, and was considered to be suitable given the objectives and constraints of this research.

### **1.6.2 FBA Devolved Grants Survey**

This study involved both a desktop<sup>17</sup> analysis and the collection of data from landholders involved in the FBA devolved grants incentive program. Key sources of information used to inform this research was collected by a range of methods including undertaking field visits<sup>18</sup> to the study region.

The FBA devolved grants survey represented the primary data collection mechanism for this research. The survey collected data on the intangible and indirect benefits (e.g. social capital and governance capital enhancing processes) associated with the regional NRM governance model as identified in the literature, and also collected data on transaction costs of participation in the program. The rationale for the survey was to address the lack of empirical data on transaction costs of implementing NRM incentive programs under a devolved arrangement such as regional NRM. McCann *et al.* (2005) assert that little work has been undertaken to estimate the size or

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<sup>17</sup> During the course of the study, the researcher was working with the Community Partnerships unit in the Queensland Department of Natural Resources and Water, the lead state government agency responsible for delivering NAP and NHT2 funded programs in Queensland as part of the regional NRM arrangements.

<sup>18</sup> Field visits to the Central Queensland study area were conducted during the course of this research between 2005 to 2007. During this period, the researcher observed and participated in meetings with key regional NRM stakeholders ranging from different levels of government, regional NRM organisations, industry peak bodies, researchers, and landholders.

importance of costs that fall to farmers or other stakeholders to comply with new NRM policies. They note that surveys or interviews have been used to estimate transaction costs in evaluating NRM policies and identify some recent examples, including Falconer (2000) and Kasterine *et al.* (2001) who estimated farmers' transaction costs of participating in agri-environmental schemes.

The survey questionnaire developed for this research was conducted by telephone to participants in the FBA devolved grants program. An advance letter on Central Queensland University letterhead was sent out to targeted respondents that explained the purpose of the survey and the confidentiality of the responses in accordance with Dillman (2000, pp.162, 318).

Survey design followed some of the techniques prescribed by the Tailored Design Method (Dillman 2000). There were 37 questions developed in line with De Vaus (2002) and Dillman (2000), and following advice from questionnaires conducted in similar fields and feedback from a range of NRM researchers and policymakers.

The survey only targeted individuals who participated in the FBA's devolved grants program. In order to extrapolate the results of why people participated to the general farming population, it would be necessary to survey landholders who chose not to participate in programs run by the FBA. Surveying non-participants would have been useful to assess participation rates and provide useful comparisons with other comparable regions. This could also identify the factors behind non-participation. A multivariate model (e.g. probit model) could then be used to examine differences between participants and non-participants. However, time, resource, and data limitations on the research did not permit this type of investigation for this study.

A wide range of individuals provided comments on various versions of the questionnaire, including policy officials from the Catchment Programs unit at DNRW, FBA, and Central Queensland University. Results from earlier surveys conducted by DNRW and the FBA assisted in confirming the relevance of questions included in the final survey.

The survey also investigated the indirect benefits associated with social capital and governance capital resulting from engagement with the FBA through participation in NRM programs. The survey elicited a range of landholder and farm characteristics and investigated a range of issues relating to landholder participation, including:

- Current and future plans for farm property
- Farm property characteristics
- Transaction costs of involvement (application process and implementation)
- Socio-economic characteristics of farm households
- Development of social capital
- Attitudes and perceptions towards the FBA

The majority of survey questions were closed and had pre-defined response categories. The use of closed response categories enables the results from different respondents to be easily compared and analysed. The survey was formatted for short answers such as 'yes' or 'no', with attitudinal and practice questions outlined using a 5 point Likert-scale response category. An example of this included responses ranging from strongly disagree to strongly agree. The final section included standard demographic questions. The demographic response categories were consistent with the Australian Bureau of Statistics (ABS) to allow for comparisons with other regions as appropriate. In several places throughout the survey there was an opportunity for respondents to make comments. Comments gained from the opened-ended sections were also used to inform the analysis.

The survey phase of the research followed several design stages. The first stage involved defining important attitudes and issues related to community-based devolved governance processes for inclusion in the survey. This was achieved by reviewing related literature and conducting informal focus group interviews with individuals involved in regional NRM in Queensland. This stage also involved identifying the relevant stakeholder groups and preparing a target respondent list. The second stage used the information from these sources to construct the survey questions. This stage also involved referring to a range of textbooks, and discussion with academics working in NRM and officers working with relevant government

agencies. The design of the survey was also informed by the literature and other social and economic landholder surveys conducted in Queensland, such as the Burdekin Catchment Landholder Survey conducted by CSIRO in 2002 and the 2006 BRS survey which collected social and economic information to support regional NRM planning in the Burnett Mary region. In the third stage, a preliminary draft of the survey was reviewed with FBA staff to ensure that the survey was consistent with the relevant NRM program focus. This resulted in a significant review of the survey questions (stage four) including removing certain redundant questions and refining existing questions to more accurately reflect the issues of interest. In stage five, the final survey was implemented. This consisted of sending out pre-survey letters one week in advance introducing the research project and requesting participation if contacted, and conducting the survey by telephone using computer assisted telephone interviewing methodology. Finally, the survey results were analysed.

### ***Sample Selection***

The sampling method used in the survey was targeted or purposive sampling (Babbie 1990; De Vaus 2002). This non-probability sampling technique was appropriate as the study concerned a specific segment of the population, namely, landholders involved in the FBA devolved grants program. While such a design did not lend itself to providing a comprehensive assessment of regional NRM governance processes as a whole, it offered useful data to validate theoretical links between collaborative natural resource governance arrangements including considerations of transaction cost and indirect benefits such as the development of social capital critical for successful implementation and on-ground delivery of NRM programs of interest in this study.

Landholders who participated in the FBA devolved grants program were identified to represent the sample population. The grants program was chosen because it represented the most common form of incentive mechanism used by regional NRM and catchment management organisations in Australia to encourage private landholders to adopt improved land management practices. In addition, the survey also provided an opportunity to directly assess the relationship between the FBA and

its grassroots catchment stakeholders. This is a critical element and purported strength that differentiates the regional NRM model with more centralised governance approaches.

## **1.7 ETHICAL CONSIDERATIONS**

This research was carried out in accordance with the ethical guidelines prescribed by the Faculty of Arts, Business, Informatics and Education at Central Queensland University. The purpose and intent of the study was overt and open to all participants. Participants were also informed that their involvement was voluntary and withdrawal from the study was without prejudice.

It was essential in the process of data collection that every effort was made to ensure the anonymity of key informants and to assure participants that any information provided was to be held in strict confidence in accordance with Central Queensland University ethical research policies. This was particularly important for the survey instrument used in this research as responses from some individuals could potentially reveal their financial situation and identity based on their responses to the survey questions. In other circumstances, this was not a major issue as participants in interviews conducted were generally very willing to discuss their experiences and perspectives on the issues raised.

## **1.8 SUMMARY**

In this chapter, the broad rationale for the research was outlined together with the research questions to be answered and research methods guiding the study. The rationale and design of the FBA devolved grant survey instrument was also presented.

The first research task to achieve the goals outlined in this chapter is the development of a comprehensive understanding of the nature and background of the institutional and governance arrangements for natural resource and environmental governance in Australia. This task is addressed in chapter 2.



## **2. Moving forward, looking back: Background of Natural Resource Governance in Australia**

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*Sustainable development requires a political system that secures effective citizen participation in decision making*

(Gro Harlem Brundtland in *Our Common Future*, 1987)

### **2.1 INTRODUCTION**

Community-based approaches to natural resource management have evolved over the past two or more decades as an alternative approach to centralised forms of governance predicated on state control of resources (Armitage 2005). In addressing the natural resource and environmental degradation presently being witnessed in Australia and elsewhere, explicit government policies and programs directed at changing attitudes towards land management practices are currently being implemented, with recent programs encouraging greater community participation and collaboration, and a 'bottom-up' approach. Consistent with this more inclusive, participatory approach towards regional natural resource planning matters, governments in Australia and over 60 countries around the world (Lane 2006; Ribot 2002) have embarked on the process of promoting the devolution of natural resource governance to regional community-based programs (Marshall 2004; Cortner and Moote 1999), and encouraging more collaborative processes in the development and implementation of policy decisions relating to the conservation of the environment. This was also prompted in part by efforts of the United Nations to promote devolution as the major strategy for implementing Agenda 21 decisions on the environment and the principle of sustainable development in returning more governance controls to the local level (Mehta *et al.* 1999). Further elaboration on this reform of natural resource governance is provided in section 2.2.1.

Notwithstanding earlier efforts by governments in Australia to address such growing environmental concerns through the programs of Landcare and Integrated Catchment Management, regional landscapes across Australia are continuing to experience significant natural resource degradation attributable to unsustainable

land management practices, with the estimated costs of environmental degradation continuing to escalate (e.g. Bellamy and Johnson 2000; Commonwealth of Australia 1999). Environmental pressures, particularly salinity, erosion and water quality issues are resulting in the loss of land from productivity, increasing farm costs, and reducing the sustainability of farming enterprises. The economic cost of such occurrences is substantial, both in terms of production losses and environmental mitigation activities. If the current intensity of agriculture persists with insufficient modification to land management practices, degraded land will be increasingly lost to production. Furthermore, Australia's variable climate results in extreme fluctuations of drought and flood events, which can have devastating impacts on farming and agricultural activities.

Natural resource degradation in agricultural regions of Australia is one of the most severe environmental problems continuing to face governments (Williamson *et al.* 2003). Hatfield-Dodds (2006, p.377) notes that there is growing acknowledgement that Australian farming systems, which are based on practices developed in markedly dissimilar environmental contexts<sup>19</sup> of the northern hemisphere, have not been "well adapted" to the Australian continent's landscape systems.

Current estimates of the costs of environmental degradation in Australia are as high as \$3.5 billion<sup>20</sup> per annum, which is equivalent to approximately one-fifth of the value of agricultural value added (COAG 2000; ACG 2001). Studies suggest that half of these costs are borne by agricultural producers and individual landholders, a

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<sup>19</sup> Australian soils are largely dissimilar to that of northern hemisphere soils upon which agricultural practices have developed. They are ancient and infertile, characterised by a top soil depth of less than a few centimetres. However, agricultural practices were adopted from the United Kingdom, where the soil is fertile and deep (Williamson *et al.* 2003).

<sup>20</sup> One report prepared for the National Farmer's Federation and the Australian Conservation Foundation estimates that the full cost of land and water degradation could cost Australia \$2 billion annually (Madden *et al.* 2000), a figure which could increase to over \$6 billion annually if no action was taken (Williams *et al.* 2001). Another report describes that the annual cost of land and water degradation is approximately \$3.5 billion per year, excluding the cost of pests and weeds (Commonwealth of Australia 2000b). Conacher and Conacher (2001) estimate that Australia-wide, land degradation (including erosion and salinity) is estimated to cost annually over \$2 billion in restoration works, and \$1.2 billion in lost production. These figures do not include the value of environmental costs such as the loss in biodiversity.

third by households and the remainder by state and local government (NLWRA 2001). Hence, a large component of the economic costs of land and water degradation will ultimately be shouldered by the individual landholder (Curtis and Lockwood 1998).

The economic and environmental loss (e.g. loss of biodiversity) occur mostly on land that is under private management (Skitch 2000). In Australia the private sector manages approximately 60% of land (the majority of which is rural), hence it is clear that any inroads to be made with respect to addressing environmental degradation in Australia will need to involve local action from landholders. As rural communities depend in part<sup>21</sup> on the health of a number of ecosystem services (Coop and Brunckhorst 2000), it is important that a balance is reached between conservation and production outcomes to ensure the continued survival of both. This is not always easy in practice as some landholders struggle to balance “the biophysical capabilities of their landscapes with meeting debt repayments, declining returns, increasing pressure from government regulations and policies...These uncertainties create incentives to focus on current consumption at the expense of future productivity” (Williamson *et al* 2003, p.9).

Despite degradation being worse now than it was in the 1980s when Landcare was established (Williamson *et al.* 2003), Landcare has been successful by way of raising levels of awareness on the issue of environmental degradation. Williamson *et al.* (2003, p.10) state that programs such as Landcare:

...have not equipped landholders with the ability to manage land sustainably: such programs have encouraged reliance on financial support from governments for action to take place. Landcare is a single dimension approach that does not have regard to social and economic stability. Rather than embark on a program of capacity building, the governments tend to continue policies of financial assistance, which are often short term and lack coordination.

In the same vein, Marshall (2001, p.51) observed in relation to ICM programs:

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<sup>21</sup> There are also a number of biodiversity losses that may not have direct social and economic impacts on landholders.

Rather than empowering the citizenry in terms of self-reliance in avoiding further escalation of agri-environmental conflicts between farmers and others, existing ICM arrangements make it likely that solutions to these conflicts will in the foreseeable future continue to rely heavily on external intervention—especially provision of financial support channeled through cost-sharing mechanisms—by governments.

Kasdan (1993) asserts that if policies are based on the premise that communities cannot competently manage their resources locally, this will lead to the establishment of management regimes and institutions which in fact ensure that the communities cannot. Essentially, such regimes may develop into a type of cultural mindset wherein these beliefs, values and institutions are reaffirmed in a vicious cycle, and can in fact ‘lock-in’ (e.g. Marshall 2005; Arthur 1990). Genuine holistic, integrated planning has often failed because the implementation has been fragmentary, single function and ineffective (Green and Tunstall 1998).

Acknowledgment of the need for a change in the way natural resources were managed in Australia first occurred in the 1980s. It was at this time when Australian governments began to respond to public concerns by signalling a shift away from a ‘top-down’, reductionist, control-based paradigm towards a more integrated systems approach, incorporating public participation and adaptive management (Blann *et al.* 2000). This response also involved a higher degree of inter-agency (Jackson 2003; Gray 1989) and inter-organisational (Alter and Hage 1993; Huxham 1996) collaboration between government agencies, and also involved greater collaboration between the government and the community. It was also at this time when landscape-scale or *regional* approaches such as Landcare and Integrated Catchment Management began to emerge as preferred processes. One of the principal reasons for this shift to more participatory approaches has been a belief that collaboration improves the prospects of solutions being implemented with “less hierarchical intervention, or more spontaneously, than would otherwise be the case” (Marshall 2001, p.9).

### **2.1.1 The Progressive Vision**

The rationale behind this repositioning of natural resource governance towards more integrated and collaborative arrangements can also be traced back to the so-

called *Progressive vision*. Founded on principles of ‘modernist beliefs’ (Marshall 2005, p.10) and the applicability of the ‘scientific method’ to the social world (Wacquant 1993), the Progressive vision was very much the progeny of the Industrial Revolution.

Marshall (2001) indicates that under such a Progressive<sup>22</sup> vision, which formally governed environment and natural resource management policy in Australia and other Western societies until recent decades (and continues to exert significant influence as a result of being embedded in the Western culture of politics and administration), human social behaviour was viewed in atomistic-mechanistic terms, presuming that the best solution to any given problem could be arrived upon by breaking it into parts and solving the parts separately. This was typical of the positivist mentality of the day. Progressive ideology viewed governance organised paternistically with key decision making relegated to a hierarchical sphere of experts, with little or no collaboration with the irrational public (Owens 2000). Korf (2003) notes that this logic stems from the belief that citizen participation is difficult to institutionalise and the machine of bureaucracy finds it challenging and tiresome to cooperate with unorganised citizen groups without formal institutional structures and hierarchies.

This traditional method of governing is the issue identified by Chambers *et al.* (1989), who point out in the context of poverty alleviation in developing country sustainable livelihood programs, that it is deeply embedded in a transfer of technology mode whereby scientists or other technical experts decide research priorities, generate technology and pass it on to extension agents to transfer to farmers. Chambers *et al.* (1989) also note that normal bureaucracy is hierarchical and tends to centralise, standardise and simplify. When the two are combined, as is the case in the large organisations, they tend to replicate, propagate the status quo, and resist change. Similarly, Newell (2000, p.12) notes in the context of international development programs:

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<sup>22</sup> Marshall (2001) uses this term to describe mainstream neoclassical theory. This is the definition adopted in this thesis. However, it is also noted that the term has also been used in the United States since the 1920s and 1930s to refer to a more socialist vision of society.

These traditional patterns of governance are likely to be unable to (and have shown themselves to be so in other cases) serve well resource-poor farm families working in complex, adverse and risk-prone environments. Instead a more decentralised, differential and versatile way of assessing the needs of rural communities is necessary if the institutions and policies are to make useful pro-poor interventions. This means ensuring that farmers' analysis is the basis of research priorities, encouraging farmers to experiment and evaluate and for scientists to learn with and from them.

Hence, it is an important development that centralised, Progressive policies were recognised to be not the most appropriate governance mechanism in the uncertain and complex arena of natural resource and environmental management. Natural resource governance in Australia grew largely from these types of Progressive Era policies which were based on "technocentric utilitarianism" in which science and efficiency took precedence over values (Klyza 1996, p.15). Motivated by the management techniques based on administrative science that were revolutionising American capitalism at the time, proponents of the progressive movement argued that government programs should also be administered scientifically (Marshall 2005). In commenting on the Progressive Conservation Movement which emerged at the time, Marshall (2005, p.13) also notes that it developed out of a confidence imbued by "the rapid productivity gains and improvements in material living conditions in these countries during the late nineteenth and early twentieth centuries". This movement derived from acute concerns over "the uncontrolled overexploitation of natural resources that had arisen in the second half of the 1800s" (Marshall 2005, p.12), and was convinced that "technical experts divorced from the corrupting influences of the politics of the times could best determine the public's interest" (Wondolleck and Yaffee 2000, p.11).

Hence, planners employed by government agencies at the time were presumed to represent the public interest (McGarity 1990). Such a synoptic approach<sup>23</sup> to planning tended to reside solely within the domain of scientists and technicians and guided by experts to serve the public interest (Lachapelle *et al.* 2003). Poisner

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<sup>23</sup> Lachapelle *et al.* (2003, p.485) characterise this approach as one that views planning like engineering, where technical experts possess the specialist expertise to solve problems, and an assumption that their actions represent the broad public interest. Essentially, this is another way to describe the Progressive approach.

(1996) adds that agency decision making was designed to be both professional and objective to avoid the appearance of bias, hence data was gathered, analysed and interpreted to the public by experts (Bryan 1996). During this period, the notion of public involvement in any government policies was unheard of, and often viewed as an unnecessary burden. Lachapelle *et al.* (2003) comment that public perception of the abundance of natural capital and faith in technology negated the requirement for any radical reform.

However, the Progressive vision met growing challenges to its dominant position in the form of environmentalism in the 1960s. At a time of unprecedented affluence for Western countries, people became less interested in materialistic values and more interested in the non-materialistic values associated with natural resources and the environment such as aesthetic and amenity values (Marshall 2005). As a consequence, this led to the emergence of the modern environmental movement that rallied against core progressive assumptions (Nelson 1987, cited in Marshall 2005, p.17).

The resulting shift towards more collaboratory and participatory approaches was founded on the growing acknowledgment that natural resource governance arrangements in place did not appear to be capable of responding to the scale and complexity of the significant environmental degradation events being experienced. The shift was also a result of perceived deficiencies of the Progressive Era planning philosophy that functioned “in a vacuum” and tended to isolate the public from decision makers (Lachapelle *et al.* 2003, p.475). On the apparent inadequacies of governance arrangements in addressing the escalating occurrence of environmental degradation, Marshall (2001, p.1) adds that:

...the existing way of organising this governance, which derived from the ‘progressive vision’ for social organisation, was ill-adapted for coping with the kinds of complex environmental problems that nowadays arise with increasing rapidity.

A growing sentiment of distrust by the public that technical experts could determine what was best for them started to take hold. Accordingly, Syme (1993, p.3) affirms that “the days of the DAD (Decide-Announce-Defend) style of planning have gone. The public is demanding more input”.

In the 1980's, Australian governments responded to public concerns by signalling a shift from their early approaches typified by a top-down, expert-driven stance to approaches emphasising collaboration between agencies and between governments and the public (Marshall 2001).

The historic shift in attitudes towards the Progressive vision has been acknowledged and crystallised in debate surrounding the concept of sustainable development. Perhaps most notably, the paradigm shift in thinking is recognised in *Our Common Future*, the Report of the World Commission on Environment and Development (Brundtland 1987), which is explored later in this chapter.

## **2.2 THE PARTICIPATORY IMPERATIVE**

A long history of participatory, community-based approaches to planning and development exists. Since the publication of the seminal text on citizen participation by Sherry Arnstein (Arnstein 1969) over three decades ago, there has been a considerable increase in the extent of community and stakeholder involvement in natural resource planning (Buchy and Hoverman 2000). Mansuri and Rao (2004) assert that a first-wave of participatory development was witnessed in the 1950s, and spread to over 60 countries by the early 1960s, due in a large part to the efforts of the United States Agency for International Development. Encouraged by considerations of social justice and ethical practice, a number of formal approaches have surfaced to support the engagement of communities in natural resource governance processes. These participatory approaches have been branded under a myriad of labels such as *community consultation*, *co-management*, *participative planning*, *community-based* (and *community-driven*), and *collaborative environmental management*, to name but a few. The common objective, however, was to spread the consultative net to previously excluded groups in the hope that a more inclusive process would also yield more accepted, achievable and effective outcomes. On this point, Mansuri and Rao (2004, p.11) elaborate:

When potential beneficiaries also make key decisions, participation becomes self-initiated action – what has come to be known as the exercise of voice and choice or *empowerment*.



Participation is expected to lead to better designed policies and programs, better targeted benefits, more cost-effective and timely delivery of project inputs, and more equitably distributed project benefits with less corruption and other rent-seeking activity.

In addition to this participatory focus, there have also been boundary changes occurring within the institution of government with increasing devolution of government business away from urban centres to regional areas, and enhanced opportunities for collaboration between all levels of government and the community over a range of issues (Wallis and Dollery 2002; Rhodes 2000). In the Australian context, changes are also being observed in relationships between government and civil society as citizens are afforded a greater role in influencing policy, and are provided with an increased range of opportunities to engage with government decision makers (Edwards 2001; Davis and Keating 2000). This apparent shift in the mode of governing involves providing the broader community a greater opportunity to engage with government and influence policy decisions. This is especially critical when dealing with matters pertaining to the conservation of the environment and natural resource management in light of the sustainable development debate.

Initially advanced as a response to failures in the implementation of development aid programs to less developed countries, public participation is now accepted as a cornerstone of an emerging governance paradigm based on social responsibility (Hirschman 1982). An indication of the growing significance and extent of such participatory approaches is provided by Mansuri and Rao (2004) who conservatively estimate that the World Bank's lending for community-based development projects has grown from US\$325 million in 1996 to US\$2 billion in 2003.

Community-based approaches are viewed as instruments for enhancing sustainability, improving efficiency and effectiveness, allowing efforts to be taken to scale and made more inclusive, as well as empowering the community, building social capital, and strengthening governance (Dongier *et al.* 2001; Narayan 2002). However, although there is widespread belief that participation is intrinsically good

as a process (motivated by normative considerations) and whilst there is some evidence that participation generates broadly 'better' outcomes (Isham *et al.* 1995), so long as the additional costs of such processes are not inhibitory (Hentschel 1994), there have been few empirical studies of transaction costs (McCann *et al.* 2005). Those that are reported have emphasised the importance of engaging both stakeholders and public at an early stage (Grima 1983), and the need to include information sharing and education of the community as integral parts of the process (Pena and Cordova 2001). Ostrom (1990), in examining common pool resource management problems, concluded that including affected individuals in rule-making about resources is vital to sustainable human-environment systems. Perhaps more usefully from a practitioner perspective, other work has highlighted the ability of participation to alleviate an initial uneasiness among the public about planners' and politicians' intentions (Moorhouse and Elliff 2002).

Mansuri and Rao (2004, p.11) note accordingly:

Participation is expected to ensure that projects are better designed, benefits better targeted, project inputs delivered in a more cost effective and timely manner, and that project benefits are distributed more equitably and with smaller leakages due to corruption and other rent-seeking activity.

This idealized transformatory capacity of participation has been challenged on a number of grounds. First, it has been noted that the exercise of 'voice' and 'choice' could be quite costly under certain conditions. At the most basic level it may involve real or imputed financial losses due to the time commitments required for adequate participation. Moreover, participation may lead to significant psychological and even physical duress for the most socially and economically disadvantaged, who are typically the prime potential beneficiaries of CBD/CDD projects, since genuine participation for such groups may require the taking of positions that are contrary to the interests of more powerful groups. The premise of participatory approaches is that the potential benefits of participation generally outweigh such costs-but this is by no means obvious.

Second, the mainstreaming of participation has also made it an instrument for promoting pragmatic policy interests, such as cost effective delivery, low costs of maintenance etc., rather than a vehicle for the radical transformation of society. The main outcome in such contexts may simply be to shift some of the costs of service

delivery to potential beneficiaries (Rahnema (1992)). Indeed, participation has been described both in Asia (Bowen, 1986) and Africa (Ribot, 1995) as a form of forced or *corvée* labor where the poor are coerced into making contributions that are far more substantial than those made by the rich.

Third, the notion that exposure to participatory experiences will transform the attitudes and implementation styles of authoritarian bureaucracies (governments or donors) may be quite naïve. The routinization of participatory planning exercises into the work of public sector implementation agencies puts new pressures on resources, while leaving implementers quite unclear about the potential gain to themselves from this new accountability.

Participation serves several practical purposes in collaborative environmental management. While participation can take place at different levels, Mansuri and Rao (2004, pp.10-11) state that “a key objective [of participation] is the incorporation of local knowledge into a project’s decision-making process”. Multiple stakeholders provide a range of perspectives, leading to the development of a more comprehensive understanding of the issues (Gray 1989). Furthermore, broad participation greatly reduces the possibility that one or more stakeholders will prevent the results of a collaborative effort from being enacted (Gray 1989). Over time, participation also increases the knowledge that each stakeholder has about the actions of the others (Blumenthal and Jannink 2000). This knowledge, coupled with the social interaction itself, can lead to the development of social capital and trust among stakeholders (Axelrod 1984; Ostrom 1992). Consequently, this greatly facilitates collaboration by increasing the ease of planning and decreasing the costs associated with monitoring stakeholder behaviour (Gray 1989; Baland and Plateau 1996; Ostrom 1999). This aspect of social capital formation and the associated implications for regional NRM policies and programs is examined in chapter 5.

The promulgation of the bottom-up, participatory stance (World Bank 1996) offered by such *informal institutions* (e.g. Marshall 2000) to shift the load of governance away from the planned order sought by formal institutions is due to the realisation that relevant government agencies do not possess the necessary

level of information and resources to properly undertake natural resource governance (Batie *et al.* 1986), and the increasing occurrence of natural resource and environment-related conflicts associated with the 'insulative' properties of environmental goods relied upon by agriculture in the past, apparently reaching full capacity (Reeve 1999).

Calls for local participation and devolution in the management of natural resources and the environment continue to sound (Mehta *et al.* 1999). Such calls for decentralisation reforms has been informed by beliefs that, by virtue of increased proximity to the people they serve, democratic local institutions will provide a path to greater efficiency and equity in development and management activities (Suzuki 2005). This has been coupled with an inherent recognition that traditional centralist, top-down institutional arrangements are perhaps not always the most appropriate mechanism in this field. Resource management has been moving away from a reductionist, control-based paradigm towards a more integrated systems approach, incorporating public participation and adaptive management (Blann *et al.* 2000). However, some proponents of collaborative community-based approaches have "become unnerved by the ways in which these processes have been portrayed as a cure-all" (Conley and Moote 2003, p.383). In some cases, there are sound grounds for government control over NRM. Findings from a recent inquiry of the National Panel on Public Participation in Environmental Assessment and Decision Making (Dietz and Stern 2008) in the United States concluded that public participation was more likely to improve than to undermine the quality of decisions. Although scientists are usually in the best position to analyse the effects of environmental processes, good analysis requires information on local conditions, which is best provided by local citizens. Moreover, public values and concerns are important to frame scientific questions and to ensure that the analyses address all of the issues relevant to those affected. It also suggests that public participation increases the legitimacy of agency decisions and builds citizens' knowledge of the scientific aspects of environmental issues assisting the effectiveness and efficiency of implementation.

At a global level, devolution has emerged as the major strategy for implementing the United Nations Conference on Environment and Development's Agenda 21 decisions on the environment and promoting governance reform (UNCED 1992). Key examples include the establishment of irrigation co-operatives, co-management regimes for forestry and fisheries management, and community wildlife management initiatives (Woodhill and Robins 1998; Stig Toft Madsen 1998; Poffenburger and McGean 1996; Yandle 2003; Pimbert and Pretty 1995). Mehta *et al.* (1999) notes that on one hand such devolution responds to emerging economic ideas that markets, and local governments, should take on more of the tasks performed by large, inefficient, central state machineries (Crook and Manor 1998), but on the other hand, the spread of community-based NRM initiatives has sought to rediscover the virtues of indigenous knowledge, promote small-scale local and communal natural resource management, and support and empower peoples' own initiatives in self management of natural resources that are key to local rural catchment livelihoods.

In the case of fisheries management, Yandle (2003) notes that 'co-management' regimes can reduce the high transaction costs associated with regulations (Scott 1993) and provide the opportunity for fishers and local stakeholders (e.g. recreation fishers, indigenous interests, and local communities) to participate in decision making (Pearse and Wilson, 1999; Singleton 2000). However, co-management cannot be regarded as a panacea for NRM problems. Researchers have raised concerns over external and internal legitimacy (Jentoft 2000), capture of the regulatory process (Singleton 2000), and capture of management groups by community (or industry) elites (Lane 2006; ADB 2003; Davis and Conner 1996).

Critics of the community-based approach note that evidence and learning from such initiatives often fall well behind the rate at which projects are being implemented and scaled up (Mansuri and Rao 2004). Filion (1998, p.1101) asserts that proposals for community-based programs regularly fail to consider how they can be implemented within the relevant economic and political context, often imbuing them with a "utopian flavour". Accordingly, Owens (2000, p.1141) notes

that such initiatives “presents a more profound challenge than is sometimes acknowledged and...remains largely aspirational”. Bellamy and Johnson (2000) comment that communities face many barriers in attempting to achieve real change by moving beyond rhetoric of such approaches. Hence, Sturgess (1997, p.34) remarked that few government-community attempts at public participation and collaboration accomplish what is expected from them due to “a lack of appreciation of the conditions necessary for success”.

Marshall (2001) notes that there exists ample historical evidence demonstrating that success in building collaborative partnerships between governments and communities requires considerably more than rhetoric and goodwill. He reflects on how colonial attempts at community development by Great Britain and the USA in the 1950’s and 1960’s generally failed (Marshall 2001, p.65). In the same vein, Midgley (1986) concluded that community initiatives supported by governments seldom achieved successful community participation. In addition, Shortall (1994, p.250) asserts that past experiences should lay the foundation for improving future government-sponsored community-based programs – paying due consideration to the “means of advancing forward from previous problematic experience rather than pushing blindly ahead and trading on the positive connotations of the idea of participation”.

Besides widespread support in the literature, community-based approaches are also supported by some of the more influential international donor and conservation organisations including the World Bank and the World Wide Fund for Nature (McCay 2002). It appears that there is justification to decentralise and devolve NRM responsibilities. However, Bellamy and Johnson (2000) suggest, in relation to the Australian NRM experience, that there is a lack of appropriate cost-sharing mechanisms to accompany the transfer of responsibilities for NRM from state and federal government agencies to the local community. Marshall (2004) adds that governments have not only underestimated the complexities associated with applying these approaches but also the importance of learning from them in order to gain a better understanding of how they work. This point is echoed in the

Australian National Audit Office (ANAO 2008) review of the NHT and NAP regional delivery model.

In relation to the Australian experience, Marshall (1999) declares that over the last 15 years, there has been a prominent shift toward incorporating public participation into strategies for addressing degradation of natural resources and the environment. The stated aim has been to empower local communities to more self-reliantly deal with this costly and worsening problem. Such changes in the mode of natural resource governance has also brought with it significant additional costs accompanied with disappointing achievements based on the experiences in Australian NRM to date. Marshall (2001, p.9) further notes:

Degradation of Australia's natural environment as a result of agricultural land use persists—and in some key areas continues to worsen—despite attempts of policy makers to address this issue over more than six decades.

As has been demonstrated elsewhere, the 'Australian experiments' have rarely achieved their objective of local empowerment (Vanclay 1997; Marshall 1999, p.1). Such landscape-scale or regional approaches have not yet resulted in the paradigm shift required to address the declining ecological and social bases (Williamson *et al.* 2003; Lockie 1999; Martin 1991). Sustainable land management remains an elusive goal, despite many attempts by governments to address the issues<sup>24</sup>. Bellamy *et al.* (1999) argue that further refinement of earlier NRM programs such as Integrated Catchment Management need to be grounded in lessons drawn systematically from past and current experiences with such programs.

Although government policymakers are optimistic and have a renewed faith in this apparent new rebirth we are bearing witness to – a *neo-renaissance* in natural resource governance that is going some way in addressing the issues which plagued earlier programs – there is also growing concern that the current iteration is still

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<sup>24</sup> For example, funding for the Natural Heritage Trust (Liberal Party of Australia, *Saving Our Natural Heritage*, Liberal Party, Canberra, 1996). This document pledged \$1.25 billion for a Heritage Fund (the Natural Heritage Trust) for special projects in the period 1996-2001 from the part sale of the national telecommunications carrier, Telstra. This was to be in addition to on-going core funding, however core funding has declined by 35% over three successive budgets (Williamson *et al.* 2003).

falling short and failing to address the key factors that motivate on-ground land management decisions made by landholders regarding NRM. This is after all, the missing link between translating the *collaborative vision*<sup>25</sup> for natural resource management into reality through on-ground behavioural and practice change.

### **2.2.1 The Sustainable Development Discourse**

As noted in the preceding section, there has been a shift over the last two or more decades towards increased public participation on a range of matters including NRM. One of the key drivers for such a shift can be identified in the discourse of sustainable development which emerged during this period. Public participation and empowerment in policy decision affecting social and environmental conditions is regularly cited as a key component of sustainability (e.g. Koontz 2006). Although a highly contested term<sup>26</sup>, the notion of *sustainable development* has perhaps come to embody and influence a significant part of this philosophy. This section explores the notion of sustainable development which has driven much of the policies and programs surrounding natural resource governance activities in Australia.

The concept of sustainable development has its origins at least in the 1970s, principally stemming from the convening of the United Nations Conference on the Human Environment, which brought together representatives from 113 nations in Stockholm, Sweden in 1972 to address environmental and economic issues using an integrated approach (Beer *et al.* 2003; Marshall 2005). In 1982, a special session of the Governing Council of the United Nations Environment Program was held to review progress since 1972. Due to dissatisfaction with achievements, it the World Commission on Environment and Development to identify the future course of action (Pearce *et al.* 1989, cited in Marshall 2001). Subsequently, the term became

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<sup>25</sup> This 'vision' for collaborative environment management is further elaborated in G.R. Marshall. 2005. *Economics for Collaborative Environmental Management: Renegotiating the Commons*. Earthscan, London, p.9.

<sup>26</sup> For example, David Pearce, Anil Markandya and Edward Barbier (1989, pp.173-185) suggest over 40 definitions.



more widely adopted after 1987, culminating from international consensus<sup>27</sup> after the release of *Our Common Future*, the Report of the World Commission on Environment and Development (WCED) (Dryzek 1997).

The Our Common Future Report noted apprehension over the state of the natural environment with rates of change in society and the natural environment being exacerbated to the extent that technological advances and the capacities of scientific disciplines were unable to keep pace in designing solutions to such problems. In the ensuing years, the idea was debated and developed further<sup>28</sup>. However, perhaps most influentially, the Brundtland Report<sup>29</sup> legitimised the widening doubts about each generation inevitably being better off than those preceding it (Marshall 2005), called for human activities to be redirected towards sustainable development, and gave the most widely accepted definition of a concept that has since been central to the environmental debate – sustainable development as development that “...meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland 1987, p.8).

The core principle underlying this definition is that of intergenerational equity, that is, where future generations have the same right to resources as current generations (Scott *et al.* 2000). A sustainable system (including a social and economic system) is one that is stable, regenerative, productive and profitable, resilient, appropriate, self-reliant, and non-disruptive (Campbell 1991).

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<sup>27</sup> For example, the World Conservation Strategy was launched in 1980 by the IUCN, together with the UNEP and WWF, which urged the integration of environmental and economic concerns to maintain natural resources for future generations (IUCN *et al.* 1980; McTainsh *et al.* 1993)

<sup>28</sup> International fora such as the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil in 1992, and the World Summit on Sustainable Development in Johannesburg, South Africa, held one decade later, helped to further shape what the concept of sustainable development had come to embody.

<sup>29</sup> The Report of the World Commission of Sustainable Development also became known as the Brundtland Report, after the Commission’s Chairperson, the then Prime Minister of Norway, Mrs. Gro Harlem Brundtland. The Report is one of the seminal environmental documents of the 20<sup>th</sup> century.

Box 2.1 and 2.2 outline objectives and principles of sustainable development, respectively. Figure 2.1 outlines the interconnected three dimensions of sustainable development: social, economic and environmental.

**Box 2.1: Objectives of Sustainable Development**

Sustainable development is a normative concept used to prescribe and evaluate changes in living conditions. Such changes are to be guided by four Brundtland aspirations:

1. To satisfy basic human needs and reasonable standards of welfare for all living beings. (Development)
2. To achieve more equitable standards of living both within and among global populations. (Development)
3. To be pursued with great caution as to their actual or potential disruption of biodiversity and the regenerative capacity of nature, both locally and globally. (Sustainability)
4. To be achieved without undermining the possibility for future generations to attain similar standards of living and similar or improved standards of equity. (Sustainability)

(Source: Lafferty 1996, p.189)

**Box 2.2: Principles of Sustainable Development**

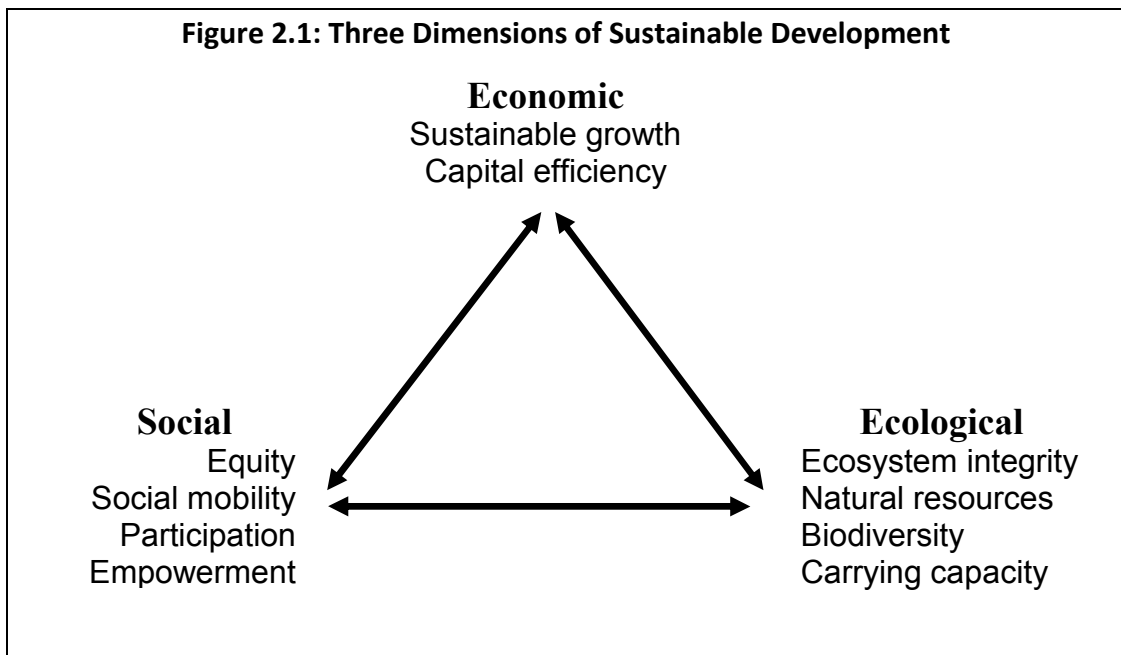
1. Respect for ecological integrity;
2. Efficient use of human, financial and natural resources;
3. Equity;
4. Participatory decision making; and
5. Environmental stewardship at all levels of society.

(Source: Department of Justice 1995)

The concept has been articulated as aspirations and principles in policy and law internationally, and in many national and sub-national jurisdictions (Connor and Dovers 2004). Hence, a fundamental principle of the sustainable development ethic lies in the belief that the ability of the environment to support human life and economic activity through these functions should be maintained into the future (Beer *et al.* 2003; Brundtland 1987).

In Australia, the principles that emerged from the Rio Earth Summit<sup>30</sup> were expressed as principles of 'ecologically sustainable development' (ESD), and culminated in the 1992 National Strategy for Ecologically Sustainable Development. This defined ESD as constituting the following (Commonwealth of Australia 1992, n.p.):

...using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.



(Source: World Bank 1997)

Consistent with these ideals, the National Strategy for Ecologically Sustainable Development (NSED) outlined three core objectives (COAG 1992):

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- To provide for equity within and between generations; and
- To protect biological diversity and maintain essential ecological processes and life-support systems.

<sup>30</sup> The 1992 United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, is also known as the Rio Earth Summit.

One of the guiding principles of the NSESD is that “decision-making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations” (COAG 1992, n.p.).

While the principles of ESD have arguably not been effectively put to practice<sup>31</sup>, Stein (2000) asserts that at least in theory its influence in Australia is evident by its inclusion in the legislation of the nine state and territory governments in Australia. Twenty-three Australian Government Acts refer to ESD, while 47 NSW Government Acts make reference to ESD (Stein 2000). Governments therefore, have a clear legislative imperative to consider ESD principles in all decision making.

The concept of sustainability, implemented through various integrated approaches to natural resource management, supports community-based approaches having a key role in operationalising ESD at the local level, and in addressing the significant resource degradation from agricultural development in Australia (Bellamy and Johnson 2000). Connor and Dovers (2004, p.35) broadly categorise the policy and institutional areas into which Australia has placed the bulk of its commitment to ESD as including:

- Community-based programs such as Landcare, Waterwatch etc., with an emphasis on on-ground coordination and works and to a lesser extent monitoring, relying to varying degrees on a mixture of volunteerism and government financial and other support;
- Integrated catchment management through informal cooperative initiatives and more formally structured creation of new administrative and statutory arrangements;
- Less formally structured or supported regional-scale planning initiatives, often explicitly seeking to integrate economic, social, and environmental concerns through long-term planning involving community participation or leadership.

Principles of the sustainable development discourse can be readily evidenced in Australian NRM programs. They have been the favoured delivery mechanism for the major government-financed regional NRM programs. The importance of social

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<sup>31</sup> Stein (2000) provides a discussion of the issues associated with operationalising ESD.

and economic factors for sustainability is recognised by the inclusion of social and economic considerations in the regional NRM arrangements implemented through the NAP and NHT programs. Regional NRM groups, responsible for implementing the natural resource management agenda in their respective catchment regions, are obligated to consider the social, economic, and environmental impacts of their decisions on their catchment communities.

Overall, the adoption and institutionalising of the sustainability agenda into mainstream policy discussions, be it through ESD or other avenues, remains far from attainable. Bellamy and Johnson (2000) maintain that in practice, attempts at implementing integrated, flexible, and comprehensive programs of promoting ESD through community-based approaches both in Australia and internationally have been persistently shown to be difficult (e.g. Dorcey 1986, 1991; Lang 1990; Syme *et al.* 1994), often resulting in inequitable outcomes (e.g. Dale and Bellamy 1998). Sustainability is a profound social goal pervaded by complexity and uncertainty (Connor and Dovers 2005), whose cause is not helped by the often ambiguous and highly contested nature of what the concept is perceived to entail by different groups.

## **2.3 SUMMARY**

In this chapter, some of the relevant literature in the area of community-based NRM was reviewed and a background discussion on the development of participatory processes, including community engagement and public consultation processes to achieve desired NRM objectives, was presented. This was followed by an introduction and background to the discourse of sustainable development and exploring the notion of ecologically sustainable development in the Australian context through the NAP and NHT national funding programs. Attention now shifts to the background and history of Australian programs of natural resource governance, which is presented in chapter 3.

### **3. Australian Programs of Natural Resource Governance**

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*We cannot understand today's choices...without tracing the incremental evolution of institutions*

(Douglass C. North, 1990, p.100)

#### **3.1 INTRODUCTION**

North (1990, p.102) declared that “history matters” since it constrained what was possible in the present and likely to occur in the future. Hence it is likely that choices made without a historical perspective regarding institutional arrangements would be inferior to those that considered such a perspective, and in addition, analyses of why particular institutional changes succeed or fail would be incomplete (Marshall 2001). Thus, North (1990, p.100) remarked accordingly that “We cannot understand today’s choices...without tracing the incremental evolution of institutions”.

Much of what sustainable development represents has manifested itself into various policies and programs of natural resource governance in Australia over the past two or more decades. Natural resource governance in Australia has evolved over this period in very much an ad hoc fashion, involving a combination of actors and influences including different government agencies, community groups, sustainability and participatory discourses and policies, laws and regulations. Rainnie (2005, p.132) comments that Australia’s history of policy development for regions has been “...patchy, non-systematic and ideologically driven”. The Report of Inquiry into Catchment Management in Australia acknowledges that “the current approach to, and application of catchment and natural resource management in Australia is ad hoc, inconsistent and confusing” (Commonwealth of Australia 2000a, p.5). Similarly, as Dovers (1999, p.100) comments, “...the very rapid growth in community-based [environmental governance] programs follows no apparent coherent design or intent...”.

To understand where the future for natural resource governance arrangements may lie, it is now timely to review how the institutional arrangements behind

natural resource governance programs in Australia have evolved into the current arrangements. A discussion on the background of the Australian NRM programs of Landcare, Integrated Catchment Management and the regional NRM arrangements is presented in the following section. Figure 3.1 outlines a history of natural resource governance arrangements in Queensland commencing with the Landcare movement in the 1980's to the regional NRM arrangements of interest in this thesis.

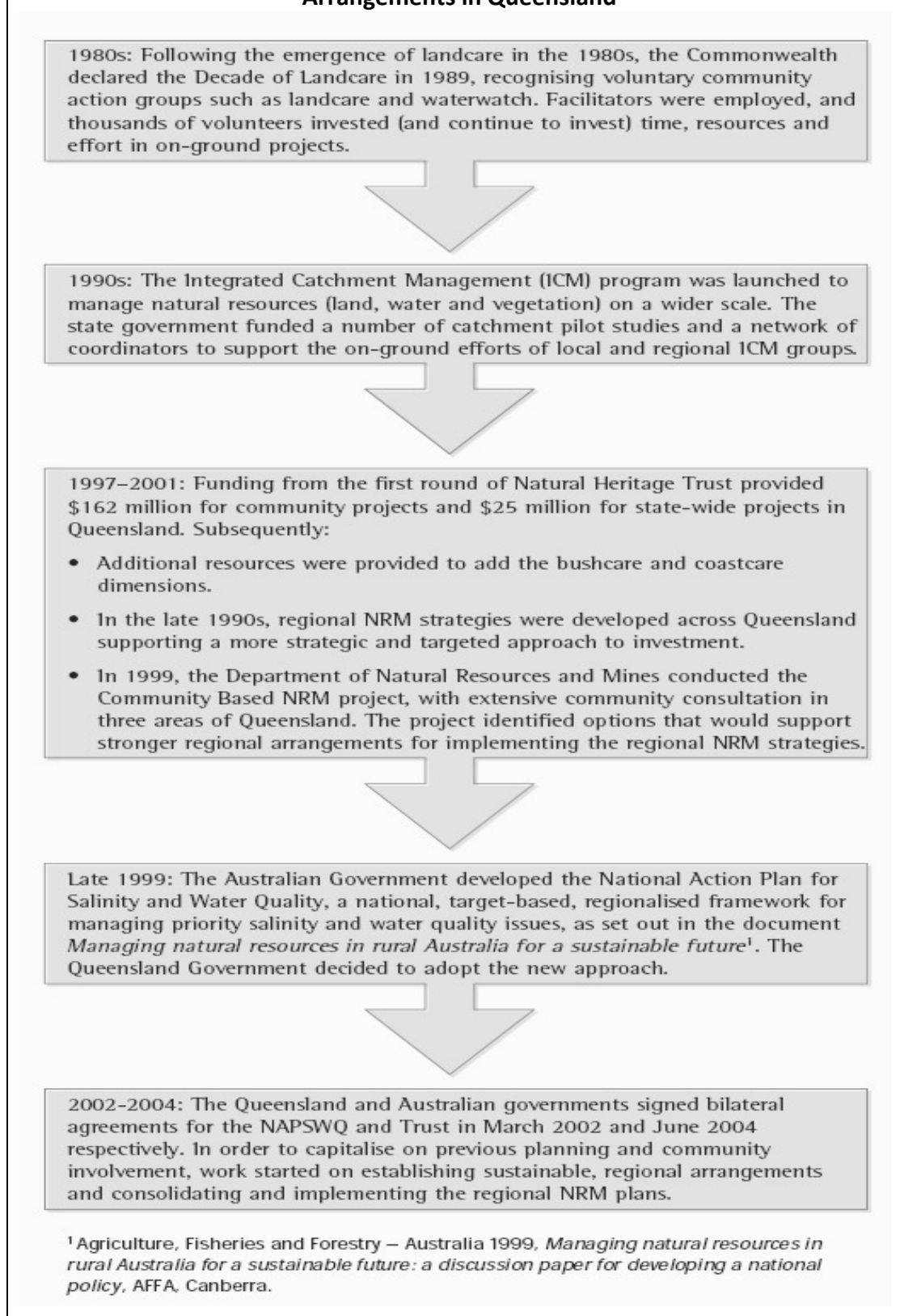
### **3.1.1 The Emergence of Landcare**

With the launch of the World Conservation Strategy (IUCN 1980), and increasing international influence on environmental policy, Australia prepared a National Conservation Strategy in 1983 which outlined the importance of taking care of the nation's land resources. The National Soil Conservation Program was also established in the same year, providing the coordination and funds to tackle soil degradation. This precipitated further debate which saw the establishment of what was to become the Australian *Landcare* movement.

The Landcare movement developed from the mid 1980s, where a new community-based approach for dealing with the growing problems of land degradation evolved. Although commonly linked as an outcome and response to the sustainable development debate which formally emerged after the release of the Brundtland Report, Landcare has in fact developed from the accumulated knowledge and practice of many decades of the "agronomic tradition" of soil conservation in Australia (Connor and Dovers 2004, p.37).

It was during this period where concern over rapidly increasing salinity led to the growth in the number of conservation groups, particularly in Victoria and Western Australia (Woodhill and Nabben 2004). In 1986, under the leadership of Joan Kirner, the then Minister for Conservation, Forests and Lands, and in part driven by her experience of community childcare groups, the Victorian Government introduced a program of direct funding for voluntary land conservation groups (Campbell 1994).

**Figure 3.1: History of Natural Resource Governance Arrangements in Queensland**



(Source: DNRM 2005, p.8)

It was such a community group model that inspired what proved to be a critical alliance between two non-government organisations, the National Farmers



Federation (NFF) and the Australian Conservation Foundation (ACF). It brought with it significant political implications and long-term ramifications for natural resource management policy in Australia. In the mid-1980s, the ACF decided to focus its attention on land degradation issues, which it argued constituted Australia's most serious environmental challenge (Woodhill and Nabben 2004).

In 1989, the NFF and ACF jointly submitted a proposal for a National Land Management Program to the Commonwealth Government, based on a voluntary community-based approach, drawing on the emerging experience of Landcare groups in Victoria and Western Australia (Farley and Toyne 1989). The National Land Management proposal resulted in the 'Decade of Landcare' announced by the Commonwealth Government in 1989. Funding of \$320 million was allocated for land management activities over ten years (Commonwealth of Australia 1991). Marshall (2001, p.29) notes despite such a "quantum leap in the level of funding... Landcare was novel in so far as funding was provided directly from the Commonwealth rather than indirectly via the state government programs". To deliver the program, partnership agreements were developed between the Commonwealth and the states and territories. Part of this agreement involved the development of a Decade of Landcare Plan for each of the states and territories, which combined to form the Commonwealth Decade of Landcare Plan (Commonwealth of Australia 1991).

The National Landcare Program was subsequently established in 1992 as one of the mechanisms to progress towards sustainable ecosystems in line with ESD principles adopted in the National Strategy for ESD, with the main focus on sustainable agriculture and improved management of the natural resource base at the farm level. Landcare<sup>32</sup> was intended to catalyse local activity and involved the formation of voluntary partnerships between the community, government and industry to promote environmental conservation activities aimed at addressing land degradation at the local level. Landcare groups consisted of groups of landholders

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<sup>32</sup> It is estimated that by 1997 about 4,300 volunteer community-based Landcare groups were operating around Australia including bushcare, urban landcare, rivercare, coastcare, and sustainable agriculture groups (Landcare Australia 2006; Marshall 2007).

in a locality working together to tackle land degradation problems to ensure the “economic and ecologically sustainable” management of land (Mues *et al.* 1994, p.1).

Landcare demonstrated the potential of local-level action to address land and water degradation (Paton *et al.* 2004). By engaging with farmers and landholders to improve practices at that level, it was anticipated the community would achieve significant public benefits through a more economic use of available resources, improved water quality and resource condition, a sound resource base for future economic growth, and prosperous and more sustainable regional communities.

However, in hindsight, questions about the impact of Landcare on reducing land degradation led to a more sobering perspective. Reversing land degradation is without question a long-term objective that will take decades, if not longer to occur. However, after the Decade of Landcare there was little evidence to suggest a foreseeable change in the trend of continuing and indeed escalating degradation (e.g. Bellamy *et al.* 2000). Landcare, along with other NRM programs, had limited success in bringing about large scale on-ground change (Woodhill and Nabben 2004) and “has not lived up to its potential” (Sturges 1997, p.34). This failure to achieve significant on-ground change must be understood in terms of incentives for farmers to make large-scale change. Often when the costs and risks are assessed there is in fact insufficient incentive to drive change. On top of the limited financial incentives, there has been a great reluctance of government to introduce regulatory measures. By the mid 1990s, it became evident that local groups working with limited resources were unlikely to achieve the landscape scale change necessary to protect critical community assets (Curtis 2003; Curtis and Lockwood 2000).

The principle underlying the Landcare movement, namely that awareness raising, education and catchment planning involving groups of farmers could solve land degradation in agriculture, has been the subject of criticism (e.g. Lockie and Vanclay 1997). It has become apparent that Landcare has not achieved the desired outcomes despite a large investment of government funds, and it has been

perceived as being a waste of time and resources, with farmers being disillusioned with the process (Marsh 2001). The value and effectiveness of what farmers, Landcare groups and Landcare workers have done has been challenged. Pannell (2000; 2001) goes a step further and questions the ethical implications of Landcare promoting practices which are neither scientifically proven nor economically viable.

Prager and Nagel (2008, p.108) note that although there have been some early successes in Landcare, shortcomings are evident as the approach matures. Wilson (2004) contends that there is little evidence that Landcare has been able to directly influence government policy. Notwithstanding the criticisms that the Landcare movement has attracted, Marsh (2001, p.126) acknowledges:

...Landcare has taught us a great deal about building community capacity, developing social processes that incorporate multiple stakeholders, and the consequences of working with unrealistic expectations in situations of incomplete knowledge. The social processes that Landcare has been successful in developing now need to be built on a firmer foundation of science and economics.

Pannell (1998) acknowledges that while increasing social capital is a worthwhile contribution of Landcare, it is not sufficient in itself to achieve NRM change. Curtis and Lockwood (2000, p.69) add that Landcare:

...has increased awareness of issues, enhanced landholder skills and knowledge, and contributed to increased adoption of best management practices. There are examples where groups have accomplished on-ground work likely to reduce land and water degradation at the local or subcatchment scale.

Landcare, therefore, has provided a foundation from which future NRM initiatives can evolve and develop to address natural resource and environmental issues<sup>33</sup>.

### **3.1.2 Integrated Catchment Management**

Building on the foundation of the National Landcare Program, Integrated Catchment Management (ICM) was introduced in Queensland in 1990. A State Steering Committee developed an ICM program and strategy in 1991 as a voluntary partnership approach facilitating the development of catchment management

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<sup>33</sup> This aspect is consistent with the notion of institutional path dependencies (e.g. Challen 2000) explored later in this thesis (chapter 4).

strategies by community, industry and government partnerships (Aslin *et al.* 2002; Bellamy *et al.* 2002). Bellamy *et al.* (2002, p.7-8) further elaborate:

ICM is promoted as a community-based collaborative model of governance to address natural resource problems of mutual concern. It is the pioneer of formalised partnerships between government and community on NRM in Australia. Importantly, community-based catchment management approaches are one of the new trends in “governance” that have fundamentally transformed the institutional ‘landscape’ pertaining to arrangements for natural resources policymaking and implementation...ICM/NRM arrangements have evolved from a general trend away from government-centred, single-issue approaches to integrated approaches with an emphasis on community involvement and whole-of-system approaches where the emphasis is upon community involvement and whole-of-system approaches to land and water management.

ICM approaches vary around Australia but are all based on the concepts of integration of community involvement, technical knowledge, organisational structure and policy objectives (Bellamy *et al.* 2002). ICM represents a move away from Landcare to a regional community body model pertaining to arrangements for NRM policymaking and implementation. In Queensland, ICM has no formal legislative basis with major elements of the approach founded on (Rowland and Begbie 1997):

- voluntary participation by both government and communities;
- a community focus with a key role for non-statutory Catchment Coordinating Committees;
- partnerships between government, industry and community;
- participatory and consultative processes; and
- taking a strategic and planned approach to tackling important issues.

ICM differs between the states in the nature of its legislative support and the administrative structures of resource and environmental agencies. Specific catchment management legislation exists in Victoria, NSW and South Australia. In these states, legislation has devolved powers for planning and management directly to the catchment or regional level (Maher *et al.* 2000). Other states have policy commitments to ICM and have made organisational changes to implement catchment management planning. The specifics of ICM programs differ between the states and territories, and a range of collaborative sub-programs (e.g. Landcare)

are nested within the organisational structure they provide (Commonwealth of Australia 2000a; Gardner 1999). Table 3.1 outlines some of the fundamental principles that characterise integrated approaches to catchment management such as ICM.

**Table 3.1: Principles of Integrated Catchment Management**

<ol style="list-style-type: none"> <li>1. An integrated systems approach that encompasses, for example, the recognition of nonlinear processes and connectivity between problems, the concept of “the whole being more than the sum of the parts,” and the recognition of complexity and uncertainty in human and natural system interactions.</li> <li>2. A long-term perspective (i.e., many years, generations) and broad spatial scale focus (i.e., landscape, region, or catchment).</li> <li>3. Recognition of the relevance of the human and cultural context and the diversity in values relating to natural resources (that is, people as an integral part of the problem and not external to it; the need for coordination of decision making among stakeholders in government, industry, and the community; and the need for active involvement of the whole community to encourage community ownership of the problem and its solution).</li> <li>4. Strategies for resolving conflict through negotiation and mediation among stakeholders.</li> </ol>
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(Source: Bellamy and Johnson 2000, p.267)

National reviews of ICM processes in Australia conducted by Syme *et al.* (1994) and AACM (1995) recognised that ICM is presented as not only a philosophy, but also as a process and a product. These details are elaborated on in Box 3.1.

Despite the existence of these programs for over a decade, experience with ICM programs in Australia has also been criticised due to a lack of observable gains in realising environmental outcomes (AACM 1995) and enduring widespread agri-environmental degradation (Marshall 2001). Bellamy *et al.* (1999) echo these sentiments in concluding that progress by ICM programs in improving the natural resource base at the catchment scale is yet to be thoroughly established.

One of the major criticisms of ICM stems from not being able to measure and evaluate NRM outcomes. This deficiency results from the complexity of issues surrounding the measurement of, and attributing impact to, governance systems and biophysical relationships. Bellamy *et al.* (2002) add that ICM outcomes are not

measured in terms of significant remediation of the natural resource base or catchments or even in terms of the effectiveness of ICM policy initiatives.

**Box 3.1: ICM as a Philosophy, Process and Product**

- **Philosophy** – to foster an organisational culture and associated attitudes that view cooperation and collaboration as essential and interactions between natural resources and human activities or responses in a holistic framework;
- **Process** – an overarching planning framework and implementation process that reflects the philosophy of ICM and provides the ‘vehicle’ through which ICM is delivered. The process needs to provide a flexible, adaptive, on-going and dynamic mechanism which coordinates the activity of many people, both in government and the community; and
- **Product** – the planning and implementation of sustainable resource use practices which will vary from place to place, depending on conditions and needs. These should, however, incorporate environmental, economic and social considerations and need to clearly relate to specific resource management outcomes.

(Source: Bellamy *et al.* 2002, p.8)

However, ICM initiatives in Australia have achieved some important social and institutional outcomes building on the legacy of Landcare. Bellamy *et al.* (2002, p.viii) remark accordingly:

ICM has mobilised communities and laid the foundation for improved community participation in NRM. The ICM approach has facilitated greater ownership of issues, allowed stakeholders to get together, promoted sharing of resources and helped to build consensus on NRM problems. A critical mass of people has been established with an understanding of integrated catchment management and skills in its application.

Marshall (2001) states that it is premature to criticise ICM<sup>34</sup> programs on the basis of an apparent lack of positive environmental outcomes as visible improvements in environment condition often lag considerably behind program actions. This sentiment was echoed in the *Report of the Inquiry into Catchment Management* (Commonwealth of Australia 2000a, p.84) which remarked that “the problems facing Australia’s catchment systems will not be solved in a decade or even a quarter of a century. They will take generations to address”. Ribot (2003) has also argued for the need to allow sufficient time for decentralisation reforms to be properly effected prior to conducting serious assessment.

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<sup>34</sup> ICM-type programs are often referred as *integrated resource management* (e.g. Bellamy *et al.* 1999). Other authors also use the terms *integrated environmental management*, *integrated ecosystem management*, *integrated watershed management* in referring to these types of programs (Marshall 2001, p.43).

Instead, Bellamy *et al.* (1999) argue that it is more reasonable to evaluate its outcomes for the relevant human processes and activities rather than for the condition of the environment. Noting experiences with similar programs in the United States, Born *et al.* (2001, p.8) concluded:

The ultimate accomplishment measure may be environmental outcomes... but relying solely upon environmental outcomes is overly simplistic, can take decades, and fails to capture the significance of other potential achievements and impacts.

However, there are still concerns surrounding the use of this alternative “process-oriented yardstick” (Marshall 2001, p.42). These concerns arguably stem from confusion about what the concept of ICM actually involves in practical terms (AACM 1995; Hooper 1999), coupled with criticisms that ICM strategies and programs developed in Australia have seldom proceeded towards successful implementation (AACM 1995; Bellamy *et al.* 2002; Mitchell and Hollick 1993; Pigram *et al.* 1994; Syme *et al.* 1994). Consequently, few community-based catchment groups have progressed beyond the “planning phase” (Price 1996, p.32). This phenomenon has also been witnessed in similar programs run in other countries (Born *et al.* 2001; Innes *et al.* 2000; Margerum 1999).

It is therefore not surprising that a certain frustration prevailed around ICM initiatives – a frustration of not being able to demonstrate tangible outcomes for the level of effort and resources committed to such a process (AACM 1995). Vanclay (1997a) asserted that the only outcome achieved through public participation in ICM programs was fulfilling legislative and political requirements. Marshall (2001, p.44) asserts:

In some quarters, frustrations of this kind have been used as evidence that environmental governance approaches based on collaboration with, or participation by, by the public are fundamentally flawed.

Hence, critics had begun to argue that the “participatory rhetoric has outrun the ability to accomplish” and that a return to centralised, expert-driven governance “without the noise of participation” should be reconsidered (Rhoades 2000, p.330, cited in Marshall 2001, p.44).

Bellamy and Johnson (2000) comment that there have been many attempts at operationalising integrated approaches to NRM, but a high level of uncertainty exists and much still needs to be done to reconcile the rhetoric of integrated approaches into practice. They note that an integrated resource management paradigm needs to recognise the interdependencies of natural systems, political systems, social systems, and technology in addressing 'wicked' and 'messy' problems that are an inherent characteristic of natural resource use (e.g. Allen and Gould 1986; Forester 1989; Ludwig 2001; McCool and Guthrie 2001; Rittel and Webber 1973). Mason and Mitroff (1981) observe that such 'wicked' problems are also characterised by interconnectedness, complicatedness, uncertainty, ambiguity, conflict, and societal constraints.

Bellamy *et al.* (1999) assert that the implementation of these types of 'integrated' programs in Australia is in an experimental stage with much of the conceptual development and experience relating to catchment management programs that involve experimentation with both the approach undertaken and the institutional and organisational structures established (e.g. Mitchell and Hollick 1993; Syme *et al.* 1994). Currently, discussion continues to echo this assertion as the current installment of the regional experiment continues through the regional NRM arrangements.

ICM approaches in Australia have focused on technical solutions, paying little attention to addressing the public and private costs and benefits of their implementation. These factors exacerbate the already considerable uncertainty that exists in community-based programs.

Presently, there has been little comprehensive evaluation of community-based, integrated programs of natural resource governance. Much of the focus of attention has been on the rhetoric (e.g. Jennings and Moore 2000; Bellamy and Johnson 2000) of such approaches and the promise of success rather than its usefulness as a learning-by-doing process (e.g. Syme *et al.* 1994; AACM 1995). Ultimately, progress toward improvements in the environment and natural



resource condition through the current regional NRM institutional arrangements is yet to be demonstrated.

### **3.1.3 Regional NRM Arrangements**

Since the late 1990s, Commonwealth and State governments in Australia have progressively devolved greater NRM functions to regional NRM groups. Regional governance and planning frameworks are advocated as the most appropriate scale and mechanism for addressing NRM and environmental problems. It is apparent that governments are anticipating that regional communities will succeed where they have previously failed. This follows a global trend towards adopting more holistic and integrated social, economic and environmental frameworks advocating the devolution of governance from higher to lower levels, and the integration of a range of NRM actors including both State and community participants (e.g. McGrath-Champ 2005; Söderbaum and Shaw 2003).

Despite the general disappointment and frustration surrounding earlier programs promoting a local catchment community focus to address natural resource and environmental degradation issues, local catchment communities and regions are becoming increasingly significant players in recent approaches to NRM in Australia. Lane *et al.* (2005a, p.351) observe:

A key feature of the neo-liberal turn in Australia has been the devolution of functions and roles, previously held to be the responsibility of government agencies, to local communities, often in partnership with government and industry organisations. The role of government agencies is increasingly one of direction only, using community funding grants to encourage desired courses of action. 'Communities' in partnership with government funding agencies, in turn informed by expert advice, are increasingly understood to be the key actors or agents for environmental management.

'Place' and 'region'-based management of the environment and natural resources are increasingly becoming the main physical location and fundamental unit for community-based environmental practice, labour and emotions (Jennings and Moore 2000). Accordingly, Lane *et al.* (2005a, p.352) assert that such an agenda requires:

...informed, engaged and skilled local communities who can actively participate in environmental management. There is consequently an increasing focus from governments

on building the 'capacity' of communities to participate in this agenda, and a number of education programs by both NRM and cultural heritage agencies are framed in these terms. Lane *et al.* (2004; 2005b) suggests that such decentralised, regional approaches to NRM may mask a retreat from central government regulation and intervention on large, multi-scale, cross-jurisdictional environmental problems to community-based natural resource governance. Bradby (2007) asserts that while such a view may have some credence, regional governance models do have significant advantages from both a consultative planning and implementation perspective.

Notwithstanding earlier efforts to address natural resource degradation through Landcare and Integrated Catchment Management, the effects of significant natural resource and environmental degradation continued to persist (Commonwealth of Australia 1999), and have arguably not resulted in the paradigm shift required to address the declining ecological and social bases (Lockie 1999; Martin 1999). This prompted calls for a more strategic approach to investments in programs for addressing the ongoing degradation of the environment in rural and regional Australia.

A discussion paper produced by the National Natural Resource Management Taskforce in 1999 designed to serve as the foundation for NRM policy in Australia highlighted the need to devolve authority to regions and catchments by establishing institutional structures to "give the people of the region greater authority over natural resource management" (Commonwealth of Australia 1999, p.9).

With about two years of the Decade of Landcare program left to run, the Australian Government responded in 1997 by establishing the Natural Heritage Trust (NHT1) with a contribution of \$1.25 billion over five years (1997-98 to 2001-02). In 2000, a further commitment by the Australian Government was made to specifically address salinity and water quality problems by establishing the National Action Plan for Salinity and Water Quality (NAP) which involved an investment of \$1.4 billion over seven years (2000-01 to 2007-08) in 21 priority regions as an 'initial step' towards achieving improvements in land and water management in regions

highly affected by salinity, or contributing to salinity and water quality problems in other regions (COAG 2000, cited in Robins and Dovers 2007, p.111). Both of these national funding programs were based on a community-based landscape or regional approach to NRM planning and program delivery. The programs were established to help restore and conserve Australia's environment and natural resources (FBA 2004a). However, as the Dryland Salinity Report (Virtual Consulting Group 1999, p.2) noted, under NHT1 there were "too few people", "too little landscape" and "too little change to make a difference". Without a considerable strategic effort much of the support offered through the NHT was likely to produce minimal national benefit (Paton *et al.* 2004). This echoes sentiments expressed by Marshall (2004) commenting that governments have not only underestimated the complexities associated with applying these community-based approaches but also the importance of learning from them in order to gain a better understanding of how they work.

In the 2001 and 2004 Federal Budget, it was announced that an additional \$1 billion and \$300 million, respectively, would be available to extend the NHT funding a further five years to 2007-08 and bringing the total investment under the program to \$3 billion. The state governments provided matching in-kind resources for activities implemented in each of the states through the NHT1 at the regional level. Together, the NHT and NAP represented the biggest financial commitment to environmental action in Australia's history (Commonwealth of Australia 2006).

The NAP and NHT extension (NHT2) were a means of providing funding directly to community-based regional NRM and catchment management bodies<sup>35</sup>. The basis of funding was determined through a process of accrediting regional NRM plans and investment strategies prepared by regional NRM groups that would address priority national and state NRM issues. To be accredited and receive funding from the state and Australian governments under NAP and NHT2, regional NRM plans

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<sup>35</sup> Since 2001, 56 regional NRM groups across Australia have been established with responsibility for planning, implementing and evaluating activities that lead to the improvement, maintenance and conservation of natural resources in their regions (LWA 2006a).

must identify priority targets for NRM issues in the region and demonstrate that key government strategies and statutory responsibilities have been addressed (Paton *et al.* 2004). Unlike the initial phase of the NHT which adopted the Landcare model and focused on education and awareness-raising activities, regional NRM programs funded through the NHT2 and NAP were targeted towards strategic on-ground implementation (Curtis *et al.* 1998).

The establishment of the NHT2 and NAP followed various shortcomings of the Landcare model, which was criticised for lacking a strategic approach with regards to the allocation of funds for on-ground conservation activities. Funds were spent largely on planning and raising awareness and not sufficiently on on-ground programs (AACM 1995). Under the “catalytic” Landcare model, “funds had been spread broadly in order to raise awareness and understanding of conservation issues as widely as possible across all landholders” (Marshall 2001, p.59). Toyne and Farley (2000, p.8) also remark that under Landcare, funding was “compartmentalised” into programs administered by Commonwealth agriculture or environment departments which “led to complex and often overlapping applications by groups for funds”.

Unlike Landcare, regional NRM relies on the devolution of responsibility to regional NRM groups for planning and prioritising target areas for funding to achieve NRM outcomes in a region. Under the NAP and NHT2 funding programs, the Australian Government formally established community-based regional NRM groups with functional responsibilities for NRM planning and a funding capacity to implement planning outcomes. Regional NRM groups prepared NRM plans in accordance with the Inter-government Agreement (IGA) on the NAP and NHT2, and bilateral agreements between the states and the Australian Government. Hence, the NAP and NHT2 programs are driven by a single regional plan, developed by local communities and supported by Government and the best available science to improve natural resources on a regional scale (Commonwealth of Australia 2006).

The Queensland and Australian Governments signed the bilateral agreement for the Natural Heritage Trust Extension in June 2004. This agreement encouraged

community, local government and industry stakeholders to continue to work together, through the regional NRM groups, to address NRM issues.

Under the terms of the agreement, the Australian Government would provide funding for projects at a national, state and regional level. The State Government would match this with in-kind contributions at state and regional levels. By 2007, approximately \$111 million has been distributed to regional NRM groups in Queensland.

Under the bilateral agreements, regional NRM groups were required to prepare NRM plans and regional investment strategies for accreditation by Australian and State Government Ministers. Prior to consideration by Ministers, on the recommendation of the Joint Steering Committee, regional NRM groups were to develop draft regional plans through an iterative and consultative process with significant community and State and Australian Government input.

The first of these major programs, the NAP, involved an investment by the State and Australian Governments of some \$162 million in Queensland for the development of investment strategies to begin remediation of water quality and salinity issues in the four investment regions (DNRM 2002). These regions are the Burdekin/Fitzroy, Queensland's section of the Murray Darling Basin, Burnett-Mary and the Brisbane-Lockyer regions.

There are a number of underlying implications for Queensland associated with the evolution of new (or modification of existing) community bodies in regions to fulfill the above role. Key implications identified by Gilbey (2002) include:

- The degree to which the Government would wish to devolve NRM planning and implementation to regional groups;
- The degree to which other key regional stakeholders feel engaged in the development and operation of these groups (e.g. local government and industry).
- The relationship between the regional groups and existing NRM planning bodies;

- The extent to which the regional NRM plans prepared by the regional groups integrate with existing regional planning activities;
- How Government agencies will support and resource the activities of the regional groups; and
- The extent to which regional groups should influence budgetary and operational decision making by government agencies involved in NRM.

A key issue is whether the regional NRM arrangements are an efficient way of organising the interactions between government and landholders.

Bellamy *et al.* (1999) identify the perceived benefits of community-based and integrated approaches to natural resource management as including:

- Development of catchment management strategies with community-wide ownership;
- Improved awareness of catchment processes;
- Resolution or amelioration of conflicts among catchment stakeholders;
- Planning and implementation of resource use practices on a catchment-wide basis that lead to sustainable use, management, and conservation of natural resources;
- Development of new complementary institutional arrangements; and
- Establishment of a participative process linking policy formulation to implementation, incorporating lessons learned into the policy process.

Some of the principles of a regional NRM approach are outlined below (DNRM 2005, p.7):

- Large-scale practice change is more likely when local people are responsible for NRM planning and management;
- A regional NRM approach uses the capacity of those closest to the issues more effectively than a state-wide approach;
- Local and regional groups are ideally placed to engage with landholders and industry sectors, to raise awareness about sustainable landscape management and to support on-ground work;
- A regional approach ensures a good link between local groups, such as landcare and bushcare, and state and Australian Government agencies.

- A regional approach to NRM is often geographically appropriate in a highly decentralised state such as Queensland.

The regional NRM arrangements are unlikely to have evolved into its current form without the earlier NRM programs of Landcare and ICM. Though often regarded as a failure with respect to achievements in the context of environmental and natural resource management outcomes, the Decade of Landcare institutionalised a type of catchment management and land management 'stewardship' (e.g. Lawrence *et al.* 2004) ethic at the grassroots level. In particular, the Landcare movement fostered awareness of agri-environmental and broader NRM issues and arguably laid the foundation for the emergence of the regional NRM arrangements. In a review of the Auction for Landscape Recovery market-based instruments (MBI) pilot program in Western Australia, Grafton (2005, p.22) remarked "a key factor explaining participation by landholders is their Landcare-based experience". A number of studies have also found a positive relationship between membership of Landcare groups and adoption of some conservation practices (Cary *et al.* 2002; Curtis 1997; Curtis and De Lacy 1996; Mues *et al.* 1998). It is this level of voluntary action that the regional NRM arrangements are seeking to leverage in the promotion of improved land management practices. Marshall (2008, p.13) concludes accordingly:

The economic dividend from increased voluntary adoption of conservation practices under this approach arises from the reduced transaction, political and other opportunity costs of achieving the same result entirely through coercion or financial inducements.

This community-based approach to NRM planning is not without its risks, particularly in ensuring regional NRM groups have the capacity to administer significant amounts of funding and to develop and implement strategies that will deliver sustainable NRM outcomes (Gilbey 2002). There is a question on the ability of the regional NRM groups to achieve the required level of integration with co-existing regional planning activities; to deliver acceptable levels of accountability for the expenditure of public funds; and to be cost effective compared to other NRM models, including those that do not involve a significant community engagement component. There is also a question of what degree of Australian

Government influence on state-based NRM planning processes is acceptable in the long term which may affect the ability to achieve NRM outcomes.

### **3.2 INSTITUTIONS SUPPORTING NRM IN AUSTRALIA**

In light of the developments over the last two or more decades with respect to natural resource and environmental governance in Australia, it is important to now outline and identify those institutions<sup>36</sup> that are responsible for implementing NRM policy given this shift towards a more devolved, regional approach. It was noted earlier that NRM in Australia has been characterised to be rather ad hoc and involved a suite of different actors and associated regulations and policies. This is not surprising given the complex arena where these developments are taking place involving a number of stakeholders and multifaceted and interconnected issues. A number of institutions exist to support and implement NRM policy at the national, state, and regional or local level. Figure 3.2 outlines a list of key institutions involved in NRM decision making in Australia.

Within these different institutions, many processes and programs seem to be occurring and overlapping at the same time and it remains unclear whether a systematic approach is being followed in the implementation of programs towards achieving holistic NRM outcomes. This is an important issue given the significant amount of funding and resources being invested in natural resource and environmental governance in Australia. Understandably, the complex nature of diverse landscapes and biophysical characteristics across Australia require institutions and programs at different levels and scales to support policy decisions. In this section the important institutions for NRM in Australia and their role and contribution to overall economic welfare is outlined.

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<sup>36</sup> Discussion here focuses on the different institutions involved in delivering NRM outcomes in the Australian context. A discussion on the theoretical aspects of institutions and governance is presented in chapter 4.



### **3.2.1 National-level Institutions**

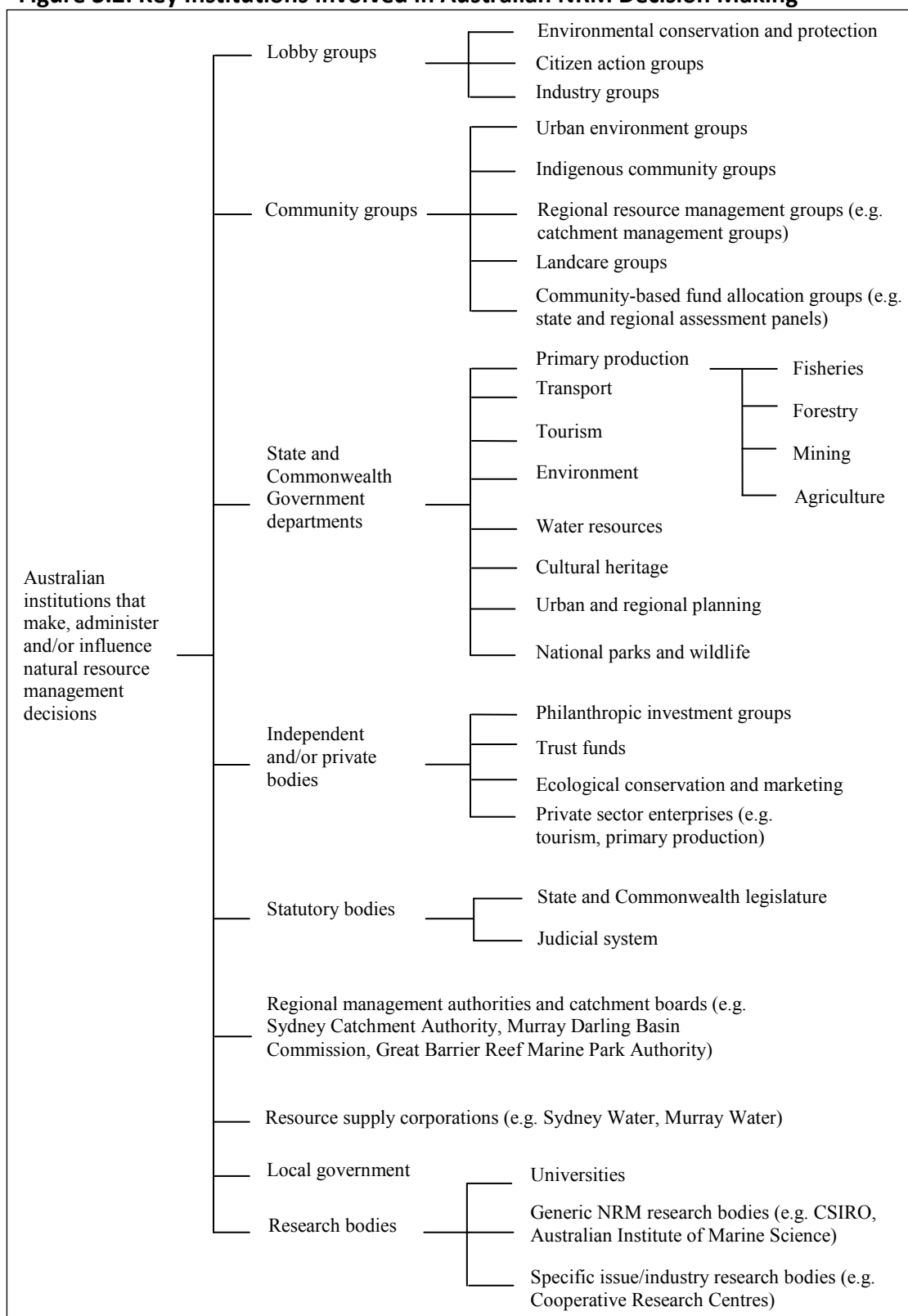
At the national level, the Australian Government has established various institutions to support NRM policies and programs to achieve natural resource and environmental outcomes. These are summarised below.

#### ***National Landcare Program***

Commencing in 1989 heralding the Decade of Landcare, the National Landcare Program (NLP) is a program within the Australian Government's Department of Agriculture, Fisheries and Forestry, which supports and promotes the landcare movement in fostering sustainable use and management of natural resources at the catchment community level. The NLP encourages landholders to undertake landcare and related conservation activities by supporting collective action by local and regional communities to sustainably manage the local environment and natural resources. As highlighted earlier in this chapter, Landcare operates as an ongoing partnership between government and the community, and is regarded to be a critical link in encouraging on-ground action to improve natural resource management at the farm, catchment and regional level.

The Australian Government has committed funding of \$37 million for the National Landcare Programme for 2006-07 and committed funding until 2008 to encourage on ground action that will result in enhanced sustainable natural resource management at the farm, catchment and regional level. However, it has generally been acknowledged that the Landcare model distributed funds too thinly and evenly in a 'vegemite approach' (Pannell 2000) and has not being an efficient mechanism to strategically address NRM issues.

**Figure 3.2: Key Institutions Involved in Australian NRM Decision Making**



(Source: Hajkowicz *et al.* 2000, p.5)

### ***Land and Water Australia***

One of the most significant national-level institutions established in Australia to inform policy and discussion relating to NRM matters is Land and Water Australia (LWA). LWA is a statutory research and development corporation originally established as the Land and Water Resources Research and Development Corporation in 1990 under the Primary Industries and Energy Research and Development Act 1989. It was set up in the same year in which the then Prime Minister Bob Hawke declared the 1990s as the Decade of Landcare. While the Corporation was established as part of the reforms of research and development arrangements in the primary industries and energy portfolio, it was closely aligned with the goals and aspirations for the Decade of Landcare program.

LWA's core business involves supporting research related to NRM capacity building and knowledge and research brokering activities to develop collaborative and innovative research and development programs for the management and take-up of sustainable NRM practices. LWA also actively develops and maintains collaborative partnerships with various industry, government and community organisations. To support the regional NRM arrangements, LWA's *Knowledge for Regional NRM Program* facilitates networks between regional NRM bodies and knowledge providers, and assists regional NRM bodies to better manage their knowledge. Accordingly the knowledge brokering role that LWA fulfils can be summed as follows:

...the success of regional NRM processes is contingent on access to the best available information, however, despite considerable public investment in both the regional NRM process and NRM research, there remains a risk that investments through regional arrangements may not be based on the best available knowledge due to the complexity and fragmentation of the NRM knowledge system (LWA 2006a, p.4).

Hence, LWA plays a key role by fostering the creation and dissemination of knowledge to better inform NRM policies and outcomes.

### ***Cooperative Research Centres***

In addition to the role that LWA plays in contributing towards knowledge brokering activities for NRM, it is also important to acknowledge similar

functions carried out by the Cooperative Research Centre (CRC) program. The CRC program was established in 1990 under the Australian Government's Department of Education, Science and Training to bring together researchers and research users. The program promoted collaborative arrangements to maximise the benefits of research through a process of utilisation, commercialisation and technology transfer (Commonwealth of Australia 2007). Parties involved in the CRC program (contributing direct funding and in-kind) include universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and industry.

The objective of the program was "to enhance Australia's industrial, commercial and economic growth through the development of sustained, user-driven, cooperative public-private research centres that achieve high levels of outcomes in adoption and commercialisation" (Commonwealth of Australia 2007). Currently, 29 of the 57 CRCs are involved with projects in the agriculture and environmental sector, which demonstrates the relative importance and saliency of issues in these sectors.

### ***Envirofund***

The Australian Government's 'Envirofund' is the local on-ground action component of the Australian Government's \$3 billion Natural Heritage Trust program. The main objective of the Envirofund is to provide a pool of funding to offer support to assist regional communities undertake local projects aimed at promoting sustainable land management practices and resource use.

To achieve this, Envirofund offers community groups and individuals the opportunity to apply for monetary grants of up to \$50,000 to carry out small-scale on-ground projects and other proposed actions to target local problems relating to biodiversity conservation and management of natural resources and the environment. The Envirofund supports on-ground actions by groups and individuals to target problems affecting local communities.

### ***Federal Government Agencies***

At the federal level at the time of writing, the Australian Government had two main agencies responsible for managing programs and projects related to natural resources and environmental management affairs. The Department of Environment, Water, Heritage and the Arts (DEWHA)<sup>37</sup> is the main NRM agency that develops and implements national policy in relation to the conservation and protection of the environment. DEWHA (Commonwealth of Australia 2006a) focuses on matters of national significance by:

- Advising the Australian Government on its policies for protecting the environment and heritage;
- Administering environment and heritage laws, including the *Environment Protection and Biodiversity Conservation Act 1999*
- Managing the Australian Government's main environment and heritage programs including the \$3 billion Natural Heritage Trust and Caring for our Country
- Implementing an effective response to climate change
- Representing the Australian Government in international environmental agreements related to the environment and Antarctica

Other key roles of the DEWHA include managing the NHT and NAP programs and responsibility for the promoting and supporting programs, services and policies for sustainable development in Australia.

The role of the Department of Agriculture, Fisheries and Forestry (DAFF) is to develop and implement policies and programs to ensure that Australia's agricultural, fisheries, food, and forestry industries remain competitive, profitable and sustainable. DAFF is a lead agency in delivering the NAP and NHT extension at the Commonwealth level. The Department's programs aim to provide support and promote sustainable natural resource management, and encourage Australian primary producers to adopt innovative and new technologies and competitive practices.

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<sup>37</sup> This agency was previously known as the Department of the Environment and Heritage. The name of the portfolio was changed following the federal election in November 2007.

### 3.2.2 State-level Institutions

At the state<sup>38</sup> level there is a mix of institutions that provide regulatory-type functions and incentive-based measures to support sustainable NRM programs and practices. The Department of Natural Resources and Water (DNRW) in Queensland is the lead agency responsible for the management of NRM and environmental programs. DNRW is also responsible as the regulatory body in Queensland to administer relevant policies, laws and statutes pertaining to NRM matters including pest management<sup>39</sup>, water resource allocation planning<sup>40</sup>, and vegetation management<sup>41</sup>. It provides NRM services by:

- developing policy and legislation for the allocation, regulation and sustainable use of the state's natural resources;
- delivering services in areas such as land information and titles, information policy, and water industry compliance; and
- offering quality scientific information to facilitate access to, and management of, the state's natural resources (DNRW 2005, p.9).

DNRW is also responsible for developing state policies and implementing regional NRM programs in accordance with the bilateral agreement between the Queensland and Australian governments under the NHT2 and NAP, working in collaboration with other supporting agencies including the Department of Primary Industries and Fisheries, and the Environmental Protection Agency.

Table 3.2 outlines some of the institutional arrangements for statutory planning and NRM activities in Queensland.

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<sup>38</sup> In this thesis, discussion will focus on state level institutions related to Queensland, where the case study for this research is based.

<sup>39</sup> e.g. Land Protection (Pest and Stock Route Management Act 2002 (Qld)

<sup>40</sup> e.g. Water Act 2000 (Qld)

<sup>41</sup> e.g. Vegetation Management Act 1999 (Qld), and Vegetation Management and Other Legislation Amendment Act 2004, 2005 (Qld)

**Table 3.2: Institutional Arrangements for Planning and NRM in Queensland**

Statutory base	Structures	Functions
<i>Integrated Planning Act 1999</i>	<i>Central/State:</i> Department of Local Government and Planning  Central office with 5 regional branch offices	<ul style="list-style-type: none"> <li>• Coordination of Local and regional planning act</li> <li>• Policy making, review and endorsement of local planning schemes to ensure they meet the requirements of the Act, especially satisfactory incorporation of State and regional interests.</li> <li>• Management of regional planning initiatives under the Act including SEQ2001, FNQ2010 and Wide Bay 2020. These integrate growth and economic development objectives with broader social and environmental concerns, and can include natural resource themes. A planning system that requires local governments to integrate State and regional dimensions into their plans</li> <li>• Coordination of the Integrated Development Assessment System (IDAS) that streamlines and coordinates assessment of development projects and land use change across levels of government and sectoral agencies through a one-stop shop process.</li> </ul>
	<i>Regional:</i> Regional Planning Advisory Committees (RPACs) - 8 in the state in 2003  No predefined regions although all are composites of local governments and do not match other planning regions:	<ul style="list-style-type: none"> <li>• Provide a framework for coordinating regional planning activities of local, state and Commonwealth governments normally in the form of a regional framework for growth management.</li> <li>• Presentation of their findings to the Minister and relevant local governments. Recommendations are implemented largely through voluntary cooperation of the respective entities.</li> <li>• Not incorporated bodies and can not manage funding, but can determine priorities, funding requirements and those organisations best suited for funding to implement each element of a strategy.</li> </ul>
	<i>Local:</i> Local governments (124)	<ul style="list-style-type: none"> <li>• Prepare and administer planning schemes.</li> </ul>
<i>Vegetation Management Act</i>	<i>Central/State:</i> Department of Natural Resources and Mines	<ul style="list-style-type: none"> <li>• Develop State policy framework for vegetation management</li> <li>• Implementation of tree-clearing controls on public land.</li> <li>• Mapping and administrative to support to regional committees</li> </ul>
	<i>Regional:</i> Regional vegetation management committees - 20 in the State  Bioregions (1 or more)	<ul style="list-style-type: none"> <li>• Preparation of Regional Vegetation Management Plans to determine tree-clearing policies at the regional level for implementation by State and local government.</li> </ul>
<i>Water Act 2000</i>	<i>Central/State:</i> Department of Natural Resources and Mines	<ul style="list-style-type: none"> <li>• Administer <i>Water Act 2000</i>, for the "sustainable management and efficient use of water and other resources by establishing a system for planning, allocation and use of water". The planning process is designed to meet future water requirements, including the protection of natural ecosystems and security of supply for water users.</li> </ul>
	<i>Regional:</i> Regional water resources planning for rivers and groups of rivers. - 17 in the State  Based on water planning regions (1 or more rivers with significant or potential extractive use)	<ul style="list-style-type: none"> <li>• The planning process is designed to meet Queensland's future water requirements, including the protection of natural ecosystems and security of supply for water users.</li> <li>• Involves a Community Reference Panel drawn from cultural, environmental and economic interests and Technical Advisory Panel to create a 10-year plan for the region.</li> <li>• Outcome of the planning process is a Water Resource Plan (WRP): <ul style="list-style-type: none"> <li>- to provide a framework for sustainably managing water and the taking of water</li> <li>- to provide a framework for reversing, where practicable, degradation that has occurred in natural ecosystems, including, for example, stressed rivers</li> <li>- to regulate the taking of overland flow water</li> <li>- to regulate the taking of sub-artesian water.</li> </ul> </li> <li>• A WRP is a priority in a region where the intensity of water resource use is already significant and where there are clear emerging pressures for increased use.</li> </ul>

<i>Coastal Protection and Management Act</i>	<i>Central/State: Environmental Protection Agency</i>	<ul style="list-style-type: none"> <li>• Development of the State coastal plan which describes how the coastal zone is to be managed as required by the Act.</li> <li>• Policies for managing the major coastal issues are detailed under the following topic headings: <ul style="list-style-type: none"> <li>- coastal use and development;</li> <li>- physical coastal processes (the effects of waves, tides, currents and coastal storms);</li> <li>- public access to the coast;</li> <li>- water quality;</li> <li>- Indigenous traditional owner cultural resources</li> <li>- cultural heritage;</li> <li>- coastal landscapes;</li> <li>- conserving nature;</li> <li>- coordinated management; and</li> <li>- research and information.</li> </ul> </li> </ul>
	<i>Regional: Regional Coastal Management Plans (11 regions although only 4 plans have been prepared)</i>	<ul style="list-style-type: none"> <li>• Implement the State Coastal Management Plan's policy framework at the regional level and identify key coastal sites requiring special management within the region.</li> <li>• These plans describe how the coastal zone is to be managed and identify the coastal management districts in particular regions.</li> </ul>
<i>National Action Plan for Salinity and Water Quality (NAP) - 4 regions</i>  <i>and</i>  <i>National Heritage Trust (NHT2) - 11 regions</i>	<i>Central/State and Regional Department of Natural Resource and Mines (State and 5 regional offices)</i>	<ul style="list-style-type: none"> <li>• In conjunction with the Commonwealth to oversee, fund and implement NAP and NHT2.</li> </ul>
<i>Regional Natural Resources Management Boards.</i>	Boards appointed from nominations called within each region.  - Members cannot be state or Commonwealth politicians or officials	<p>A Regional NRM body is:</p> <ul style="list-style-type: none"> <li>• a legal entity with a majority community membership, balancing production and conservation interests</li> <li>• has the necessary skills and capacity to develop an NRM plan and regional investment strategy to meets the agreed accreditation criteria;</li> <li>• responsible to implement the Plan in accordance with a partnership agreement</li> <li>• receives funding to deliver agreed activities under regional investment strategies and be accountable for agreed expenditure and achievement of targets</li> </ul>

(Source: Brown *et al.* 2003, p.8)

### 3.2.3 Regional and Local Institutions

#### ***Regional NRM Groups***

At the regional and local level, a number of formal and informal institutions exist to support NRM and environmental conservation activities. Funded through the NAP and NHT programs, regional NRM groups and CMAs operate in designated NRM regions around the country. In Queensland, 14 regional NRM groups have been formally designated and are operating to deliver on integrated NRM outcomes as outlined in regional NRM plans as part of bilateral agreements between the states and the Australian Government under the regional NRM arrangements of the NAP and NHT2.

#### ***Local Governments***

Local government authorities also have responsibilities to manage aspects of NRM and work closely with regional NRM groups to implement NRM planning initiatives.



Through their corporate and operational plans, programs and services, local governments also play a key role in addressing community aspirations and building local capacities. Local governments are also responsible for managing local development and land use change, as well as regulating a range of activities concerning NRM (e.g. pest management activities, and water supply). This is performed under various planning schemes in conjunction with the integrated development assessment system and local laws (DNRM 2005, p.9).

### ***Community NRM groups***

Community NRM groups such as Landcare, Bushcare, Coastcare, and Waterwatch, focus on local environmental and sustainability issues and also play a role in NRM activities. Such groups comprise mainly volunteers from the local community and are involved in undertaking community-level activities including running awareness campaigns and education, and monitoring environmental condition. They also implement on-ground works and assist landholders to adopt more sustainable practices (DNRM 2005, p.9).

### ***Peak Stakeholder Groups***

Peak stakeholder bodies (e.g. industry representative groups and conservation groups) play a key role in influencing their members in becoming aware of, and involved in NRM initiatives. Such groups have also played an important role in advising governments on promoting the adoption of innovative, more sustainable practices by their members (DNRM 2005, p.10).

### ***Non-Government Organisations***

Non-government organisations including *Greening Australia* and the *World Wide Fund for Nature* (WWF) have also developed a reputation for producing practical and innovative guides (e.g. Woodhill and Robins 1996; Dore *et al.* 2000) to assist rural communities and other NRM stakeholders to work towards more sustainable NRM practices. These organisations have also been involved in managing components of on-ground NRM initiatives for government agencies including the

Queensland Government's Vegetation Incentives Program, and field pilots<sup>42</sup> run under the National Market-Based Instruments pilot program.

### **3.3 SUMMARY**

Natural resource governance arrangements are evolving and in a state of constant change. Past programs have been poorly resourced – relying heavily on Australian Government funding, lacking substantial local or state government support for implementation, and substantially limited by only short-term funding arrangements.

Earlier NRM programs have been primarily driven by increasing participation using social science and focusing on land managers as the main decision making units. However, the issue surrounding effective resource governance is not just concerned with increasing participation, but to clearly identify the factors and influences of participation to achieve long-term behavioural change. Australian natural resource governance has been moving away from command and control type policies to more participatory approaches characterised by local collaboration and provision of incentives for adopting improved management practices. The latter has become known as 'regional NRM' which embodies these characteristics.

Of particular interest in this thesis is that little or no analysis of the regional NRM arrangements has been undertaken using an economic lens. Relevant economic theory and concepts which can be used to analyse and recommend solutions to addressing NRM problems are introduced in chapter 4.

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<sup>42</sup> Greening Australia was involved in the delivery of the Round 1 National Market-Based Instruments Pilot Program, *Creating positive land use change with a natural resource management leverage fund*, and WWF Australia had a role in the *Auction for landscape recovery* pilot.

## 4. Institutions for Natural Resource Governance

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*The objective of sustainable development and the integrated nature of the global environment...pose problems for institutions...that were established on the basis of narrow preoccupations and compartmentalised concerns*

(Gro Harlem Brundtland in *Our Common Future*, 1987, p.9)

### 4.1 INTRODUCTION

It has already been established that there has been a marked shift in the institutional arrangements through which natural resource governance is occurring in Australia. Changes have also been seen in the nature of relations between government and the wider community with greater opportunities for citizens to be involved in shaping and influencing the direction of policy. As established in chapter 2, this shift to more participatory approaches has also been prompted in part by international debate espousing such mechanisms as a way to develop policies and programs that are more relevant, efficient and focused on the important issues facing a region.

Some of the theoretical underpinnings of this paradigm shift will be explored in this chapter by first reviewing the concept of market failure with respect to NRM and environmental problems. This is followed by discussion on the notion of 'governance' and investigating what constitutes an 'institution', their roles and how these mechanisms can significantly influence the attainment of NRM and environmental outcomes.

### 4.2 MARKET FAILURE

By taking an economics lens, natural resource and environmental governance can be viewed as the implementation of institutional arrangements that facilitate the efficient allocation of resources to achieve desired NRM objectives. With respect to dilemmas of collective action and NRM, inefficiencies and continued degradation of the environment occurs when the outcomes of individuals acting in their own private interest diverge from what would occur if individuals acted collectively to maximise the benefits and welfare to all members of society (Bryan *et al.* 2005).

Such a divergence between private and public interests is known as *market failure*. Market failure generally results from inadequate institutional arrangements or from poorly defined property rights. Murtough *et al.* (2002) outline the following reasons to explain the lack of markets for environmental goods and services:

- large transaction costs;
- externalities (spill-over effects);
- non-rival and non-exclusive impacts (public good effects);
- high uncertainty about the attributes of a good or service;
- asymmetric information (sellers are much better informed than buyers, or vice versa);
- few buyers and sellers; or
- ownership cannot be defined and enforced, or is very costly to do so.

The following section provides an overview of market failure, its relevance to natural resource governance and explores avenues to address these issues.

#### **4.2.1 Issues of Market Failure**

A freely operating economy may still produce sub-optimal outcomes. The existence of market failure is often used as justification for government intervention in the free market. In relation to natural resource and environmental governance issues, the key areas of market failure that are explored below are:

- Presence of externalities;
- Existence of public goods; and
- Lack of adequate information.

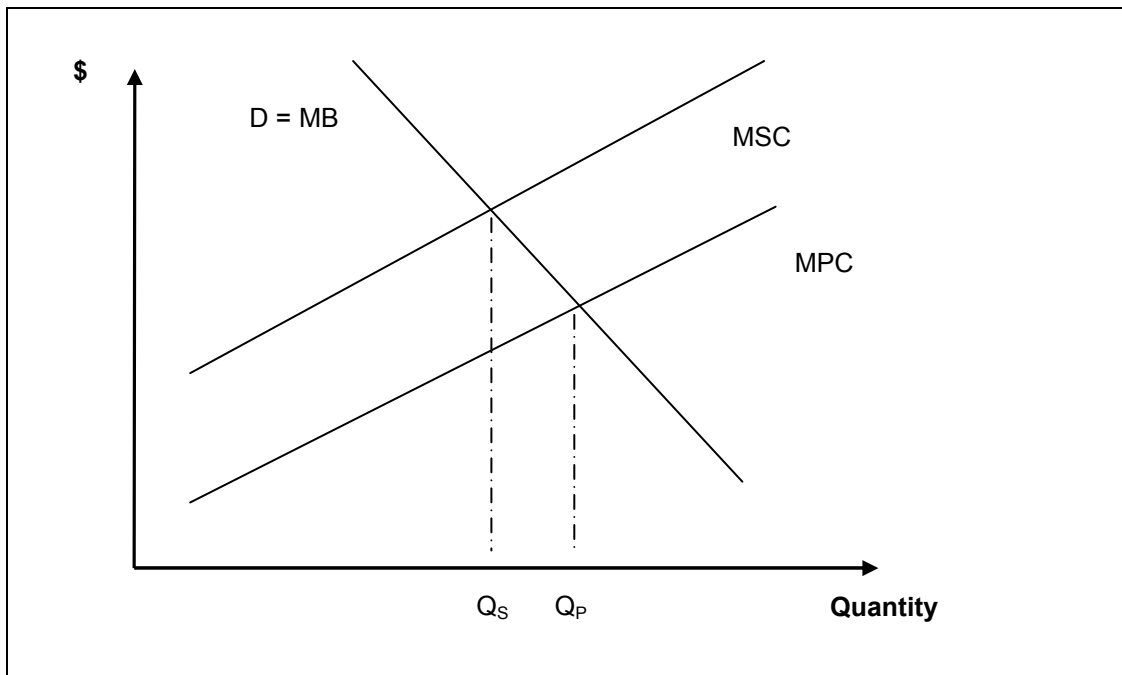
##### *Externalities*

Externalities or 'external economies' (Pigou 1920) refer to spill-over effects or impacts on any party not directly involved in a given economic transaction. An externality occurs when an economic transaction results in costs or benefits to a third party. Pigou (1920) argues that market failure results from the divergence between private and social cost that impacts on third parties. Pigou (1920, p.159) identifies two situations which arise in this category: (i) the case where services are rendered without due payment (i.e. positive externality); and (ii) where disservices are rendered without compensation (i.e. negative externality). Maier

and Shobayashi (2001) note that the main concern of the latter is that the good generating the externality is likely to be associated with overprovision. In contrast, the former is likely to be underprovided as there is little incentive to provide the good or service if the benefits cannot be captured.

There are several types of externalities. Private externalities only affect an individual or a firm, while public externalities affect a group of individuals or firms. Viner (1953) notes that there are key differences between pecuniary and technological externalities. The former occurs when an impact is transmitted through the price mechanism, such as the advent of higher property prices resulting from more people moving into a region. Technological externalities occur when an impact is external to an individual or firm that is not transmitted through the price mechanism. Technological externalities affect the utility or production function of others directly. For example, improved production processes resulting from the research and innovation from another firm is a positive technological externality (Viner 1953). These externalities have been described as “real” externalities, because unlike pecuniary externalities, technological externalities are often not accounted for (e.g. Buchanon and Stubblebine 1962, p.371; Bator 1958, p.358). A network externality occurs when the benefit an individual derives from a good is dependent on the number of other individuals in society that adopt the good (Cornes and Sandler 1996).

**Figure 4.1: Negative Externalities**



Many of the problems associated with NRM and environmental governance are often linked to negative externalities. One example of such a situation is a factory emitting air pollution which has negative impacts on air quality for the community. Figure 4.1 illustrates how the presence of negative externalities affects the private and social costs of production. In this diagram, there are two cost curves, marginal private cost (MPC), and marginal social cost (MSC), which includes both private and public costs.

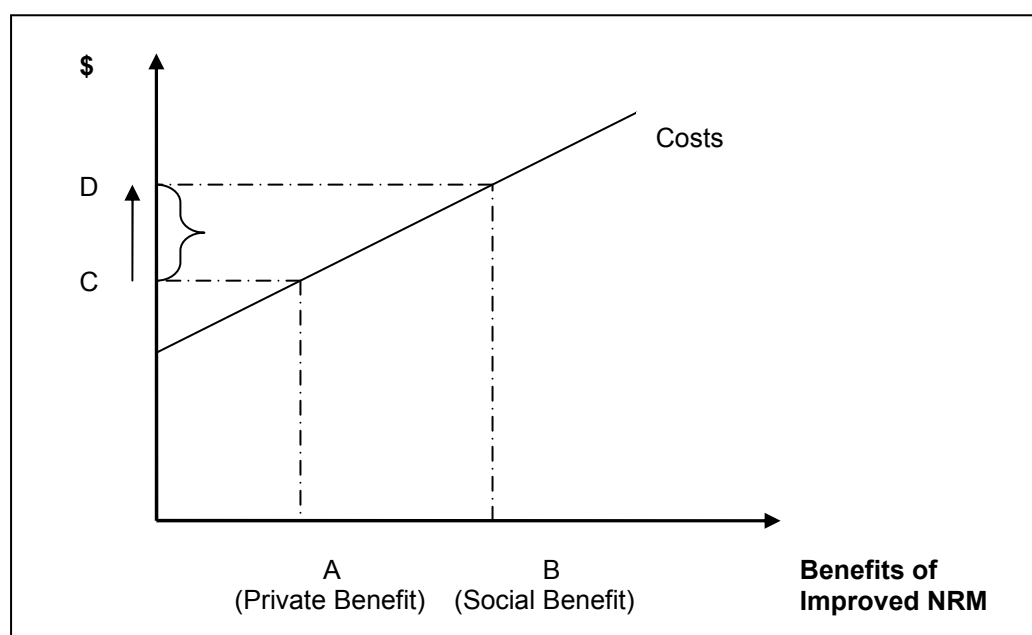
As private firms would only take into consideration their private costs in relation to what level of a good to produce, an equilibrium level would occur at  $Q_P$ . However, when taking into consideration the negative externalities resulting from this level of production, the more appropriate equilibrium level would occur at  $Q_S$ .

Positive externalities also have a role in NRM issues. Positive externalities confer a benefit on the initiating agent, but there are spill-over effects on others. For example, conservation of biodiversity on private land (which generates positive externalities) may require a landowner to forgo other uses of the land. The divergence between private and social benefits helps to explain why biodiversity is

declining around the world as private land managers cannot capture the social benefits of their individual conservation actions.

Figure 4.2 outlines the incentive gap between private and social level costs in relation to undertaking improved NRM actions. Individual landholders undertake NRM activities corresponding to point A. However, the maintenance and conservation of environmental and natural resource assets required to provide the desired social benefits is at point B. There is no incentive for private landholders to undertake the additional costs associated with extra NRM work in which they do not benefit directly (e.g. the difference between C and D). As a result, despite public demand for environmental goods and services, the market for producing such goods and services is not well developed to facilitate such an outcome (Bryan *et al.* 2005).

**Figure 4.2: Gap between Public and Private Benefits**



(Source: Comerford *et al.* 2005)

### *Public Goods*

Public good theory is well suited to natural resource governance issues as the attributes of public goods closely align with many NRM and environmental dilemmas. Public goods have the attributes of non-excludability and non-rivalry in consumption. The former relates to the fact that no individual can be effectively prevented from consuming the good. However, the attribute of non-excludability

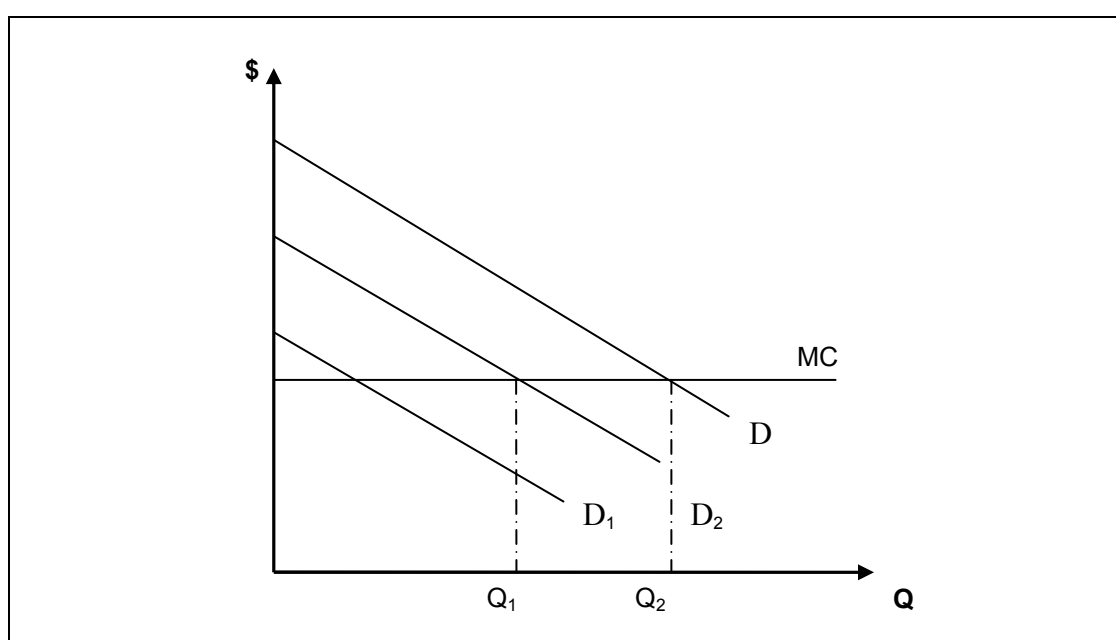
may change as the advent of new technology may give rise to the possibility of exclusion for certain types of goods. For example, television broadcasts are non-rivalrous, and before encryption technology, was non-excludable. However, the advent of encryption technology has meant that broadcasters are able to sell individual access to their service, effectively excluding non-paying individuals. Adams and McCormick (1993) note that institutional and legal factors may also have an influence on the level of excludability of a good, hence excludability may not be inherent in the good itself.

The second attribute of non-rivalry in consumption refers to the notion that consumption of the good by an individual does not reduce the amount of the good available for consumption by others. Samuelson (1955, p.350) notes accordingly that this can be expressed by viewing the total provision of the public good as  $X$ , where individual consumption of the public good,  $X_1$  and  $X_2$ , are related by a condition of equality rather than summation (i.e.  $X = X_1 = X_2$ ). The attribute of non-rivalry in consumption is inherent to public goods such as biodiversity protection (Adams and McCormick 1993).

Figure 4.3 illustrates the optimal level of provision for a pure public good. Each individual has a separate demand for the public goods. As there is non-rivalry in consumption,  $D_1$  and  $D_2$  – representing the individual willingness to pay curves – are vertically summed to show the total level of demand for the public good,  $D$ . The optimal level of provision occurs at the level  $Q_2$ , where total demand equals marginal cost.  $D_2$  represents the individual with the highest level of demand corresponding to the quantity  $Q_1$ , which is significantly less than  $Q_2$  (the optimal level of social provision). No incentive exists for other individuals to provide the public good as they can take advantage of the provision at  $Q_1$ . Tisdell (1991) notes that no amount of the public good will be provided if the individual demand curve exceeds the marginal cost.



**Figure 4.3: Optimal Level of Provision for a Pure Public Good**



(Source: Tisdell 1991, p.57)

It is apparent that the free market is able to provide some level of public goods. This level of provision may be higher if citizens were able to collectively provide the good. Head (1974) notes that public goods may be provided at an optimal level in smaller communities where the costs and benefits provision are clearly defined and where free-riding could be easily observed. Evidence from economic experiments (e.g. Zelmer 2003; Ledyard 1995; Dawes 1980) investigating voluntary provision of public goods found that the marginal per capita return from contributing was a significant positive factor in voluntary provision of public goods. Recent experimental studies suggest individuals under certain conditions free-ride to a much lesser extent than what standard economic theory predicts (Gintis *et al.* 2005). This may be explained by various types of informal norms, for example based on reciprocity, ethical considerations or perceived fairness (e.g. Camerer 2003; Ostrom *et al.* 1994; Ostrom 1990).

One of the main reasons for the market failure outcome concerning the provision of public goods relates to the inadequate incentives for individuals to voluntarily pay as they are able to enjoy the benefits from the good despite not contributing towards its provision (Samuelson 1954). It is this aspect of public goods that embodies the “free-rider” phenomenon, where individuals take advantage of the

provision of a good by others without paying for the benefits. Wicksell (1958) asserts that a key reason for this situation stems from the notion that individuals view their contribution to be too insignificant to make any difference to the overall outcome.

In practice, pure public goods are rarely encountered. Cornes and Sandler (1996) suggest that goods lie along a continuum with pure public goods and pure private goods located at each end. The goods in between are known as “impure” public goods, sharing some attributes of both private and public goods (Cornes and Sandler 1996, p.9). Goods that exhibit the attribute of non-excludability but can be subject to congestion as the level of use rises is known as a “common pool resource” (CPR) rather than a public good (Ostrom 1990, p.144). A typical example of a CPR in relation to NRM is a fishery resource. It is difficult to exclude people from using the resource, but overuse tends to result in a reduced fish stock. Goods that display attributes of non-rivalry but are excludable have been come to be known as “club goods” (e.g. Buchanan 1965). As their name suggests, these goods are provided by clubs, where individuals pay for use of the good. The size of these clubs is limited by the degree to which rivalry or congestion exists. For example, the use of a gym is non-rivalrous up to a point; hence gym membership should be set at less than this level.

Other goods, known as “mixed goods”, can provide both public and private benefits (Holtermann 1972, p.81). Mixed goods are a common feature of environmental policy discussion for addressing market failure in relation to achieving NRM outcomes. For example, conservation of vegetation may result in conserving biodiversity and also provide private benefits in the form of shelter for stock (Aretino *et al.* 2001). The presence of public good aspects helps explain why markets fail to supply the socially optimal level of natural resource and environmental goods.

### *Information Failure*

The efficient and effective operation of the market mechanism is founded on the premise of full access to information by all economic agents. This assumption is

rarely satisfied in practice as it not always possible to obtain full knowledge before making economic decisions. The consequence of such information failure is that individual decisions and actions may be misinformed. For example, in the context of natural resource and environmental governance, lack of adequate information relating to the broader landscape impacts of specific land management actions may result in individuals undervaluing environmental goods and services.

A common dilemma facing NRM practitioners is the situation where there exists inadequate knowledge and understanding of environmental and biophysical processes. This knowledge gap disguises the causal links between various land management actions and the impact on the environment. Moreover, time lags in observable outcomes further add to the complexity as the impact of actions may not be observable for many years (Aretino *et al.* 2001; Marshall 2001). For example, land management actions targeting improved water quality may take years before measurable impact is observed in the rivers and streams of a catchment area.

Another form of information failure exists where one agent in a transaction is much better informed than the other. This situation reflects one of asymmetric information<sup>43</sup> and is typical of NRM problems. For example, land managers generally possess more information concerning the total costs of carrying out environmental conservation work than governments. On the other hand, governments have a better understanding of the value society places on environmental goods and services. This makes the task of crafting policy responses to market failure all the more challenging, since the costs and benefits to the community are not easily discernable.

#### **4.2.2 Tackling Market Failure**

There are a few possible strategies available to address problems of market failure which were outlined in the previous section. Most responses require some form of government intervention in the market. This section will explore some of the

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<sup>43</sup> The principal-agent problem which is outlined in section 4.2.3 also highlights the issue of information failure and information asymmetry in relation to NRM issues.

possible solutions available to tackle the issue of market failure with respect to NRM.

In identifying the appropriate policy avenues, it is important to carefully consider the costs and benefits of all available interventions, including the following factors (ABARE 2001):

- Effectiveness of the policy in achieving its outcome;
- Efficiency in relation to administration, monitoring and enforcement costs and the level of information required;
- Flexibility of the policy to deliver an outcome in the face of changing conditions;
- The acceptability of the policy to stakeholders; and
- Equity concerns about the impact of the policy on different stakeholders;

Gunningham and Young (1997) add that precaution should also be included in any evaluation of policy interventions, that is, ensuring that the policy includes steps to prevent the occurrence of serious or irreversible consequences, especially in the face of scientific uncertainty of the outcome.

It is important to note that it is not necessary to identify a single instrument to respond to individual environmental problems. Depending on the nature of the problem, a policy response should consider a suite of responses as many instruments can complement each other. Careful selection of a suite of instruments can ensure that the weaknesses of each are outweighed by the strengths of others (Gunningham and Young 1997). In the same vein, it also needs to be acknowledged that multiple policy responses also increase transaction costs.

For example, regulation, voluntary approaches and incentives can be combined together to address a complex natural resource management problem. This approach is also likely to offer more certainty over outcomes and may provide more flexibility in responding to changed conditions. Some instruments are also likely to function more effectively when used in conjunction with others. For example, providing a rate rebate scheme to property owners offers an incentive

which may assist with the uptake of voluntary conservation covenants to achieve NRM outcomes in a target region.

### *Direct provision*

Governments may decide to address information failure and public good issues of market failure by directly intervening to provide the good or service. This may also include the protection or conservation of a good, such as the environment (e.g. biodiversity). Governments typically address information failure by providing information to consumers on a range of issues. These include the regulation of professional services such as medical or legal practitioners through relevant licensing arrangements.

In considering direct provision to address issues of market failure, one factor that needs to be carefully evaluated is that of “crowding out” (Frey 1993; 2001). Individuals may voluntarily contribute to a public good for various reasons guided by ethical and socially responsible considerations. Hence, government provision of public goods may potentially “crowd out” the supply of the good by private individuals. Individuals previously contributing to provision of a public good may no longer continue to do so as government provision of the public good may impact on their “intrinsic motivation” or utility gained from its provision (Bergstrom *et al.* 1986, p.26).

### *Regulation*

Regulatory or command and control mechanisms have been the traditional policy response to market failure in relation to natural resource and environmental governance issues. These mechanisms directly influence environmental performance by identifying limits on pollution levels, regulating products or by limiting activities to certain conditions (OECD 1994). These include regulations governing allowable emissions or pollutant levels, and land-use restrictions. These measures aim to have producers internalise the cost of their externalities. Governments may also introduce licensing and minimum standards for products to

address information asymmetries that may occur between buyers and sellers (Leland 1979).

There are some issues concerning the use of regulatory measures as the main tool of environmental policy. Since regulations prescribe a uniform requirement for compliance, individuals or firms with different costs of modifying behaviour or production processes are treated the same. Hence, no incentives exist to encourage improvement of environmental performance beyond the prescribed minimum standard. In addition, as there is no incentive for individuals or firms to be innovative to address their environmental performance, regulations outlining a method of compliance can be costly as firms do not have discretion to adopt their least-cost approach. Regulations also need to be enforceable, and linked with penalties for non-compliance. This requires that sufficient resources are available for undertaking ongoing monitoring of individual agents' actions.

Notwithstanding the potential problems and inefficiency of regulatory mechanisms, there is a role for regulation in a policy mix for achieving NRM outcomes. Regulations may be more suitable in situations involving higher scientific uncertainty over NRM processes and outcomes, and where the potential exists for irreversible NRM and environmental damage. Regulations may also perform better than other policy instruments during crises that may require many temporary changes to the control mechanism (Baumol and Oates 1988). Regulation is also an important element needed to support other policy instruments, including facilitating the smooth function of markets for environmental services and the enforcement of property rights. For example, a regulatory and governance framework is essential to underpin the effective operation of market-based mechanisms such as competitive tenders for addressing NRM issues.

### *Improving property rights*

Property rights refer to the exclusive authority to determine how a resource can be accessed and used (Alchian 1965). There are a few types of property rights regimes that identify and define beneficiaries of a resource and manner of access and

appropriation. The following lists different property rights regimes, from no property rights defined to all property rights assigned to individuals (Bromley 1991):

- *Open access*: All parties can access and use the resource in any manner.
- *State-owned property*: The State owns and controls the resource, and determines rules governing access and use.
- *Common property*: The resource is held in common by a group and managed according to common rules of access and use.
- *Private property*: Individuals or firms possess property rights over a resource that is well-defined and enforceable by institutional and regulatory frameworks.

Well-defined and enforced property rights supported by appropriate regulatory and institutional frameworks can assist with addressing problems associated with market failure and public goods (Coase 1960). In his seminal paper, Coase (1960) identified that the issue of externalities typically involves more than one party, and it is not clear which party should have to modify their behaviour. As long as clearly defined property rights exist, and there are benefits to be gained from change, bargaining and negotiation will result in an improved outcome. However, the existence of transaction costs can have an impact on negotiation, especially where many stakeholders are involved.

Government can also intervene to modify property rights by (Pearce 2004, p.116): (i) establishing property rights where none existed previously; (ii) modifying existing property rights with the introduction of restrictions governing use and access over a resource; and (iii) facilitating bargaining and negotiations between property rights holders and beneficiaries. Turvey (1963) notes that it is important to consider issues of fairness and equity in the design of policy to modify existing property rights regimes.

Assigning private property rights to environmental goods or services that have characteristics of public goods is a method of addressing market failure and negative externalities as it provides an incentive to manage the resources in an

appropriate manner. The realisation of the inherent inefficiencies, and ultimately unsustainability, of outdated property rights regimes is leading to a new generation of institutions and policy mechanisms in environmental and natural resource governance. For example, in a landmark case of assigning property rights to ecosystem services, the city of New York created a public watershed corporation to manage \$1 billion in watershed protection and compatible community development programs throughout the rural economies of its watershed, and in turn avoided an estimated \$6 billion in capital costs and millions in annual operating costs to build and run a water treatment plant (Chichlnisky and Heal 1998; Heal 2000). A rapidly evolving practice of land conservation is the purchase of public easements to secure development rights, recreational access, or other property rights by the state or non-governmental organisations, with the title remaining in private hands and available for compatible private enterprise such as sustainable forestry or farming (Merenlender *et al.* 2004; Byers and Ponte 2005).

Such examples highlight the diverse alternatives available for addressing market failures perpetuated by current property rights regimes. New institutional mechanisms have evolved from addressing local externalities to those that address global transboundary problems, and from the relatively certain impacts of point source pollution to the more diffuse and complex interdependencies of economies on ecological functions.

#### *Suasive instruments*

Suasive measures are aimed at changing an individual or firm's perceptions and priorities about the environment through information provision, education programs and social recognition and pressure schemes. Suasive instruments attempt to internalise environmental awareness and responsibility into individual decision making (IC 1997). They are relatively low cost in comparison with other policy options, but are unlikely to contribute towards achieving NRM outcomes when used in isolation. Suasive instruments are well suited to accompanying other policy tools to achieve desired outcomes. For example, suasive measures work well with market-based instruments to try to achieve NRM outcomes through the



provision of information and implementation of education campaigns to raise awareness and improve participation rates.

Provision of information and undertaking education and training programs are key elements of suasive activities undertaken by the government. These are often used as a response to information failure, and can also help change the perceptions of society towards a particular issue. Education and awareness programs can assist landholders to show that private benefits can be high enough to justify improved NRM activities. This may be one of the few instances where suasive measures may bring about environmental change when used in isolation (ABARE 2001, p.189). Social recognition and pressure schemes are other types of suasive instruments. These schemes influence norms and values in society to deplore poor resource management practices or encourage positive environmental behaviour.

The suasive power of rural communities – the power that a community can have over individuals to behave in a particular way – can also inhibit the willingness of landholders to adopt changed land management practices. In small communities particularly, this can be a strong disincentive to adopting changed practices and Richards *et al.* (2003) note that social sanctions may face those who adopt changed practices. Psychological motivations for actions may also be influenced by community pressure or social norms (e.g. Ajzen and Fishbein 1980).

Suasive pressure can also provide opportunities for regional NRM groups to harness the power of the community through using social capital<sup>44</sup> to change an individual's perceptions and priorities about the environment. Social capital refers to community processes such as networks, norms, reciprocity and social trust, which can play a critical role in addressing collective-action problems associated with NRM, with an absence of social capital acting as a constraint to changing land management practices (Kilpatrick and Falk 2001).

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<sup>44</sup> The concept of social capital and its role in a regional NRM approach is further discussed in chapter 5.

Depending on the nature of the problem, an astute policy response will include a suite of policy responses as many instruments can complement each other. For example, regulation, voluntary approaches and incentives can be combined together to address a complex NRM problem. This approach is also likely to offer more certainty over outcomes and may provide more flexibility in responding to changed conditions. Some instruments are also likely to function more effectively when used in conjunction with others.

#### **4.2.3 The Principal-Agent Problem**

A problem arises when individuals or organisations act on behalf of others. In these cases, agents are tempted to act opportunistically in the knowledge that they will get away with it since the principals are not well informed or remain “rationally ignorant” about the details of the agent’s actions (Kasper and Streit 1998). This situation is known as the moral hazard problem, that is, when an agent changes behaviour because they know they are not being observed. The principals incur high monitoring costs if they want to find out what the agents are actually doing. Hence, there exists a situation of asymmetric information, that is, where the agent has more information (relevant to the transaction) than the principal. Consequently, agents may get away with shirking some of their duties when they could work harder. When this logic is applied to government, citizens – the principals – often do not get from government officials what they want because parliamentarians and officials pursue their own purposes. This is known as the “principal-agent problem”, a consequence of the knowledge problem (Kasper and Streit 1998, p.65).

The challenge of public sector management is often characterised as a principal-agent problem, where the problem for society (as the principal) is to ensure that government employees (the agents) are working in their interests. People typically have incentives to focus on their own interests (such as promotions, more staff) than the interests of the principal. The challenge for public policy makers is to design mechanisms where the incentives that face individual employees align with the wider outcomes desired.

Thus, the principal-agent problem lies in the difficulty, or perceived difficulty, of ensuring that those at lower levels within a governance structure will act in the best interests of the principal. Wallis and Dollery (1999, p.69, cited in Marshall 2001, p.161) states that a principal-agent relationship:

...comes into being whenever a principal delegates authority to an agent whose behaviour has an impact on the principal's welfare...the principal economises on scarce resources by adopting an informed and able agent, but simultaneously takes on the risk that, since the interests of the principal and agent will never be identical, the agent may fail to maximise the wealth of the principal... agents almost always possess more information about the task assigned and the relative efficacy of their own performance. Agents often take advantage of this asymmetry of information by engaging in shirking or opportunistic behaviour ...

Thus a social contract can be understood to entail civilians, as the principals, engaging governments, as their agents, to help them resolve their assurance problems. They delegate to governments various powers on the condition that they are used for this purpose only. However, this inevitably provides considerable scope for these powers to be used for unauthorised purposes. The assurance problems of civilians are therefore lessened only to the extent that they trust governments not to fail them. Moreover, if this trust is lacking then civilians will judge it less in their self interest to cooperate with efforts by government to help them to cooperate with one another.

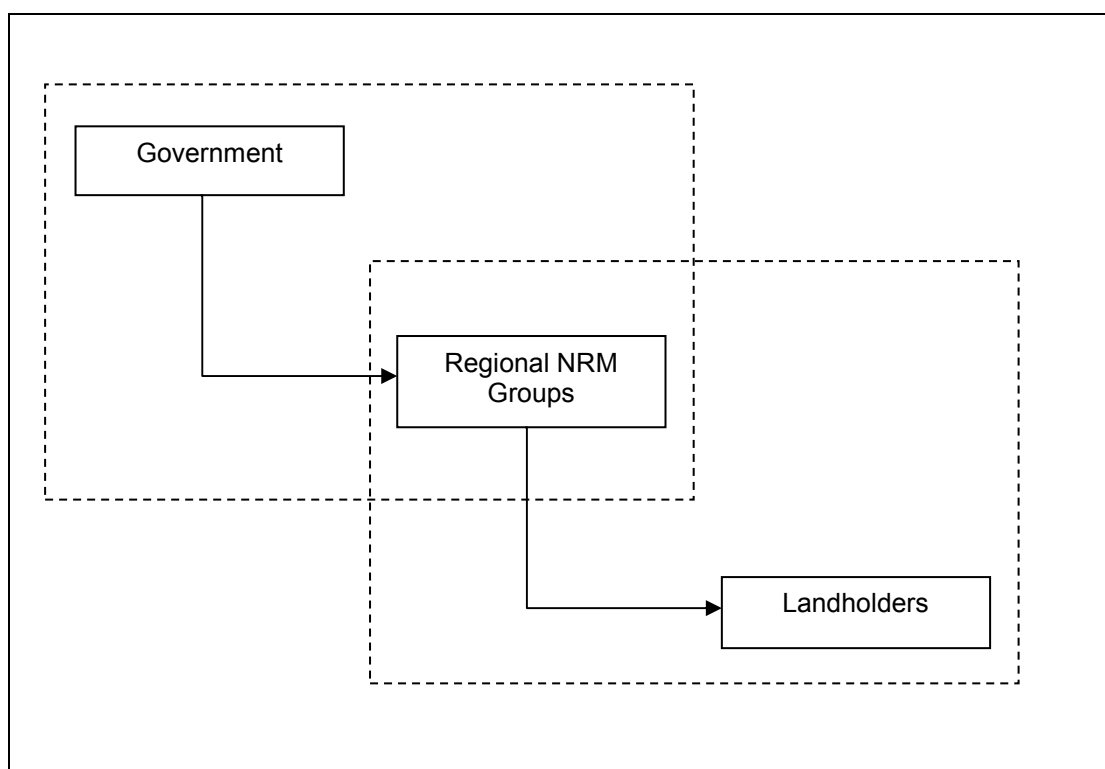
### ***Issues of Principal-Agent Problems***

Broadly framed, governments act as agents on behalf of the general community to develop and implement policies for managing natural resources and the environment in the region of interest. Citizens, as the principals, expect that the government will act in the community's best interest to ensure that funds are appropriated in the manner that delivers efficient and effective regional NRM outcomes. As regional NRM arrangements are being implemented, which involve the devolution of some authority and funding to community-based regional NRM groups to implement programs, it is clear that appropriate monitoring and evaluation systems will be required to ensure that NRM outcomes are achieved in

the most efficient and effective manner. More importantly, the question needs to be asked whether the principal-agent problem varies with institutional structure, and in turn, whether the regional NRM model is an effective way to address the principal-agent problem.

In light of these issues, it is apparent that there exist several layers of principal-agent problems with respect to regional NRM. The first is reflected in the community-government layer, which involves the community, as principals, delegating responsibility to public officials (government) to undertake management of natural resources and the environment. However, as governments embark on a process of devolving responsibilities back to regions or communities to develop and implement NRM policies and programs, a second layer of principal-agent problems emerge. This is manifested in the following relationships with respect to regional NRM: (i) Government (the principal) wants to ensure that regional NRM groups (the agents) perform actions; and (ii) Regional NRM groups (the principal) want to ensure landholders (the agents) perform actions (see Figure 4.4).

**Figure 4.4: Multi-level Principal-Agent Problems in Regional NRM**



The preceding discussion explored the nature of market failure and principal agent problems with respect to NRM dilemmas, and outlined a range of options for addressing such problems. The following section shifts focus to the overarching framework from which potential solutions to such problems can be managed and appropriately implemented. This broad framework can be conceptualised under the umbrella of ‘governance’. The type of governance approach adopted in a given context can have far-reaching implications on achieving NRM outcomes.

### **4.3 THE CONCEPT OF GOVERNANCE<sup>45</sup>**

This section introduces the general concept of *governance*. A more detailed examination of governance as it relates to institutional economics of interest in the case study focus of this thesis – and in particular, governance surrounding new institutional economics – is presented in section 4.5.

There appears to be a revival of interest in relation to the notion of governance. In the English language the term has existed since the fourteenth century and after a period of “being rather unfashionable, it experienced a renaissance in the latter part of the twentieth century” (Dore 2001, p.2). A key factor in this revival has been the need to distinguish between ‘governance’ and ‘government’. Jessop (1998, p.30) defines governance as the “modes and manner of governing”, and government as the “institutions and agents charged with governing”.

The literature also presents a range of other definitions. Edwards (2000) and Rhodes (1997, p.15) regard governance as the prerequisite structures and processes for an organisation to achieve its goals including the capacity of organisational actors to relate to each other and to its stakeholders. On a similar note, Kooiman (1993, p.2) relates governance to patterns that emerge from the activities of social, political and administrative actors and their purposeful efforts to guide, steer, control or manage aspects of society. Paquet (1997) also views governance as guiding and steering an organisation. Lowndes and Skelcher (1998,

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<sup>45</sup> This section explores the generic notion of governance. A more detailed examination of concepts of governance as it relates to institutional economics of interest in the case study focus of this thesis – and in particular, governance surrounding new institutional economics – is outlined in section 4.5.

p.318) argue that governance is both a political and administrative concept and propose a three-part typology of market, hierarchical and network modes of governance. Considine (2001) adapts this typology by proposing four ideal governance types: procedural, corporate, market and network. The OECD offers a definition which summarises many of these themes:

...governance is defined in terms of relationships, and thus includes more than public administration and the institutions, methods and instruments of governing. It also encompasses the set of relationships between governments and citizens, acting as both individuals and as part of or through institutions, e.g. political parties, productive enterprises, special interest groups, and the media (OECD 1999, p.19).

Rhodes (1997a) argues that policy networks have been fundamental in the shift from government to governance. He lists a number of shared characteristics of governance, including: reconfiguring the boundaries of the state which promotes interdependence between public, private and civil sectors; ongoing interactions between network members based on trust, the resource exchange, and negotiated processes and shared outcomes; and autonomy from but connection to the state to steer and manage (1997a, p.53).

Edwards (2001a, p.2) applies the term “participatory governance” to refer to the “structures and arrangements which support effective relationships across public, private and community sectors as they collaborate in decision making processes towards agreed objectives”. Amin and Thomas (1996, p.257) and Amin and Hausner (1997, p.19) use the term “interactive and negotiated governance” and provides a more comprehensive description of participatory decision making and policy development based on five elements:

- A high level of interest representation and organisation;
- A spread of decisional authority and autonomy;
- The state as an arbitrator and a facilitator between autonomous organisations;
- A dense network of vertical and horizontal channels of representation and communication; and
- A reliance on iterative dialogue for conflict resolution and policy consensus.

The concept has also come to be known as the body of rules, enforcement mechanisms and corresponding interactive processes that coordinate and bring into line the activities of the involved persons with regard to a concerted outcome (e.g. Fischer and Petersen 2004; Huppert *et al.* 2003). The term is also used in a variety of applications. Mehta *et al.* (1999, p.18) asserts that the notion of governance:

...has become something of a catch-all to describe the ways in which the activities of a multitude of actors, including governments, non-government organisations (NGOs) and international organisations, increasingly overlap. It describes a complex tapestry of competing authority claims.

Often there are attempts at distinguishing between different spheres – local, regional or national government – and governance, but this does not match the reality of the tapestry (Dore 2001). Domains are not always clearly defined and may regularly overlap (Rosenau and Czempiel 1992).

Under the banner of this ‘catch-all’ view there are other concepts linked to the notion of governance, including a focus on administrative functions. For example, a minimalist interpretation of governance refers to efficient administrative systems that are open and accountable to constituents, members, supporters, business partners, or shareholders (Dore 2001).

The Asian Development Bank (ADB) defines governance as “the manner in which power is exercised in the management of a country’s economic and social resources for development” (ADB 1999, p.3). For multilateral lending agencies such as the ADB and World Bank, governance is mainly focused on the government activity of its Developing Member Countries in its role as a multilateral aid donor for development. The ADB (1999, p.7) promotes pillars of “good” governance, increasingly used in the governance discourse:

- *Accountability* – the extent to which public officials are answerable for government behaviour;
- *Participation* – the extent to which people are involved in the policy-making process;

- *Predictability* – the extent to which a rule-based decision making system operates; and
- *Transparency* – the extent to which information on public sector decision making, policies, actions and performance is available to people.

Other views of governance are much broader than just those concerning government authority, of which the latter is defined by Leftwich (1995, p.428) as the “formal institutional structure and location of authoritative decision making in the modern State”. The broader definition includes the wider field of internal, external, civil, political and economic power. At this more general level, Dryzek (2000, p.120) notes:

...government in international politics may be defined as explicit and binding collective decision at the system level: Treaties, international courts, organisations such as the World Trade Organisation with the capacity to impose penalties on States for non-compliance, and the Security Council of the United Nations are all examples of government. Governance, in contrast, may be defined as the creation and maintenance of order and the resolution of joint problems in the absence of such binding decision structures.

Rhodes (1997) comments that governance signifies a change in the meaning of government, referring to a new process of governing; or a changed condition or ordered rule; or the new method by which society is governed. Newell (2000) suggests that governance is a term that has become popular in a context of globalisation in which governments are perceived to be less powerful and autonomous than they perhaps once were. He views governance as the collective attempts to manage and regulate social relations. Rosenau and Czempiel (1992) add that governance is merely government without the necessary involvement of governments. Similarly, Stohr (2001) views governance as a governing structure in which the public and private sector, and civil society cooperate to solve problems of a public socio-economic nature to construct a more equitable society. Hatfield-Dodds *et al.* (2007, p.3) assert that governance should not be synonymous with ‘government’, citing literature (e.g. Cashore *et al.* 2004; Marshall 2005) which outlines different non-state governance options, which “may often be more flexible and involve lower transaction costs than the imposition of new government



regulatory arrangements". By and large, the regional arrangements for NRM in Queensland reflects this approach where regional communities have been devolved some authority to plan and manage NRM and environmental programs.

Stohr (2001) introduces the concept of subsidiarity in order to re-assert the importance of multi-level public decision making power that begins at the local level and delegates power upward to higher levels of government. However, managing or governing effectively has increasingly seen governments cooperating with, or devolving more functions to, lower level actors such as civil society and the wider community. This is embodied in the principle of subsidiarity, which is explored in section 4.3.2.

Definitions of governance have moved beyond a fixation with law, coercion and formal political structures to incorporate a broader range of practices and management philosophies (Newell 2000). Under this approach, governance refers to a regulatory framework in a sphere of activity which functions effectively even though they are not endowed with formal authority. The essence of governance is its "focus on governing mechanisms which do not rest on resource to the authority and sanctions of government" (Newell 2000, p.3). Furthermore, the increasing usage of the term has been also taken to mark a transition to "a broad concern with a wide range of governance mechanisms with no presumption that these are anchored primarily in the sovereign state" (Jessop 1995, p.310). There is also an inherent acknowledgment that political power can be distributed externally from the state as well as within it (Goodwin 1998). Table 4.1 lists some key features of this notion of governance.

**Table 4.1: Key Features of Governance**

1. The blurring of boundaries and responsibilities for tackling social and economic issues
2. Autonomous self-governing networks of actors
3. The capacity to get things done
4. The exercise of authority within a given sphere
5. Accountability and transparency

(Source: Newell 2000)

The notion of governance has largely arisen from the need to have decision making 'without government' (Rosenau and Czempiel 1992; Dore 2001). This need arises in complex and interdependent situations, with unclear regulation mechanisms, but with great need for regulation. In the same vein, Young (1994, p.15) elaborates in relation to collective action problems:

Governance arises as a social or societal concern whenever the members of a group find that they are interdependent in the sense that the actions of each impinge on the welfare of the others. Interdependence is likely to become a source of conflict when the efforts of individual members of the group to achieve their goals interfere with or impede the efforts of others to pursue their own ends. It will be seen as a basis for cooperation, on the other hand, when opportunities arise to enhance social welfare by taking steps to coordinate the actions of the individual members of the group. In general, moreover, the higher the level of interdependence among the members of the group, the more pervasive and complex these collective-action problems become.

Work (2002a) ties together much of the definitions presented above in broadly defining the concept of governance as the system of values, policies and institutions by which a society organises collective decision making and action related to political, economic and socio-cultural and environmental affairs through the interaction of the state, civil society and the private sector. The term *governance* in this thesis rests with this broader conception as it applies to natural resource and environmental management. It is a multi-dimensional decision making process involving a wide range of actors interacting in various forms to achieve the desired NRM outcome (Dore 2001).

There has also been a growing emphasis on the role of informal systems of governance in relation to environmental and natural resource management matters. Newell (2000, p.5) notes that "the role of norms, rules and expectations is particularly important in bounding special behaviour for the collective good". A key factor lies with an understanding that institutions function not just due to reform of rules, procedures and routines, but because of the norms, expectations and customs that guide behaviour (Newell 2000).

As noted in the preceding discussion, governance functions are being increasingly carried out by actors other than the state. Newell (2000) suggests that this partly reflects an erosion of state sovereignty in a context of globalisation and neo-liberal reform. It also reflects the fact that the range and complexity of decisions that modern governments have to make has expanded to such an extent that governments have looked to NGOs and industry to carry out some of their work for them. This can be a helpful and efficient way of delivering services to the community. In the area of natural resource and environmental management, there is a growing emphasis on cooperative environmental governance, involving public-private partnerships between businesses, NGOs and within different sectors of government (Glasbergen 1998). Accompanying this participatory shift to the NGO sector has been an increased recognition of the importance of ‘whole-of-government’ approaches involving collaboration between different levels of government and NGOs in order to effectively achieve desired outcomes on a range of matters. This aspect of governance is explored in the following section.

#### **4.3.1 Joined-up Approaches to Governance**

As natural resource governance moves towards greater collaboration and public participation, governments are also under increasing pressure to collaborate between agencies to improve policy and decision making to achieve outcomes.

Head (2005a, p.6) asserts that one key challenge for participatory and collaborative governance lies with the rigidity of traditional bureaucratic “silos” (regulatory and organisational) that tend to dominate the public sector in each of these arenas. These silos are the result of the Progressive ideology of *departmentalism*, where governments are divided into different specialist departments or agencies to facilitate specialisation of function, increase efficiency, and clarify accountabilities. Departmentalism tends to increase governmental insensitivity to issues that do not lie solely within their departmental functions, and can stifle the development of whole-of-government policy and efficient delivery of services (Shergold 2004; Richards and Kavanagh 2000).

Although holistic approaches are being acknowledged as desirable, there are particular challenges around whether the government sector has sufficient capacity to coordinate its own actions across different policy and regulatory domains, and how effectively it can pursue holistic government coordination (MAC 2004; Jackson 2003). Yet, many of the complex problems emerging that are demanding attention, such as those in the realm of NRM, cut across many traditional bureaucratic spheres and agencies (Head 2005a). Meijers and Stead (2004) argue that environmental policy-making in particular requires policy integration. Newman (n.d, p.9) adds:

...the concept of sustainability integrates environmental, economic and social into one (not balancing them off against each other) and must therefore be integrative

Hence, attempts to achieve sustainable, triple-bottom-line outcomes necessitate broader and more collaborative approaches (McKenzie 2003).

‘Whole-of-government’ or ‘joined-up’ government is essentially a problem solving strategy designed to deal with such issues or problems that are not confined to a single department and which need an interdepartmental approach to manage (Clark, 2002; Ling, 2002; Meijers and Stead, 2004; Mulgan, 2002; Peters, 1998). By working across agencies, the links between social, economic and environmental well-being are more likely to be recognised and managed. Recognising linkages across departments can lead to improved outcomes by developing shared perspectives and combined responses. This is increasingly considered to be critical in developing a comprehensive understanding of issues and development of policies (McKenzie 2003).

There is a growing body of literature encouraging the use of whole-of-government, joined-up government and other policy integration approaches to achieve strategic governance outcomes (e.g. Jackson 2003; MAC 2004; Rhodes 2000; Reddel 2004; Ling 2002; Reddel and Woolcock 2004). Such approaches are characterised by coordinated and collaborative decision making between government departments or agencies. Whole-of-government decision making aims to improve coordination and information exchange within and across governments (Edwards 2002). Pollitt (2003) asserts that whole-of-government approaches have the following goals: (i)

to eliminate inconsistencies between policies; (ii) to more strategically use resources; (iii) to create synergies between stakeholders or departments to improve cooperation and information exchange; and (iv) to offer communities less fragmented and more collaborative access to government services and decisions. Accompanying this approach are desires to achieve triple-bottom-line<sup>46</sup> outcomes (McKenzie 2003). The calls for greater policy integration are coming from a number of areas, one of the most prominent being natural resource and environmental management, where integration is frequently recognised as being crucial for achieving sustainable development (Meijers and Stead 2004).

Such calls for changes in the mode of governing from one of government to *governance* involves a shift towards more inclusive, participatory approaches; the devolution of government business to the regional or other local levels; and the blurring of boundaries between state and society as citizens are provided with a greater opportunity to engage with government and influence policy decisions on a range of matters. This does not mean there is no longer a role for government, but recognises that there are net benefits in including other stakeholders in policy development and implementation.

More specifically, there is a growing trend calling for greater inter-agency collaboration and community involvement in shaping regional policy decisions on matters such as the governance of natural resources and the environment. This trend reflects the broader shift of governments working more closely with the community of interest to improve regional community outcomes and is coupled with policy reforms centred on the discourse of “devolution”, “inclusion”, “partnerships” and “community” (Reddel 2004, p.129).

Accordingly, the term *joined-up government* has been invariably used as an umbrella term concerning the coordination of “...activities across organisational boundaries without removing the boundaries themselves. These boundaries are inter-departmental, central-local, and sectoral” (Ling 2002, p.616). The concept

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<sup>46</sup> Policymakers are increasingly expected to apply the triple-bottom-line, that is, to take into consideration social, economic and environmental implications of decisions. It is not the aim of this thesis to contribute to discussions on the process of weighing up each of the components, but advocate that policy decisions should take into account of these overlapping areas.

follows on from what has been termed *holistic government* in the literature on public sector management (e.g. Meijers and Stead 2004), which refers to an understanding that is greater than the mere piecing together of the partial perspectives (OECD 1996, p.29), much of what characterised Progressive ideology as discussed in chapter 2. A similar concept is that of “cross-cutting policy making” (Cabinet Office 2000), which addresses issues not captured by sectoral departments and their objectives. The concept of regional NRM is an example of such a cross-cutting issue, wherein a range of different parties are required to act collaboratively towards achieving desired NRM outcomes.

Effective governance, by way of improved integration of policy or other avenues, involves not only formulating appropriate policies across a range of levels but also ensuring that policies in different sectors are coordinated to be more coherent and consistent. This is the philosophy behind the concept of joined-up government. In the context of NRM decision making, this requires that policy decisions in areas that can influence sustainable resource use (such as trade, energy and agriculture) are directed by the need to support sustainable NRM outcomes (Newell 2000). Policies in one sector often have spill-over effects on other sectors, and therefore cross-sectoral coordination is key to achieving the desired objectives. Again, it needs to be made clear that institutional realities are such that “sectoral anchors” often tend to maintain the status quo and hence, constrain the degree of cross-sectoral collaboration that is possible (Newell 2000, p.6). On this point, parallels can be drawn with the idea of ‘lock-in’ proposed by Arthur (1990; 1989) on the adoption and development of new technologies, and applied by Marshall (2005) in the collaborative environmental governance literature, where the increasing-return dynamics that make group cooperation possible also make it difficult to achieve due to well-established past patterns of behaviour.

Jackson (2003) asserts that governments no longer just provide solutions to problems but now work closely with communities to solve them. This is in contrast to the traditional progressive, top-down hierarchical system where government ‘experts’ and their agencies determined, in isolation from the community, the most

appropriate way to resolve societal problems (Owens 2000; Brown and Keast 2003, p.108). This represents a re-alignment of roles and responsibilities that acknowledge the 'wickedness' and complexities surrounding natural resource governance issues. The regional NRM governance arrangements reflect such a policy shift.

In Australian natural resource governance, the establishment of the NHT and NAP are two major programs through which whole-of-government action is being undertaken. Relevant federal government agencies jointly administer these together with state, territory and local governments. Community groups, industry and landholders are also involved through negotiated arrangements for establishing regional NRM groups, accompanied by associated accountability, administration and program delivery functions.

#### **4.3.2 The Subsidiarity Principle**

Simply devolving functions to NGOs and other non-state actors is not sufficient for achieving *good governance*. Making decisions at the appropriate level is critical. For people to feel a sense of ownership and participation in the process, decisions need to be made as near to the target constituency as possible. This notion is echoed in the principle of subsidiarity, which offers insight into deciphering the most appropriate level at which to make a decision. It requires that governance functions be devolved to the lowest level at which such functions can be implemented satisfactorily (Young *et al.* 1996). Schumacher (1973) maintains that the onus needs to be placed on those wishing to supplant a lower level of a governance function to demonstrate that a lack of capacity exists at that level to carry out the function satisfactorily, and that a higher level would be more capable. In the context of the European Union for example, where the principle has been institutionalised at the constitutional level (e.g. Connor and Dovers 2004), Newell (2000, p.5) observes:

...policy is guided by the desirability of making policy at the lowest level possible and only deferring decision-making to a higher authority where necessary and appropriate or where issues are beyond the competence (authority) of more local institutions.

In the context of natural resource governance, the main issues concern when to scale up or down, and how the different needs of policy-makers and communities are negotiated and accommodated. This involves being clear what formal political organisations are appropriate to determine which decisions are best made at the local level - establishing a clear and workable division of competence – comprising effectiveness (which level does it make more sense to make decision) and efficiency (which level has lowest net costs). In reality, however, choices are often complex and involve trade-offs, and the lines are not always clear-cut. A certain level of political will is required to make the difficult decisions to challenge traditional institutional boundaries. Of critical importance is the context of how decisions are made and the potential implications and impacts of such decisions. For example, do lower levels take account of impacts beyond their immediate region? This is particularly important for natural resource governance matters that have large scale externalities such as the impact of sediment on the Great Barrier Reef or the impact of tree clearing on carbon emissions or biodiversity.

#### **4.3.3 Decentralisation**

There have traditionally been a number of arguments advocating the centralisation of government services as a particular governance structure. The key economic advantages relate to benefits arising from economies of scale (e.g. one set of policy makers at the national level rather than multiple ones at different levels), and benefits arising from consistency (e.g. the benefits to business and communities from having a consistent institutional framework). This mentality also traces its lineal influence from the legacy of a Progressive Era mindset.

However, decentralisation and devolution have become “dominant policy trends in natural resource management” in recent decades (Birner and Wittmer 2004, p.667). This trend is consistent with the principle of subsidiarity, and accompanied by a marked shift towards greater public participation and collaboration on NRM policy matters, together with various forms of program and service decentralisation (Reddel 2002, p.6).



Decentralisation relates to the role of, and relationship between, central and sub-national institutions, and whether they are public, private or civic. Some 60 countries around the world have pursued decentralisation as a means of improving governance across a range of policy sectors, including NRM (e.g. Lane 2006; Agrawal 2002). Many developing countries have embarked on, or are intending to pursue a path that would see some transfer of authority to local entities (e.g. Dillinger 1994). For example, Agrawal (2002) asserts that governments in over 50 countries have transferred some degree of forest management and decision making authority to local user groups, and Pretty (2003) suggests that globally up to 500,000 new local management organisations have been established since 1990.

Decentralisation has also become a central issue on the political agenda of developed countries such as those in the European Union, with more consolidated political systems (Oates 1999). The World Bank (2000) comments that there has been widespread movement towards devolution, transferring political, fiscal, and administrative responsibilities towards sub-national levels of government. Decentralisation has thus been viewed as a potential solution to many of the struggles of governance (Suzuki 2005).

Armstrong and Taylor (2000) suggest a few reasons that may explain the increasing interest in decentralisation of governance arrangements. The first of these is belief that decentralisation offers an effective means of increasing the efficiency of public expenditure. Second, it is a reaction against large centralised bureaucracies in both developing and developed nations, a means of “rolling back the boundaries of the state” (Meinzen-Dick and Knox 2001, p.1). Third, it is suggested that decentralisation is a product of a demand for closer democracy which could promote public participation in social policy and administration (Tunstall 2001). The latter is also referred widely in the literature as *civic regionalism* (Lane 2006).

Oates’s (1972) seminal paper adds support in his discussion of trade-offs between centralised and decentralised provision of public goods. Oates’s Decentralisation Theorem states that in the absence of spillovers or externalities (and of cost-savings from centralised provision), decentralisation is preferable to uniform

provision of services. Deriving from public choice theory, with roots in the neoclassical school of thought (Canaleta *et al.* 2004), it is suggested that decentralisation can improve efficiency in the allocation of resources by better satisfying the needs and preferences of local citizens, through better knowledge of these preferences (Oates 1972).

The main arguments supporting the decentralisation thesis are that it produces fair and equitable outcomes and that bringing decision making to the local level is more functional than central government control because it provides for solutions that are tailored to the local situation (Friedmann 1998). Cocks (2003) asserts that devolution of authority to local communities and voluntary associations provides an effective means of harnessing local knowledge and agency in both plan making and implementation.

Decentralisation raises a number of challenges, both in terms of the degree of flexibility in policy management that it can produce in practice and the capacity to guarantee public accountability. Recent reforms demonstrate that greater flexibility through decentralisation may be associated with a multiplication of intermediaries, blurring lines of responsibility and creating weaknesses in monitoring and reporting (OECD 2003). There is also a need to connect authorities at the regional level and actors involved in on-ground decisions at the local level. Partner relationships between government and civil society are often established across levels and between the public, private and civil-society sectors (OECD 2003.).

Stohr (2001) notes on the need for decentralisation, that different problems (and hence, different communities) require different solutions. Traditional centralised governments are not able to address the myriad of different situations that occur at the local level and new institutional systems are needed. Despite this, governments have traditionally tended to become bigger, more centralised and remote. To solve local problems, new systems of government must be more specialised and involve civil society and the private sector. Nonetheless, the decentralisation of governance has become influential across the policy sciences in

recent years (Lane *et al.* 2004). It is being widely viewed as a tool to improve various aspects of local governance in Australia and internationally, because it brings decision making closer to where problems and individuals are (OECD 2003).

Suzuki (2005) acknowledges the seminal definition of decentralisation presented by Rondinelli *et al.* (1983, p.9), who define the concept as:

...the transfer of responsibility for planning, management and resource raising, and allocation from the central government and its agencies to: (a) field units of central government ministries or agencies, (b) subordinate units or levels of government, (c) semi-autonomous public authorities or corporations, (d) area-wide, regional or functional authorities, or (e) non-governmental private or voluntary organizations.

In the same vein, the United Nations Development Program (Work 2002a, p.5) defines decentralising governance as:

...the restructuring of authority so that there is a system of co-responsibility between institutions of governance at the central, regional and local levels according to the principle of subsidiarity, thus increasing the overall quality and effectiveness of the system of governance, while increasing the authority and capabilities of sub-national levels.

The concept of decentralisation has its origins in the principle of subsidiarity, which proposes that functions (or actions) should be taken at the lowest, most appropriate institutional or social level within the institutional hierarchy at which it can be most effective (Connor and Dovers 2004; Stohr 2001). Accordingly, Work (2002a, p.5) observes that decentralisation thus involves:

...the transfer of responsibility for planning, management and resource raising and allocation from the central government and its agencies to the lower levels of government.

The pressure for decentralisation in many parts of the world is often driven by the need for improved service delivery (Dillinger 1994). On account of its many failures, central governments in many countries are losing a great deal of legitimacy, are viewed as remote and insensitive to local issues, and likely to incur higher transaction costs in the implementation of policy (Bardhan 2002).

A decentralised approach to governance enables solutions to be tailored to local conditions and circumstances, thus enhancing the prospects of achieving regional

outcomes (Bardhan 2002; 1996). Ahmad and Mansoor (2002, p.3) note, on evaluating the process of decentralisation in a developing country context:

Decentralisation offers considerable opportunities for better governance. In principle, decentralisation could improve the local provision of public goods, so that there were tailored to local preferences and became a local responsibility.

Frey and Eichenberger (1999, p.16) note that decentralisation can also increase institutional adaptability<sup>47</sup>. With respect to institutional decentralisation and path dependency, North (1990, p.80) asserts that “adaptive efficiency” increases with decentralisation. Adaptive efficiency provides “incentives to encourage the development of decentralized decision making processes that allow societies to maximise the efforts required to explore alternative ways of solving problems” (North 1990, p.81). Ostrom (1999a) adds that decentralisation can also increase societal capacity to learn from past experiences and trials since those individuals with the greatest interest in overcoming local collective action problems can learn and adapt with direct feedback from a specific local setting. Hence, decentralisation can allow a “better fit” between the group of people affected by a decision and the group of people with rights to participate in that decision (Marshall 2005, p.62). Centralised approaches on the other hand, hamper inductive learning in complex settings as they “obscure through aggregation and averaging...the patterns...of the system” (Wilson 2002, p.345, cited in Marshall 2005, p.62).

When there are problems of cooperation among factions, devolution that leads to local jurisdictions along factional lines may also be able to remove obstacles to government decision making and public acceptability of government decisions, and in general, facilitate collective action and cooperation (Meagher 1999). To realise benefits of decentralisation, however, international experience suggests that the process should be

...properly sequenced and phased. Ill-sequenced reforms can threaten service delivery and result in capture by local interests, thereby threatening good governance (Ahmad and Mansoor 2002, p.3).

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<sup>47</sup> The concept of adaptability is further explored in section 4.4.

Various forms of decentralisation are advocated as a means of locating governance closer to the people so as to enhance democracy and harness the agency of the community, reducing the level of regulatory intervention by the government (Lane *et al.* 2004). Work (2002b) identifies three main types of decentralisation: political, administrative, fiscal. These can take four forms: devolution, delegation, deconcentration, and divestment. Box 4.1 outlines some definitions of decentralisation and devolution. Accordingly, the regional NRM arrangements of interest in this thesis can be classified as *devolution*.

In a case study review of different types of decentralisation, Stohr (2001) notes:

...deconcentration, while maintaining a higher degree of centralised control over decision-making through line ministries, results in better resource allocation than devolution; devolution, however, seems to encourage innovation in the creation of public/private partnerships and alternative financing strategies. At the same time, coordination between the various government departments and ministries may break down in the case of devolution. What passes for decentralization in the name of local control, looks more like deconcentration and can be viewed as a strategy to increase the presence of the central government in order to further its policy goals.

Stohr *et al.* (2001) caution that decentralisation is not a panacea to solve all problems, such as lack of participation, poverty and inequality. On the contrary, the institutionalisation of decentralised decision making whether fiscal, administrative or political, needs to be adapted to the specific needs and requirements of each context.

Moreover, Newell (2000) asserts that past attempts at decentralisation have demonstrated that merely devolving decision making to lower levels of authority does not always result in more equitable outcomes. Local elites are often able to consolidate power at lower levels thereby reproducing the same patterns of power (Lane 2006; Lockie 2001). This is an example of the classic principal-agent problem which was outlined in section 4.2.3, where the agent and principal have differing individual objectives and the principal cannot easily determine whether the agent's reports and actions are in line with the principal's objectives or are self-interested misbehavior (Milgrom and Roberts 1992).

#### **Box 4.1: Devolution and Decentralisation – Some Definitions**

Decentralisation has been used to characterise devolution of power within state bureaucracies, privatisation, and increased political power to local authorities. Knox and Meinzen-Dick (2001) discuss decentralisation as part of a group of policies that are closely related to each other. These different policies include:

- *Deconcentration*: the transfer of decision making authority to lower-level units of government;
- *Decentralisation*: the transfer of decision making and payment responsibility to lower levels of government;
- *Privatisation*: the transfer of public sector functions to the private sector or private individuals;
- *Devolution*: the transfer of rights and responsibilities to user groups at the local level.

Devolution of resource rights broadly refers to a process by which state control over the use of natural resources is gradually and increasingly shared with local communities. This can happen with or without bureaucratic or political decentralisation. It is generally accompanied by the creation or strengthening of a subset of local institutions.

(Source: Shyamsundar *et al.* 2005, p.2)

However, Newell (2000, p.6) adds that decentralising governance functions to lower levels can facilitate local level outcomes as a result of improved channels of communication and openness:

Nevertheless if officials come into contact with the people they are meant to be serving, they feel under more pressure to act in the public interest. They are less insulated from popular concerns than national level policy-makers. Politics and decision-making become more visible and intelligible in a way that encourages the organisation of civil society groups to seek to exercise influence. Enhanced flows of information between policy-makers and groups competing for influence also creates a degree of openness and more points of access, which in turn can improve the responsiveness of institutions to citizens concerns.

#### **4.4 ADAPTIVE MANAGEMENT**

The process of devolution of governance function to lower levels including local communities takes considerable time and effort in order to develop the necessary local capacity (Ostrom 2000a; Knox and Meizen-Dick 2001). Knox and Meizen-Dick (2001, p.47) add that hasty devolution processes carry a high risk of “shoddy implementation imposed in a top-down fashion”. Given the foregoing consequences of ill-timing and inappropriately devolving governance function to lower levels, growing support of ‘adaptive’ processes have been advanced as a way

forward (e.g. Hatfield-Dodds *et al.* 2007; Marshall 2005; Folke *et al.* 2005; Dovers 2001).

The idea of 'adaptive management' is emerging more often in policy debate and research into environmental and natural resource governance (e.g. Marshall 2003; Bellamy and Johnson 2000; Olsson *et al.* 2004; Berkes 2002; Wilson 2002; Wondolleck and Yaffee 2000). This follows from acknowledging that the pursuit of improved environmental and NRM outcomes is a complex task which poses significant challenges, necessitating that policy decisions be made without complete knowledge (Marshall 2003). It advocates for a process of continuous learning from past policy 'experiments' that have been adopted (Berkes and Folkes 1998, cited in Marshall 2003, p.1).

Observing from environmental projects in the context of international development, Mansuri and Rao (2004, pp.50-51, emphasis added) state that effective community-based development:

...requires slow, gradual, persistent *learning by doing*, with a project design that gradually adapts to local conditions by learning from the false starts and mistakes that are endemic to all complex interventions... requir[ing] careful evaluations coupled with phased-in scaling up with constant adaptation...

Marshall (2005, p.59) observed accordingly:

Proponents of adaptive management recognize that the choice between institutional options for a given problem should not be determined solely by their immediate contributions to solving the problem, but also by the opportunities they offer to learn about the problem.

The concept of adaptive management has undergone much theoretical development and practical application since its conception in 1978 after the publication of "Adaptive Environmental Assessment and Management" by C.S. Holling (1978) which critiqued science based "centralised expert management" practices that largely disregarded the complexity of ecosystem processes (Hatfield-Dodds *et al.* 2007, p.2). The idea was initially advanced as an approach to manage the harvest of fisheries and forests by applying a systems model to support management actions, with policies applied experimentally allowing for a process of

ongoing policy assessment and review (Jacobson 2003). This experimental approach eventually resulted in a more general theory of system dynamics and an understanding of interdependent social-ecological systems (Holling and Meffe 1996; Gundersen and Holling 2002). Hatfield-Dodds *et al.* (2007) remark that this systems approach overlapped with work conducted by Elinor Ostrom (e.g. Ostrom *et al.* 1999; 1992) on traditional institutional arrangements and social dynamics of NRM.

The concept of adaptive management has been applied in a range areas, including the management of grasslands (e.g. Allen 1997; Salwasser 1999), ecosystems (e.g. Lee 1995; Walkerden and Gilmour 1996), restoration projects (e.g. Light and Blann 2000), National Parks (e.g. Agrawal 2000; Bunch 2000), and conservation areas (e.g. Innes *et al.* 1998; Mertsky *et al.* 2000).

Marshall (2005) maintains that mainstream (neoclassical) economics is inappropriate for analysing collaborative environmental management because it assumes problems relating to institutional design can be solved optimally at the outset no matter how complex the problems are. Marshall (2005, p.4) adds that this is in stark contrast to the widely accepted view that collaborative natural resource management involves:

...such complexity that we can only hope to discover its optimal design for any context by learning gradually from experience – via a scientific process of institutional experimentation known as *adaptive management*.

Effectively, mainstream economics ignores any value garnered from experience and learning, a key point that proponents of adaptive management treat as critical to informing future institutional decisions (Marshall 2005).

Marshall (2005) alludes to the notion of path dependency of institutional choices which is an important point for consideration in such a process of *learning by doing* espoused by adaptive management. North (1990) argues that current choices of institutional options need to consider implications for future institutional adaptability. He recommends 'adaptive efficiency' as the choice criterion, which refers to:



...the willingness of society to acquire knowledge and learning, to induce innovation, to undertake risk and creative activity of all sorts, as well as to resolve problems and bottlenecks of the society through time (North 1990, p.80, cited in Marshall 2005, p.61).

This is because path dependency reduces institutional adaptability. Marshall (2005, p.61) elaborates:

As a result of the combined effects of internal and external economies, institutional choices are normally path dependent. After a particular institutional option is selected...it becomes more costly to revert to an alternative option than it would have been to adopt that alternative in the first place. Path dependency thereby reduces institutional adaptability

In contrast with an atomistic-mechanistic system characterised by unchanging relationships between likewise unchanging components, the components of an adaptive system and the relationships between them are continually adapting to one another (Marshall 2005, p.58). This enables flexibility and innovativeness in arriving at optimal governance arrangements to address the complexities of issues surrounding natural resource governance. Extricably linked with this flexibility component for adaption is the notion of *resilience*.

Resilience has generally been associated with ecological systems, but there is growing interest to apply it to institutional governance arrangements for NRM. Resilience refers to the capacity of a system to absorb recurrent natural and human disturbances and continue to reorganise without slowly degrading or changing into less desirable states so as to retain and improve function, identity, structure and feedbacks (Folke *et al.* 2004; Walker *et al.* 2004; Gunderson and Holling 2002; Berkes *et al.* 2003). This notion of resilience also has links to the creation of governance capital<sup>48</sup>. Folke *et al.* (2005) assert that emerging theories and approaches to environmental and natural resource governance indicate the importance of assessing and managing resilience. Hence, resilience also refers to the extent to which an institutional structure has the capacity for adaptation through learning by doing, reorganisation, and renewal in response to change (Berkes *et al.* 2003; Carpenter and Gunderson 2001). As a result, institutions can incrementally improve in form and function, and over time.

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<sup>48</sup> The concept of governance capital is introduced in chapter 5.

As human values toward natural resources and the environment vary over time, planning institutions need to acknowledge this variation and apply flexible planning methods (Lachapelle *et al.* 2003). Wildavsky (1973, p.129) notes that “planned decisions often have unplanned consequences”, and in the face of considerable uncertainty (e.g. Mehta *et al.* 1999) concerning the social, ecological and economic spill-over effects of natural resource governance decisions, relevant institutions (and institutional design) need to exhibit a degree of flexibility (Dryzek 1987; Paehlke and Torgenson 1990). Flexibility also implies an ability to be resilient in responding to learning and experiences engendered by different policy decisions and approaches to planning and management of the environment and natural resources, of which the concept of adaptive management readily conforms.

#### **4.4.1 Adaptive Governance**

In recent years, and following on from developments in the adaptive management literature, the evolution of more general governance principles and arrangements have emerged that incorporate adaptive, learning by doing processes in achieving sustainable development outcomes (e.g. Brunckhorst 2002; Olsson *et al.* 2004). This has been prompted in part by case studies revealing that implementing the principle of adaptive management has not been as straightforward as was originally envisaged (Brunner *et al.* 2005; Allan and Curtis 2005, cited in Hatfield-Dodds *et al.* 2007).

Building on the concept of adaptive management, where it was acknowledged that the capacity to adapt to and influence change was an important component in a social-ecological governance systems, Dietz *et al.* (2003) proposed the concept of *adaptive governance* to expand the focus from adaptive management of ecosystems to address the broader social contexts that enable ecosystem-based management. Thus, adaptive governance has emerged as a concept that focuses on the evolution of formal and informal institutions for the management of common pool natural resources and environmental assets that provide ecosystem services (Hatfield-Dodds *et al.* 2007). Folke *et al.* (2005) assert that adaptive governance is operationalised through adaptive co-management systems in which

the role of social capital, positive feedback relationship dynamics, learning, and trust building are emphasised which are much in the same vein as the policy thrust towards civic regionalism and regional NRM in Australia.

#### 4.5 INSTITUTIONS

The foregoing discussion has outlined the generic notion of governance, with particular emphasis on exercising governance functions at the most appropriate level in relation to decentralisation as prescribed by the subsidiarity principle and operationalising these using an adaptive governance framework. Attention now focuses on the vehicle through which natural resource governance outcomes can be achieved under such a framework. The mechanism for achieving these governance outcomes are *institutions* (Williamson 1996). Coase (1984, p.1) notes accordingly:

In the real world, to influence economic policy we work through institutions. The choice in economic policy is a choice of institutions. And what matters is the effects that a modification in these institutions will actually make in the real world.

Natural resource management and environmental outcomes – or the failure to achieve the desired level of such outcomes to be more precise – may be the result of a mismatch of existing institutional structures that have not enabled the realisation of socially optimal environmental outcomes. In the literature, institutions are considered to be essential in sustainable livelihood adaptation and NRM, and an understanding of institutions is now viewed as critical to successful policies in this area (e.g. Mehta *et al.* 1999). It is therefore useful to further explore this notion of institutions at the fundamental level where the ‘production’ of environmental ‘goods’ can be influenced by the relevant institutional arrangements present. Institutions for natural resource governance and the role they play in the daily economic interactions between individuals and firms are discussed in this section.

Human interactions depend on some form of trust which is based on an order that is facilitated by rules banning unpredictable and opportunistic behaviour. These rules are called institutions, and these institutions “reduce the costs of

coordinating human actions and therefore are of central importance to understanding human interaction” (Kasper and Streit 1998, p.3).

To understand the importance of institutions and their respective formal and informal arrangements, it is useful to explore various definitions in the literature.

North (1984, p.8) asserts that:

...institutions consist of a set of constraints on behaviour in the form of rules and regulations; and, finally, a set of moral, ethical, behavioural norms which define the contours and that constrain the way in which the rules and regulations are specified and enforcement carried out.

Ostrom (2005) also views institutions as including rules and norms. Hatfield-Dodds *et al.* (2007, p.3) define such rules and norms as referring to:

...formal enforceable principles, such as laws established by statute or common law precedent and backed by various forms of legal sanction. In some cases analysis will distinguish between ‘rules in operation’ (that impact on behavior) and ‘rules in law’ (which are not necessarily complied with or enforced). Norms refer to shared attitudes, values, and cultural traditions which are maintained and transmitted by a wide variety of positive and negative rewards (such as esteem, access to resources, social support, and risk sharing arrangements).

Others define institutions as “the set of ordered relationships among people which define their rights, exposures to the rights of others, privileges, and responsibilities” (Schmid 1972, p.893). Bromley (1989, p.41) maintains that institutions fall into two classes: “conventions”, and “rules or entitlements”, while Schotter (1981, p.9) views institutions as “regularities in behaviour which are agreed to by all members of a society and which specify behaviour in specific recurrent situations”. Kasper and Streit (1998, p.28) characterise institutions as “man-made rules which constrain possibly arbitrary and opportunistic behaviour in human interaction”.

North notes, accordingly, that “institutions are the humanly devised constraints that structure political, economical and social interaction...devised by human beings to create order and reduce uncertainty in exchange” (North 1991, p.97). North (1991, p.97) differentiates two types of institutions, consisting of both informal constraints (e.g. sanctions, taboos, customs, traditions, codes of conduct),

and formal rules (e.g. constitutions, laws, property rights). Similarly, Tridico (2004) adds that formal institutions are generally defined as the law sphere, with constitutions, regulations, and organisations. There is a direct connection between formal rules and the political-economy structure such as governance, property rights, and the judiciary system.

It is important to note the common thread of institutions being shared within a community, thereby acting to constrain opportunistic behaviour through sanctions for breaches of the rules (North 1990, p.3; Ostrom 1990, p.51). Only if sanctions apply will institutions make the actions of individuals more predictable. Rules with sanctions channel human actions in more predictable paths, creating a degree of order (Kasper and Streit 1998).

Williamson (1996; 2000b) contends that such definitions of institutions mainly operate at the level of the institutional environment, the so-called *rules of the game*. Williamson (2000b) classifies the institutional environment into “macro” and “micro” levels. The former falls within North’s (1991) broader definition. The second, more micro-analytical, level at which institutional economics works is at the level of institutional governance (Williamson 1996). This micro level deals with institutions of governance – market, quasi-market and hierarchical modes of contracting, or of managing transactions and seeing activities such as economic activities through.

Although both the institutional environment and the institutions of governance have evolutionary origins, the ramifications of each are different. It is at this second level of institutional governance that is the focus of this thesis, and more specifically, how different institutional arrangements can affect the transaction costs associated with achieving natural resource governance outcomes. Hence, transaction costs can be taken as a performance variable, where the institutional arrangement which minimises transaction costs is the most desired (e.g. Williamson 1985). Schmid (2004) suggests that institutions can be likened as the grease that makes all beneficial transactions possible, and notes that some (e.g. Coase 1937) view transaction costs as the sole reason for the existence of

institutions – if there were no transaction costs, no institutions would be necessary (Schmid 2004, p.85). As it is costly to transact, the existence of transaction costs necessitates the formation of institutions.

Certain types of institutions can minimise transaction costs and effectively facilitate beneficial economic transactions. Different institutional arrangements comprise different transaction costs and opportunity costs (e.g. institutional choice) profiles for each model. For example, the stock exchange exists to bring together potential buyers and sellers of traded stocks in a market economy. The exchange effectively reduces the transaction costs (e.g. cost of searching, coordinating, and obtaining information) which is necessary to facilitate the smooth functioning of the stock market. As noted above, other institutions including common law statutes, constitutions, regulations and codes of practice also provide a framework from which economic transactions can be properly defined, thus reducing uncertainty and transaction costs in exchange. The role and implications of transaction costs on different types of governance structures is the focus of the following section.

#### **4.6 TRANSACTION COSTS AND TRANSFORMATION COSTS**

It has been established in the preceding discussion that *institutions matter* because “institutions are the humanly devised constraints that structure political, economical and social interaction”, and “... institutions have been devised to create order and reduce uncertainty in exchange” (North 1991, p. 97). Ronald Coase (1960, cited in Wang 2003, p.1) asserts that *transaction costs matter* since “without...transaction costs, which is largely absent from current economic theory...it is impossible to understand the working of the economic system, to analyse many of its problems in a useful way, or to have a basis for determining policy”.

According to Challen (2000, p.28), “the central issue in examining alternative institutional structures is that of transaction costs...incurred in organising and coordinating human interaction”. Attention now turns to examining transaction costs and transformation costs which are intrinsically linked with the establishment and functioning of different institutional frameworks. This is an important

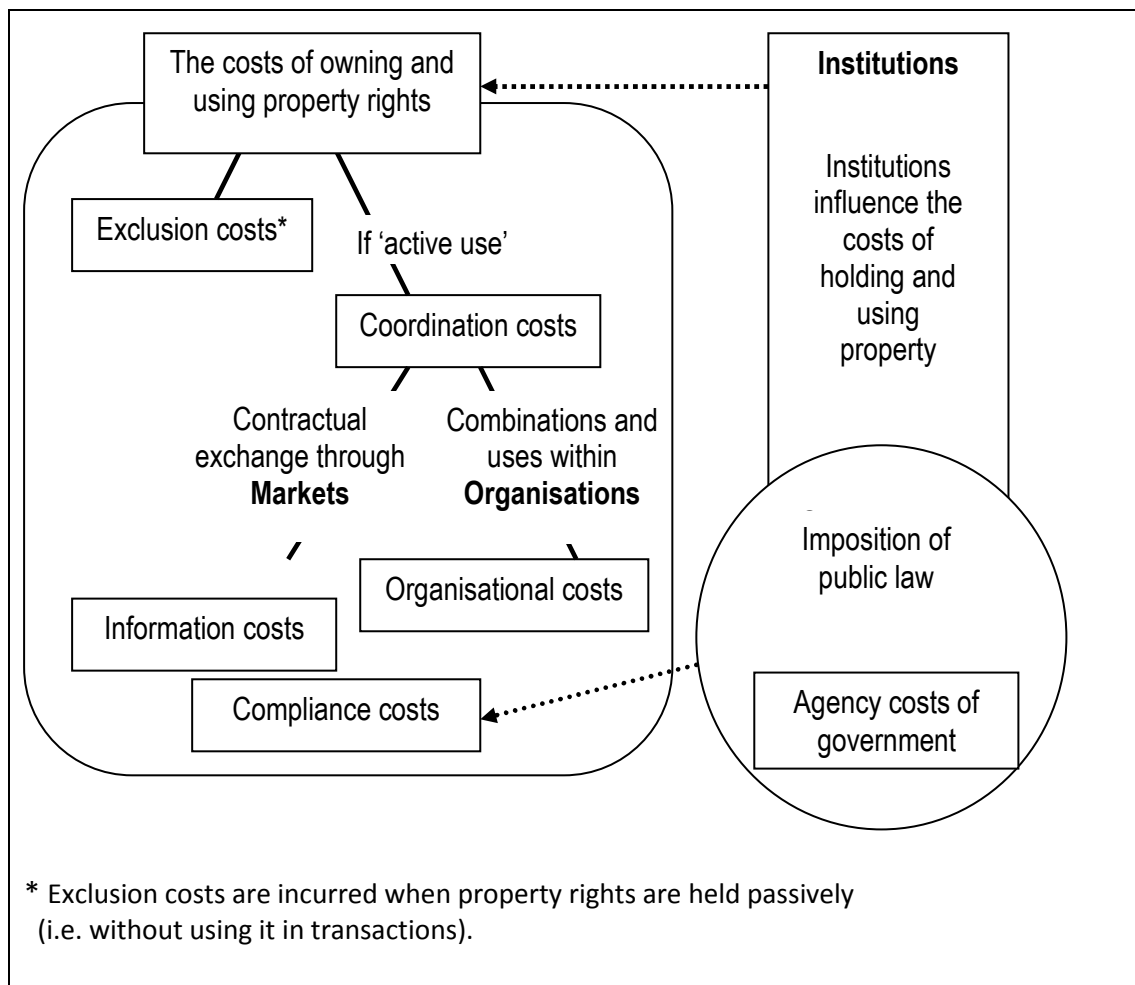
consideration as both costs and benefits need to be properly considered in the analysis of governance arrangements for NRM of interest in this thesis.

#### **4.6.1 Definition and Context**

A transaction cost can be viewed as a cost incurred in making an economic exchange. These costs include the costs of searching (i.e. information costs), coordinating, negotiating, contracting, agency costs, costs of shirking and opportunism, costs arising from uncertainty, costs of measuring quality of goods and quality of the output, costs of enforcement of property rights, costs of monitoring and detecting violations, and costs of compliance (i.e. enforcement) (Parada 2002). These costs are repeated across recurrent transactions.

Transaction costs include both monetary costs and non-monetary costs (e.g. time and effort invested in different government engagement processes). Arrow (1969, p.48) defined transaction costs as the “expenses for running the economic system”. Furobutn and Richter (1992, p.8) view transaction costs as “those costs that are connected with: (i) the creation or change of an institution or organisation, and (ii) the use of an institution or organisation”. Taking the economic system from a contractual point of view, transaction costs can be viewed as the cost of contracting, consistent with the second definition outlined by Furobutn and Richter (1992) above. These costs include the costs of drafting and negotiating contracts, and the costs of monitoring and enforcing agreements. Allen (1991) defines transaction costs as the resources used to establish and maintain property rights, which include the resources used to protect and capture (i.e. to appropriate without permission) property rights. Hence, transaction costs are incurred when property rights are put to active use, such as in conducting an economic exchange or combining them with other property rights. An outline of the various transaction costs that exist in a given institutional system is provided in Figure 4.5.

**Figure 4.5: Transaction Costs and Property Rights**



(Source: Adapted from Kasper and Streit 1998)

A significant component of transaction costs are information costs – the costs of resources and time to obtain information about alternatives for rational decision making or as Stigler (1967, p.291) remarks: “...the costs of transportation from ignorance to omniscience, and seldom can a trader afford to take the entire trip”. Kasper and Streit (1998) add that individuals often choose to remain ignorant because it is too costly to be informed, and questions to what point people carry out their information search: to the point where expected marginal cost is equal to the (marginal) expected benefit (Stigler 1971), or to a point where experience suggests they probably know enough to decide. It is rational for people to acquire small pieces of information and to remain ignorant of other information due to the high costs and uncertain outcomes of knowledge search, a notion Kasper and Streit (1998) term ‘rational ignorance’. This point highlights parallels with the notion of adaptive management introduced in section 4.4, where NRM policy decisions



(including institutional choice considerations) and land management decisions by landholders are often made with incomplete knowledge (Pannell *et al.* 2006). Consequently, Marshall (2005, p.61) adds that the implications for such institutional choices are only “typically revealed as suboptimal once actual events unfold”.

Individuals cannot know the expected costs and benefits of obtaining certain types of information before they have acquired it, so they are unable to maximise net returns from knowledge not yet acquired (Kasper and Streit 1998). This notion lies at the core of what has been termed the ‘information paradox’ (Arrow 1962). Economic agents act under conditions of limited information and bounded rationality, and since it is not feasible to survey all possible alternatives and calculate the choice which maximises satisfaction of an objective, they *satisfice*<sup>49</sup> (Simon 1955; 1957) by making decisions with a limited search (Alchian 1950, cited in Marshall 2005, p.54). Information costs are also considered to be sunk costs, as once incurred, they have no direct bearing on whether or not the information will be used.

Another important component of costs that need consideration are transformation costs. In contrast to information costs, the costs of the production have a direct consequence on the amount that can be produced with a profit (Streit and Wegner 1992). In the case of NRM of interest in this thesis, ‘production’ needs to be interpreted in a wider context than is typical in economic analysis of the industrial sector (Birner and Wittmer 2004). The conservation and management of natural resources and environmental assets can be considered as the production of ecosystem services<sup>50</sup> on which human societies depend. Hence, production costs

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<sup>49</sup> The term ‘satisfice’ was coined by Herbert Simon (1955; 1957) as a hybrid between *satisfying* and *sufficing*. It refers to accepting a choice or judgment that is good enough, one that satisfies. The tendency to satisfice appears in many cognitive tasks such as playing games, solving problems, and making financial decisions where the search for the optimal solutions is typically not or cannot be conducted (Simon 1955).

<sup>50</sup> The concept of ecosystem services has been developing as a way to recognise the interdependence of human societies on nature-based systems. Ecosystem services can be defined as the conditions and processes by which natural ecosystems, and the species that comprise them, sustain and fulfil human life (Daily 1997). These include not only life support

refer to both opportunity costs (e.g. production foregone due to NRM activities) as well as implementation costs. This production is typically achieved by placing regulations on competing resource uses, especially on agriculture, forestry and fisheries, through the declaration of protected areas for biodiversity conservation, fixing rates of resource extraction, and promoting on-farm best management practices. Therefore, the costs of institutional alternatives are unlikely to be limited to only transaction costs and need to also account for transformation costs (i.e. production and abatement costs (Marshall 2003, 2005; McCann *et al.* 2005). Challen (2000) argued that current institutional choices create future path dependencies and affect future costs (including transformation costs) associated with shifting to new institutional arrangements. Marshall (2003; 2005) suggests that transformation costs (e.g. production and abatement costs) need to be considered as a cost in the analysis of institutional decisions. Extending Challen's (2000) normative economic framework<sup>51</sup> for analysing policy choices between alternative institutional options, Marshall (2003; 2005) proposes that transformation costs need to be included in evaluating the effects of different institutional options. Therefore, an ideal framework for undertaking a cost effectiveness analysis of alternative governance structures should also include the above transformation cost implications.

#### **4.6.2 Implications for Institutional Analysis**

Coase (1937) proposed that firms and markets are alternative governance structures that differ in their transaction costs. Accordingly, the costs of conducting economic exchange in a market may exceed the costs of organising the exchange within a firm under certain conditions. This explains why it is more efficient to conduct some actions within a firm. The costs of subcontracting certain inputs in markets can be reduced by entering into open-ended, semi-permanent hierarchical

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services such as maintaining air and water quality, waste absorption and soil health, flood protection, pollination and control of pests, but also life-fulfilling services through the provision of cultural, spiritual and intellectual stimulation and maintenance of other species for their existence value (Daily 1997, cited in Cork *et al.* 2002).

<sup>51</sup> Challen's (2000) framework for comparative institutional choice analysis is outlined in section 6.5.

relations – combining resources to form organisations such as firms (Coase 1937; Cheung 1983; Demsetz 1988).

Williamson (e.g. 1985; 1996; 1999) developed Coase's argument further by identifying the types of exchanges that are appropriately conducted within firm boundaries rather than within the market, and suggested that transaction costs include both the direct costs of managing relationships and the possible opportunity costs of making inferior governance decisions. Williamson's (1996) analysis is based on two important assumptions of both human behaviour (i.e. bounded rationality and opportunism) and dimensions of transactions (i.e. asset specificity and uncertainty).

This is the theoretical foundation of transaction cost economics, which assume an institutional environment is a given constraint and that economic agents align different transaction types with governance structures to achieve economising outcomes. Williamson (1996) asserts that institutions are the mechanisms of governance. He identifies the critical dimensions characterising a transaction and links these to the institutional governance structures of transactions. The principal dimensions describing a transaction are uncertainty, frequency of exchange, and the degree to which investments are transaction-specific. Accordingly, Williamson (1996, p.4) asserts in his discriminating-alignment hypothesis that efficient organisation of economic activity requires "the matching of governance structures with these transactional attributes in a discriminating way". Transactions that differ in their attributes are aligned with governance structures that differ in their costs and competence, in order to achieve an economising result (Williamson 1991). He concludes that non-specific transactions are efficiently organised by markets, while recurrent transaction-specific exchanges are more efficiently governed internally.

Drawing a parallel with the efficient-boundary problem in private sector industrial organisation (Williamson 1985), a normative analysis of devolved governance through the regional NRM arrangements of interest in this thesis can be used to determine the appropriateness of such a governance model for achieving NRM objectives. Following Williamson (1999), which extended the transaction cost

analysis framework to the public sector to include not only production functions, but also procurement, regulation and other areas, it is appropriate to apply the transaction cost arguments to analyse institutional arrangements for NRM.

It is difficult to identify and assess many of the costs and benefits associated with different governance arrangements. Many of the costs can be identified as transaction costs as discussed in section 4.6.1, where the costs of decision making and engagement in an institutional structure can be likened to the search, negotiation, monitoring and enforcement costs familiar from market transactions as outlined by Williamson (1996). In a marginal analysis setting, the question is whether the costs incurred from an additional engagement process are justified when the benefits are considered.

Different institutional and governance arrangements can be analysed on the basis of the relative magnitude of transaction costs. This approach represents a cost effective analysis, permitting comparisons between governance structures in terms of the costs incurred in achieving certain NRM objectives (Birner and Wittmer 2004). Alternative institutional systems have transaction costs – of different types, scales, incentive structures, and in particular points in time (i.e. implications for institutional change). Bennett (2005, p.256) cautions that it is “erroneous to choose between alternative institutional structures on the basis of their net social benefits without including transaction costs”. As transaction costs have been found to account for about half of all the costs of producing and distributing the national product in modern market economies (Wallis and North 1986; North 1990), their “omission from the development of extensions to the market to encompass environmental resources could be serious” (Bennett 2005, p.258). Hence, an analysis of the regional NRM arrangements should not neglect transaction costs that may prove significant.

The regional NRM governance model of interest in this study can be analysed by identifying and comparing transaction costs of alternative institutional modes of governance in implementing a given NRM program or project, or otherwise in achieving a certain desired level of on-ground behavioural change. However, this

cost-benefit analysis approach in practice is not as straightforward as the theoretical proposition may suggest due to the inherent complexity of identifying the range of factors which may be contributing to certain NRM outcomes or behavioural change, which are likely to vary widely from situation to situation (both in composition, magnitude, and time). In the analysis of regional NRM in this study, a cost-benefit logic framework is applied in the identification and analysis of wider costs and benefits of the regional NRM governance model using the FBA case study. It is also critical to acknowledge that the analysis is not at the level of systematic detail required in a traditional cost-benefit analysis assessment due to large gaps in knowledge about the values for these components and the complexity associated with the analysis of NRM issues as outlined above.

#### **4.7 INSTITUTIONAL ECONOMICS**

There are a number of ways of analysing governance and alternative policy options in economic terms. The mainstream approach (e.g. based on standard neoclassical theory) in economic analysis is to evaluate alternative mechanisms in terms of the net benefits to society. In a welfare economics framework, this is assessed by identifying the gains and losses (e.g. opportunity costs) of a particular project, policy change, or governance arrangement, and applying an assessment tool such as benefit-cost analysis to identify if the potential gains outweigh the potential losses.

This reductionist approach is often difficult to apply to the analysis of policy settings where there is difficulty in clearly identifying and accurately measuring gains and losses such as the case in NRM. More importantly, under such a benefit-cost analysis framework transaction costs are typically not recognised as important elements and are often ignored. Several other economic approaches have been developed to deal with these types of issues, where the focus tends to be on the broader setting of institutions or incentives in ways that may generate more efficient and cost effective outcomes.

Institutional economics is an area within economics theory which can offer new insights to enriching the identification of costs and benefits in an economic analysis

of regional NRM governance arrangements. In institutional economics, there are two broad approaches to identification of efficient and cost effective outcomes. The first relies on analysis of how the selection of different institutional mechanisms seems to generate cross-sectional differences in the ways that economies perform. For example, there is evidence that countries and regions with strong, individual property-rights systems that are enforced by government, together with competitive market allocations of goods and services that do not suffer market failure problems, generate greater wealth and higher living standards than countries without these types of institutional structures (e.g. Tridico 2005; Rodrik *et al.* 2004; North 1997; Gandhi and Marsh 2003). Institutions may also explain why growth and development outcomes vary across areas, countries, and also over time (Gandhi and Marsh 2003).

The second type of institutional analysis, which guides analysis in this study, focuses more specifically at the case study level by focusing on the appropriate types of institutions and mechanisms that can deliver particular NRM objectives at lower cost. The primary focus of this analysis is on the cost effectiveness of using regional NRM groups in delivering such objectives. This is explored by analysing the transaction costs associated with implementing regional NRM governance arrangements<sup>52</sup>. Transaction costs were introduced in section 4.6 and include the costs of searching, negotiating, settling and enforcing economic actions (including those governing participants in political and economic systems). Challen (2000) refers to these as ‘static transaction costs’<sup>53</sup>, that is, the costs of decision making within a given institutional structure. The analysis of institutional choices for NRM also needs to acknowledge ‘dynamic transaction costs’ (Challen 2000). These are the costs of effecting institutional change, and arise in the transition from one institutional structure to another. This aspect of institutional change has some linkages to evolutionary economics theory (e.g. Challen 2000; North 1990; Arthur 1989; Alchian 1950), where institutional structures are viewed as being path

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<sup>52</sup> An important point to note here is that transaction costs effectively link neoclassical and institutional economics theories.

<sup>53</sup> A discussion on ‘static’ and ‘dynamic’ transaction costs is presented in section 6.5.1.

dependent (irreversible), and the level of dynamic transaction costs incurred is partly a function of the level of institutional change being effected. In turn, the choice of institutional options in one point in time will have implications for dynamic transaction costs of future institutional changes.

Tridico (2005, p.24) asserts that institutional economists perceive a very clear link between institutions and development<sup>54</sup>:

...formal and informal rules define a system of penalties and prizes which determine a set of standardised behavioural patterns. These patterns in turn shape both individual and collective action affecting economic performance and development. Hence, development policies should promote an institutional change i.e. a change in the values and in the rules which inhibit growth, and not only a change of formal rules or the implementation of reforms (i.e. structural adjustment which in social terms may be very costly).

As “institutions matter” (North 1992, p.4), it is important to implement institutional policies to achieve desired outcomes. Hence, the question of interest in this study is whether the implementation of the institutional arrangements that encompass regional NRM will bring about the desired changes in the rules and values in order to achieve desired outcomes for natural resource and environmental governance.

Advocates of institutional economics argue that if the appropriate institutional arrangements are established, there are potential long term benefits. This then begs the question: Are the regional NRM institutional arrangements appropriate for achieving natural resource governance and environmental outcomes in Queensland? In going some way to address this question, it is fitting to explore the background and development of this branch of economics with particular relevance to analysing the regional natural resource governance arrangements of interest in this thesis.

#### **4.7.1 A Background to Institutional Economics**

There are two main schools of institutional economics: the American School (e.g. Veblen, Commons, Mitchell) and the Austrian School (e.g. Menger, Mises, Hayek,

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<sup>54</sup> Here, reference is made to “development” in terms of economic development and growth over time, but in the context of this thesis, development can also be viewed in terms of sustainable development for achieving environmental and natural resource management outcomes.

Kirzner). Austrian Economics emerged as an independent school in the 1930s and advocates of the school reject any direct comparison claiming that Austrian economics, and what has become known as the New Institutional Economics (American School), are basically saying the same things with different languages (the former verbal and imprecise, the latter mathematical and rigorous) (Palermo 1999, p.278). During the planning debate (in which the planning supporters argued from a neoclassical perspective), the leaders of the Austrian school progressively clarified their differences with respect to neoclassical economists (Palermo 1999, p.277). The Austrian contribution placed the analysis of rules into the context of:

...limited human knowledge, methodological individualism – the insight that only people act, never abstract “collectives, such as nations, races or social classes – and subjectivism – the insight that only individuals are able to read the world subjectively and therefore differ in their ability to understand the world and in their value judgements.

(Kasper and Streit 1998, p.34)

Hence, it then follows that interpersonal differences have to be respected and cannot be easily aggregated into collective goals or representations. The Austrian school argues in favour of the efficiency of the market (with respect to the state) by stressing the benefits of decentralisation. The concept of competition initially identified by Mises and developed by Hayek in his theory of decentralised knowledge was the foundation for arguments advocating the efficiency of a market system. According to Hayek, competition is not a state of affairs, but a process whose desirability stems from its ability to discover and efficiently allocate the relevant information. His analysis of competition is based on the assumption that equilibrium is a theoretical state that is never reached and, more importantly, is a useless concept since it is conceptually impossible to know all data defining it (Hayek, 1937).

The “knowledge problem” is a central theme of Austrian economics introduced by Hayek (1937; 1945). In his Nobel Prize lecture in 1974 entitled, “The Pretense of Knowledge”, Hayek noted the tendency of the economics profession to pretend to know what was in reality unknowable, and practitioners therefore risked giving irrelevant advice (Nishiyama and Leube 1984). Models of the physical sciences are



applied to explain human action, always with an aim toward controlling the outcomes of human choice. However, human action is too complex and subjective to be accessed by social scientists, and the attempt is will likely lead to failure (Rockwell 2003). Hayek (1974) went on to explain how his critique of positivist economic modelling applies more broadly to anyone who would attempt to imitate the form while missing the substance of scientific procedure.

On a general level, American institutional economics can be categorised in terms of an “old” school and “new” branch. The former, also known as “original” institutional economics (OIE), generally refers to the ideas on institutionalism by Thorstein Veblen, John Commons, Wesley Mitchell, and Clarence Ayres (Rutherford 2001, p.173). As this school of institutional economics had been dominant in American universities just after the First World War (Hodgson 1998), the literature typically labels this school as the American school.

The term “new institutional economics” (NIE) has been a generic term first introduced by Oliver Williamson (1975) in the literature, but has since become a standard under which a diverse group of economists have assembled who shared a common intellectual ground characterised by the belief that: (i) institutions matter; (ii) the relationship between institutional structure and economic behaviour requires attention; and (iii) the determinants of institutions can be analysed with the aid of economic theory (Richter 2003). It first came to refer to the work stemming from the transaction cost analysis approach of Ronald Coase, Oliver Williamson, and Douglass North.

NIE draws on microeconomics theory and generally regards its ideas as complementary to, rather than substitute for, conventional neoclassical analysis (Williamson 1975, p.1). Hence, NIE builds on, modifies and extends neoclassical theory rather than replacing it (North 1995).

Despite being labelled under the common banner of NIE, there also exist clear differences in theoretical proposition between the ‘founding members’ of the NIE. Williamson (1975, p.4) views man as being boundedly rational, but North (1995,

p.18) writes that a theory of institutions needs to start with a “modification of the instrumental rationality assumption”. Coase (1984, p.231) also regards the assumption “that man is a rational utility maximizer” to be both “unnecessary and misleading.”

As a result, even within the broad NIE classification, Richter (2003) identifies two different branches of NIE: (i) a perfect rational; and (ii) an imperfect rational branch. The latter splits again into two different branches (Eggertsson 1990): The transaction cost economics of Williamson (1985) and the NIE of history developed by Douglass North (1986). Although both of these approaches are founded on the principles advanced by Coase (1937; 1960), they markedly differ in their assumptions. Although Williamson (1996; 2000a) explains that transaction costs arise from bounded rationality, his economic framework ultimately assumes that humans are capable of optimal institutional choices no matter how complex those choices may be (Slater and Spencer 2000). Hence, this would negate the need for learning by doing through adaptive management as “path dependency of institutional choices is effectively ignored” (Marshall 2005, p.70). North (1990), on the other hand, espouses a view more consistent with the Austrian philosophy, making the case that past institutional choices influence present choices, that is, institutional choices are path dependent (and irreversible).

Adding another level of complication to understanding the evolution of schools of institutional economics, Rutherford (2001, p.173) comments:

...the new institutional economics label is often extended to cover game theoretical approaches to the evolution of social conventions, and sometimes to the Austrian approaches to institutions and institutional change that build from Carl Menger and Frederick von Hayek. In addition, some people are working to reshape old institutional economics by bringing in material that one can also find discussed within the new, and the term is being read back into history in new ways so that those claimed to be predecessors of institutionalism are multiplying.

Overall, NIE introduces a number of imperfections into the theoretical context (questioning the assumptions of perfect information, certainty, and full rationality) that eliminate the equivalency results characterising the general equilibrium context. By using the efficiency principle, it provides an explanation for the

coexistence of different allocation mechanisms (planning, firms, and markets) as solutions to specific allocation problems in which each mechanism is the most efficient.

NIE argues that the world of perfect competition is a rarely encountered special case of a much broader set of economic scenarios and that economic analysis and policy making should concentrate on understanding and improving actual scenarios. In contrast to the assumptions of perfect competition, common elements central to this branch of institutional economics are:

- Substantial transaction costs exist in most forms of economic activity and profit maximising agents need to consider how to minimise the sum of transformational and transaction costs;
- The need to acquire information (information costs) is a major component of transaction costs.

Hence, institutional economics is not based on the assumption of perfect knowledge championed by conventional neoclassical economics. The lack of knowledge described as “ignorance”, is regarded as part of human existence and cannot be eliminated because it is “constitutional” (Kasper and Streit 1998, p.52). Hence, economic agents establish institutions to reduce the uncertainty inherent in human interaction (social, economic, political) and to overcome market failures caused by the presence of risk and imperfect information and weak property rights.

In the natural resource governance case study of interest in this thesis, NIE – in particular, the imperfect rational branch promoted by North (1986; 1990) – is more appropriate than OIE as it links institutions, transaction costs and the role of ‘soft’ factors such as social capital<sup>55</sup>, three issues that are central in this study. Consistent with the principles of NIE, this study puts the emphasis on transaction costs. NIE is therefore the more appropriate theoretical framework to guide this study. Another reason for choosing NIE is that although it adapts and extends neoclassical principles, it does not disassociate from it as OIE does. NIE makes an adaptation to

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<sup>55</sup> A discussion on social capital is presented in chapter 5.

the postulate of *homo-economicus*<sup>56</sup> and considers an individual as one who is nearly rational and nearly self interested. OIE rejects the concept of individualism and is more focused on the behaviour of groups. In this study, a focus on the behaviour of individuals has been chosen as typically it is the individual landholder, and not groups, who make the decision to participate in NRM programs and to adopt improved land management practices.

An institutional economics approach that considers NIE principles will seek to determine whether the regional NRM institutional arrangements that characterise Australian natural resource governance are justified. This research will involve the analysis of transaction costs and the role of social capital to determine if the institutional and governance arrangements in place are appropriate for achieving NRM objectives.

#### **4.8 CONTRIBUTION TO ECONOMIC WELFARE**

As outlined in section 4.5, different institutions exist to facilitate and support Australian natural resource governance. Of particular interest is how these different institutions contribute to overall economic welfare. Hence, it is important to identify if the contributions of such institutions are consistent with the concepts of economic welfare, the discussion of which is presented below.

Welfare economics is concerned with the effect of economic policies on the level of welfare of individuals or groups of people. The framework can be used to compare the relative merits for two or more situations by assessing the level of welfare in each. The welfare of an individual or community can be defined as its well-being. Utility is often used as a synonym, though Price (1977) argued that this has the disadvantage of implying (misleadingly) that it arises only from the consumption of 'useful' goods. Contributing to welfare are a range of conditions which may be defined as constituting well-being, such as security, protection from fear, electoral

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<sup>56</sup> *Homo-economicus* lies at the core of neoclassical economic theory – a rational, “calculating, unemotional maximiser” (Mullainathan and Thaler 2000, p.1) who acts to obtain the highest possible well-being for himself given perceived opportunities (Duflo 2003). At the heart of the assumption is that all individuals possess perfect self-interest, perfect rationality and perfect information.

freedom, as well as the more obvious economic factors including income and price levels (Price 1977). For the issue of natural resource governance, improvements in well-being may be regarded as the change in income or satisfaction levels stemming from the desired environmental or natural resource condition as a result of a suite of policies or programs.

Welfare economics is generally acknowledged as the normative branch of economics that aims to evaluate economic policies in terms of their effects on the well-being of the community. The hallmark of welfare economics is that policies are assessed exclusively in terms of their effects on the well-being of individuals (Kaplow and Shavell 2000). Early writers of the neoclassical approach to welfare economics (e.g. Pigou 1920) defined the concept of economic welfare as the sum of the satisfactions accruing to an individual through an economic system. Pigou (1920, p.11), in his seminal work, defined economic welfare as “that part of social welfare which can be brought, directly or indirectly, into relation with the measuring-rod of money”. Arguing that it was possible to compare the well-being of two or more individuals, they argued that a poor person would derive more satisfaction from an increase in income than would a rich person. This notion of cardinal utility, that is, the assumption that utility is scale-measurable by observation or judgment was later rejected by other economists of what has become known as the New Welfare Economics approach.

An economic policy which changes any factor contributing to welfare can be evaluated in welfare economics by evaluating whether the community is better or worse off as a result. In doing so, the obvious starting point is to use the individual as the basic unit for determining how one is affected by change (Price 1977). This is much more difficult in practice as it is virtually impossible for one to determine just how an economic change to an individual’s circumstances is likely to affect an individual’s utility (Price 1977). Even more challenging is attempting to quantify a welfare change even if the direction is known, as it is a subjective magnitude which is not readily measurable in other terms. Hence, it is not possible to represent a community’s welfare in absolute terms because it is impossible to accurately sum

the total utility experienced by each individual to determine community welfare under different scenarios without also making assumptions and judgments about the relative merits of distribution patterns.

Later writers (e.g. Hicks 1975) of the New Welfare Economics approach rejected the neoclassical approach proposed by earlier economists such as Pigou, asserting that making such comparisons with any precision was not possible. Instead, a theory to address this problem was proposed by the Italian political economist Vilfredo Pareto, who asserted that distributional judgments should be avoided and defined an improvement in community welfare only if it involved an increase in the utility of at least one individual and a decrease in the utility of none. This situation is viewed as an increase in efficiency, and Pareto defined a position of maximum efficiency as one in which no one could be made better off without another individual becoming worse off.

An important aim of welfare economics is the systematic ordering of alternative social states in terms of social welfare, where social welfare is dependent on the welfare of individuals in society. A social welfare function (SWF) maps individual utilities into an overall social utility function. It is an algebraic formulation that assigns numerical social utility to each possible social state, and assumes that individual utility can be aggregated to determine overall social welfare with all individuals characterised by the same utility function (i.e. equal marginal utility of income for all individuals). Ideally, a SWF should be derived from the revealed preferences of the individuals concerned, but as Arrow (1951) demonstrated in his *Impossibility Theorem*, there exists no unique method for aggregating individual preferences into social preferences. The concept of the SWF originates from Bergson (1938). The original Bergson welfare function was designed to rank not the combination of individual welfare but more directly, the combinations of all those variables on which the individual welfare depends. In particular, it includes the goods consumed and the services rendered by each of the individuals in the society.

The utilitarian social welfare function can be expressed as:

$$W(U) = \sum_i U_i \dots\dots\dots(4.1)$$

Welfare (W) is given as a function of the sum of all individual utilities (U) in society. Individual utilities can be expressed as a function of various factors, commonly including level of income, and other factors such as environmental condition, and assets. In this case, maximising the social welfare function means maximising the total income of the members of the society, without regard to how incomes are distributed. In practice the concept of the SWF emerges in the consideration of distributional implications of alternative policy scenarios.

In the context of natural resource and environmental governance, a key task is to evaluate whether changes in environmental conditions are worthwhile to society. In economics, this can be assessed by estimating the net welfare changes associated with a particular policy or proposal (this provides the theoretical base for cost-benefit analysis). In assessing the net welfare change, both the benefits and the costs involved need to be assessed. Different institutions that support NRM activities and facilitate particular outcomes can be important in several ways to influence these positive and negative impacts – including those on levels of income or willingness to pay.

In relation to NRM, the institutions that support natural resource and environmental governance can make a net contribution to economic welfare on a wider level by codifying behaviour and knowledge, assigning property rights, reducing transaction costs and providing a system of governance for achieving desired levels of natural resource and environment condition. At the functional level, such institutions achieve this through the provision of baseline information and knowledge brokering services developed through scientific research, coupled with the provision of regulatory governance activities and incentive programs by relevant government agencies. Together, these institutions address the asymmetric information in the general community through various programs of education, suasion, and financial support and incentives for facilitating the adoption of improved NRM practices and raising critical awareness of the issues at all levels of

the community. By encouraging and facilitating community involvement in the formulation and implementation of programs, improved community ownership and acceptance is achieved which in turn, can reduce implementation costs, contributing to improvement in natural resource condition to the benefit of the community as a whole and for future generations, hence improving the environmental asset base and overall economic welfare.

#### **4.9 SUMMARY**

There is support for both centralised and decentralised governance arrangements. Strong tendencies for centralisation supported by arguments of scale economies have persisted for some time. The debate over regional NRM arrangements is about a balance between centralisation and decentralisation – not about one being completely dominant – but an argument about changes occurring at the marginal level. It is likely that regional NRM arrangements will not change a lot of government processes from being centrally administered, but given such parameters, the underlying issue of interest is determining how much decentralisation may be beneficial, and whether the current institutional arrangements of natural resource governance generate net benefits. Furthermore, governments are not devolving all NRM functions to regional NRM groups with some key NRM functions still being closely managed by government<sup>57</sup>.

The identification of transaction costs can provide a mechanism to assess the appropriateness of the institutional arrangements in place for delivering NRM policy decisions. It will also provide a basis for comparison to determine how the transaction costs of different NRM programs may vary and facilitates selection of the most suitable governance arrangements for achieving outcomes.

It is therefore apparent that an analytical framework is needed that can achieve two outcomes:

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<sup>57</sup> For example, in the case of Queensland of interest in this thesis, tree clearing legislation exists to regulate and prohibit the clearing of remnant native vegetation, which is an area of responsibility of regional NRM groups. If the regional NRM model is to be seriously embraced as a genuine policy shift in natural resource governance, responsibilities such as managing tree clearing activities should be devolved to regional NRM groups rather than one that is regulated by central government authorities.



- Explain the current diversity and complexity of institutions involved in NRM; and
- Provide a mechanism for evaluating the cost effectiveness of the institutional arrangements.

These stem from the conclusion that mainstream neoclassical economics does not provide all the necessary tools for appropriately assessing and evaluating natural resource governance arrangements. An institutional economics framework is more appropriate for such a task.

It was established in earlier chapters that Australian NRM has witnessed a shift towards processes characterised by greater public involvement and leveraging *soft institutions* such as social capital. The concept of social capital is outlined in chapter 5, which explores how devolved governance approaches such as regional NRM can leverage social capital to achieve NRM outcomes.

## 5. From Social Capital to Governance Capital

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*Here I learn to do a service to another, without bearing him any real kindness; because I foresee, that he will return my service, in expectation of another of the same kind, and in order to maintain the same correspondence of good offices with me or others. And accordingly, after I have served him and he is in possession of the advantage arising from my action, he is induced to perform his part, as foreseeing the consequences of his refusal*

(David Hume, Treatise of Human Nature, 1740/1978, p.521)

### 5.1 INTRODUCTION

The preceding chapters have established that natural resource and environmental governance has been gradually moving away from traditional top-down, command and control policies to more participatory-type approaches characterised by local level involvement, and the emergence and deepening of *soft institutions* such as social capital (e.g. Pretty and Smith 2004; Paton *et al.* 2004; Pretty and Ward 2001; Blann *et al.* 2000; Marshall 1999). In Australia, this transition is reflected in the regional NRM arrangements, where regions are imbued with some level of influence and authority over NRM.

As outlined in section 4.2.1, market failure is the underlying cause of the inefficient levels of supply of resource condition and ecosystem services that form the basis for many NRM problems. Individuals and firms lack appropriate incentives to supply environmental goods, and significant institutional barriers limit change to the current situation. To improve environmental outcomes and address concerns about resource condition, governments in Australia have introduced regional NRM arrangements aimed at changing, creating and deepening soft institutions.

One outcome has been the conscious decision to invest in the creation of a new institutional structure through establishing community-based regional NRM groups. This shift to a more community-based approach to NRM has been largely driven by government with little or no economic analysis undertaken to evaluate the regional NRM arrangements to date. Little empirical research exists to guide public managers

in determining best value long term arrangements and strategic investments for achieving NRM outcomes. There is an extensive literature that espouses the benefits of adopting bottom-up, participatory approaches and the development of social capital enhancing policies which are advanced as a means of alleviating transaction costs associated with monitoring and enforcement and other NRM activities (e.g. Pretty 2003; Pretty and Ward 2001; Hayami 2001).

Deepening soft institutions, such as fostering the development of social capital, may be a key factor influencing economic welfare, and may be very relevant to understanding the level of market failure and provision of environmental services. The implementation of new governance arrangements, such as those associated with regional NRM, may be based on elements of social capital.

In this chapter, a theoretical framework for relating the regional NRM arrangements and linkages between potential changes in net transaction costs and social capital are presented. The following issues will also be explored:

- The impact of regional NRM institutions on social capital and governance capital; and
- The impact of changes in, and generation of, social capital on the decisions of land managers in relation to conservation activities and the provision of environmental goods and services.

A review of relevant literature on social capital is presented in section 5.2 which also outlines the elements contributing to changing, creating, and deepening soft institutions. This is followed by a discussion on the emergence of *governance capital* in relation to achieving regional NRM objectives.

## **5.2 UNRAVELLING THE ENIGMA**

### **5.2.1 What is Social Capital?**

There are many theories that explain cooperating behaviour in the social sciences. It has been observed that people cooperate more than they should according to standard assumptions of individual rationality (e.g. Paldham 2000; Schram 1998). This excess cooperation outcome has been confirmed in experiments even for players who

do not know each other and play only once. This behavioural 'glue' generating excess cooperation has increasingly been described as 'social capital' (Paldham 2000, p.629).

Under the regional NRM arrangements, community-based regional NRM groups have been formed and granted some decision making responsibilities relating to NRM. A key driver behind this process is founded on the premise that with possession of local knowledge on resources and the framework of social and economic conditions (O'Riordan and Stoll-Kleeman 2002), communities can work together collectively to sustainably manage the environment and natural resources for the long term (Uphoff 2002). Social capital encapsulates the idea that social bonds and norms are important for communities (Pretty 2003). Therefore, it is important to further examine this concept as it can offer a framework to evaluate how individuals are able to work cooperatively together to achieve improvements in environmental outcomes and influence economic welfare.

The concept of social capital has been applied a range of social and economic phenomena, from the growth tragedy of Africa (Easterly and Levine 1997), to the flourishing township village enterprises in the People's Republic of China (Weitzman and Xu 1994). The concept underscores the importance of "non-market social interactions in socioeconomic outcomes and seeks to fill a lacuna in the traditional neoclassical economic framework" (Quibria 2003, p.20). Granovetter (1985) argues that the neoclassical framework represents an inaccurate view of reality since it viewed humans as anonymous and resistant to any social influence through social relations. In reality, individual behaviour is continuously shaped by non-market social influences in the form of culture, norms and social structure (Quibria 2003). Social interactions matter<sup>58</sup> since they form the basis for social networks, foster trust and values, sustain norms and culture, and are the very foundation of community (Quibria 2003).

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<sup>58</sup> Therefore, it is perhaps not surprising that research into the concept of social capital has registered an explosive development across a multitude of subject areas in the last decade. Isham *et al.* (2002) note that a "keyword" search in all journals in the EconLit economics database shows that citations for "social capital" have grown rapidly over the last decade, doubling each year since the late 1990s. The study by Putnam *et al.* (1993) of Italy has been declared as the most cited contribution across the social sciences in the 1990s (Fine 2001, cited in Sabatini 2006, p.3).

A rapidly burgeoning literature explores various definitions and interpretations of the concept of social capital (e.g. Paldam 2000; Woolcock and Narayan 2000; Piazza-Georgi 2002). However, the concept of social capital remains shrouded by *vagueness*. This has led some to dismiss the construct altogether (Fine 2001), and other writers insist on more theoretical work to clarify the definition and role of the concept (Sobel 2002).

The literature on social capital has been characterised by a rapid growth in the definition and interpretation of the concept over the last two decades (Bourdieu 1986; Coleman 1988; Putnam *et al.* 1993; Ostrom 1994). However, Fukuyama (1995) and Putnam (2000) suggest the notion originates back to 1916 when Lyda Hanifan, a state supervisor of rural schools in West Virginia, used the concept to explain the importance of community participation in enhancing school performance. According to Hanifan (1916, p.130, cited in Sabatini 2006, p.4), social capital referred to:

...tangible substances [that] count for most in the daily lives of people: namely good will, fellowship, sympathy, and social intercourse among individuals and families who make up a social unit.

The value of the concept was later revived by Jacobs (1961), credited as one of the first scholars of modern social capital (Pelling 2003), following her study that highlighted mixed-use urban neighborhoods as representing a form of social capital which could promote public safety and trust within communities. Around the same period in the economics literature, Loury (1977) highlighted the concept in an analysis of racial income inequality to describe the social resources of ethnic communities, arguing that the neoclassical framework was inadequate because it did not incorporate the influences from social networks which can exert a significant influence on an individual's access to opportunities.

In much the same vein, Bourdieu's (1980) concept of social capital also focused on the individual, emphasising the importance of a social network as an individual asset that affects one's economic locus in society. Social relations are used to increase the ability of an actor to advance economic and social interests from group membership

and the driver for individual investment in such membership. Hence, Bourdieu defines social capital as:

...the sum of the resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalised relationships of mutual acquaintance and recognition (Bourdieu and Wacquant 1996, p.119).

To Bourdieu, social capital comprises two components: First, it is a resource that is tied to group membership and social networks, and second, a quality produced by the totality of the relationships between actors, rather than merely a common attribute of the group (Bourdieu 1980). In the 1980s Coleman (1988, 1990) provided a clearer, more relevant theoretical framework expressing social capital as the composition of relationships between and among individuals that promotes productive activities. These aspects of social structure comprise a resource base from which individuals are able to tap to realise personal interests. Coleman (1988, p.98) explains:

Social capital is defined by its function. It is not a single entity, but a variety of different entities, with two elements in common: they all consist in some aspect of social structures, and they facilitate certain actions of actors within the structure.

Light (2001) credits Coleman (1988) with outlining of a formal definition for describing these relationships of trust embedded in social networks. By studying parochial schools similar to the work undertaken by Hanifan (1916), Coleman demonstrated that human capital<sup>59</sup> often arose as a result of prior social capital. Both Bourdieu and Coleman believed that social capital exists between individuals and can be studied at the level of the individual. Social capital is believed to reside in the relations among the nodes and “just as physical and human capital facilitate productive activity, social capital does as well” (Coleman 1988, p.101). It exists between individuals and by extension can be accumulated by the individuals.

These individualistic notions of social capital differ from the community or aggregate perspective that has emerged as the main focus in the literature in the decade following. While Bourdieu and Coleman provide conceptualisation at the individual level, Putnam provides a focus on the benefit accruing to the community. Putnam *et*

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<sup>59</sup> Human capital is regarded by economists as including investments in education, training, and medical care, as they are termed human capital because people cannot be separated from their knowledge, skills, health, or values in the way they can be separated from their financial and physical assets (Becker 1964).

*al.* (1993) brought the concept into popular attention in the social sciences debate of the 1990s with a study on local government in northern Italy, which concluded that performance of social and political institutions was strongly influenced by citizen participation and engagement in the community. Drawing on the concept from Coleman (1988), Putnam *et al.* (1993) defined social capital as “features of social organisation, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions” (Putnam *et al.* 1993, p.167). In a recent work, Putnam further elaborates on this definition:

Social capital is closely related to what some have called “civic virtue”. The difference is that “social capital” calls attention to the fact that civic virtue is most powerful when embedded in a network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital (Putnam 2000, p.19).

The existing empirical evidence suggests that different patterns of network characteristics will impact on the nature of an individual’s social capital. One influential classification divides social capital into three types – bonding, bridging, and linking (Narayan 1999; Woolcock 2000). Stone *et al.* (2003, p.4) elaborates on these categories:

*Bonding* social capital is argued to exist in dense or closed networks, and helps people “get by” in life on a daily basis. *Bridging* social capital involves overlapping networks that may make accessible the resources and opportunities which exist in one network to a member of another. This type of social capital is particularly useful in helping people to “get ahead”. Heterogeneity or diversity of network members (in informal or formal groups) is also argued to enhance the bridging capabilities of social capital. *Linking* social capital involves social relationships with those in authority or positions of power and is useful for garnering resources.

In general, family, friendship and neighbourhood ties can be viewed as “bonding” ties; civic linkages and other more distant ties as “bridging”, since these often provide contact with different people with varied opportunities; and institutional connections as “linking” ties. The size of social networks may also affect the overall stocks of social capital. Individuals and communities with large numbers of social ties may have high levels of bonding, bridging or linking social capital, whereas those with few social ties may thus have little access or opportunity to invest in social capital.

It was outlined earlier that writers such as Coleman (1988) had defined social capital as people's ability to work voluntarily together. Other writers such as Fukuyama (1995) and Dasgupta (1999) credit this ability to cooperate to trust. Trust is often a concept intrinsically linked with social capital (e.g. Coleman 1984; Putnam *et al.* 1993). Paldham and Svendsen (2000) define social capital as the density of trust, and on the micro level, is the mutual expectation that arises within a community of regular, cooperative behavior, based on commonly shared norms. Dasgupta (1988) adds that associations reduce opportunistic behaviour by creating repeated interaction among individuals, which enhances trust. Fukuyama (1995, p.26) defines the concept of trust as:

...the expectation that arises within a community of regular, honest and cooperative behaviour, based on commonly shared norms, on the part of that member of the community. Those norms can be about deep value questions like the nature of God or justice, but they also encompassed secular norms like professional standards and codes of behaviour.

If the people in one's environment are trustworthy, trust is productive because it enables risk-taking in resource exchange and in overcoming dilemmas of collective action (Resnick 2000).

Social capital can be viewed as a resource to collective action (Stone *et al.* 2003). For individuals, this can mean access to social connections that help the processes of getting by or getting ahead. For communities, social capital reflects the ability of community members to participate, cooperate, organise and interact (Putnam 2000). Similar to other forms of capital, social capital is productive, making possible the achievement of certain ends, which in its absence, would not be possible (Sabatini 2006). However, unlike other types of capital, Coleman (1988, p.98) asserts that the idea "inheres in the structure of relations between and among actors, and not lodged either in the actors themselves or in physical implements of production". Incidentally, this is the point of contention raised by economists who are divided about how the concept should be treated.

Pelling (2003) notes that although many economists were in agreement that concepts such as social capital should form part of economics literature, there was not agreement on exactly how it should be considered. Light (2001) remarks that



economists do not agree on the relationships between (and existence of) different types of “capitals”. Becker (1996) declares that the notion of social capital should be placed in the same classification as that of human capital. Bates (1998) on the other hand, would prefer to acknowledge human capital, but exclude social capital; while other writers including Baron *et al.* (1994), Hayami (2001), and Bowles and Gintis (2002), p.422) argue that social capital may not be a form of capital in the truest economic sense and suggest terms such as “community” as more appropriate as it focuses on “what groups do rather than what people own” (Bowles and Gintis 2002, p.422). Following on from this point, Arrow (2000) argues that “capital” implies something transferable from one individual to another and it is difficult to transfer ownership of social capital.

On the other hand, Castle (1998, cited in Marshall 2001) notes that economists should consider social relations as capital because of empirical evidence (e.g. Knack and Keefer 1997) which suggests such relations can affect economic performance. Marshall (2005) adds that social capital is akin to other types of capital in that once created, it provides a continuous flow of benefits and further, that it can often be utilised for a variety of uses. In the same vein, Putnam *et al.* (1993) assert that collective action for different purposes draws on a common stock of social capital.

In summary, social capital is an umbrella term that encompasses the “norms and networks facilitating collective actions for mutual benefits” (Woolcock 1998, p 155). Although a broad range of views exist in the literature on the notion of social capital, ranging from different origins and fields of application, it is apparent that most agree on the ability of certain aspects of the social structure to generate positive externalities from group membership. This can help individuals to derive a competitive advantage in pursuing their ends and can reduce the transaction costs involved in searching, negotiating and enforcing exchange between people (Sabatini 2006). It should however, also be noted that social capital can generate negative as well as positive externalities, as evidenced by a closely-knit terrorist cell or crime gangs. This is further explored in section 5.2.3.

### 5.2.2 The Effect on Transaction Costs

Social capital may help to minimise transaction costs. As detailed in section 4.6, transaction costs arise from a range of day-to-day activities, including *inter alia*: (i) coordination activities among the community members, and (ii) interaction (e.g. lobbying, bargaining) between local communities and state agencies (Mburu *et al.* 2003). Transaction costs may differ between households due to household characteristics and differences in the willingness of households (or the incentives created for them) to bear the transaction costs involved in collective actions of natural resource management (Arifin 2006). Earlier studies suggest that transaction costs arising from coordination activities are influenced by the social cohesion or the social capital of the community members (Ostrom 1994, 2000).

Transactions costs are important in daily economic activities such as locating appropriate buyers and sellers, negotiating contracts, complying with government regulations, and enforcing contracts in the event of dispute or fraud. Fukuyama (1995) asserts that social capital can play a key role in reducing transactions costs and increasing economic efficiency. This is consistent with Wallis and Dollery (2001, p.250), who add that transactions costs tend to be lower in societies with high levels of trust and strong civic norms, subsequently providing:

a greater range of market transactions in outputs, credit, land and labour (Fukuyama 1995), offers stronger incentives to innovate (Rogers 1983), and accumulate physical and human capital (Galor and Zeira 1993). There may also be a greater sharing of household risk (Morduch 1995) and the scope for cooperative action by local groups is expanded particularly in cases where the excessive exploitation or under-maintenance of assets would result from purely individualistic behaviour under open access to common-property resources (Ostrom 1990).

Social capital can also be substituted for other productive inputs such as physical or human capital. For example, Schmid and Robison (1995) declare that trust can substitute for police surveillance and legal services. In the same vein, Coleman (1990) outlines an example in which social capital within a farming community – by underpinning levels of trust – allowed extensive borrowing and lending of farming

equipment and thus enabled each farmer's work to be completed with less investment in physical capital.

In communities with higher stocks of social capital, cooperation requires less explicit enforcement and the resources spent on regulation and monitoring are less than in those with low stocks of social capital (Greiling 2006). Furobotn and Richter (1999) also stress the contribution of trust concerning the aspect of decreasing transaction costs. A decrease in transaction costs accompanied by mutual gains in cooperative behaviour is the central message in Institutional Economics, particularly in relation to cost reductions resulting from the extrinsic value of trust (Kubon-Gilke *et al.* 2005, cited in Greiling 2006). Sekhar (2007) adds that social capital increases trust between individuals and groups, and the likelihood of cooperation, thereby lowering the costs of maintaining the flows of ecosystem amenities from public goods and common pool resources.

A social environment providing individuals with many opportunities for involvement and participation, and allowing people to meet frequently, is a fertile ground for nurturing shared values and social norms of trust and reciprocity (Sabatini 2006). The improved diffusion of information and the higher opportunity cost of free-riding in turn, make peoples' behaviour more predictable. Putnam *et al.* (1993) asserts that a society that relies on generalised reciprocity is more efficient than a distrustful society.

Knack and Keefer (1997) demonstrated that trust matters since it correlates strongly with economic growth and development and it appears that trust also correlates with private investment. Hence, a possible explanation could be that trust reduces the transaction costs (Shirley 2003). Therefore, an increase in social capital and trust-based relations reduces the average cost of transactions, much in the same way an increase in physical capital can reduce the average cost of production (Paldam and Svendsen 2000; Routledge and von Amsberg 2003). As social capital develops trust, reciprocity, and a common understanding of social norms, it reduces the need for preparing formal contracts. It can reduce transaction costs by generating expectations that allow people to conduct interactions with a degree of certainty. It

reduces opportunity costs and frees resources, as individuals are not compelled to invest in monitoring others and can trust them to act as expected (Pretty and Ward 2001). Similarly, Arifin (2006) adds that societies characterised by high levels of trust are also less dependent on formal institutions to enforce agreements. Hence, reductions in transaction costs allow more interactions to occur, promoting productive efficiency (Maskell 2000; Offe and Fuchs 2002).

In the context of this research, the regional NRM arrangements promote the development of local institutions as they place a key emphasis on the role of regional NRM groups. The relationship between these groups and local landholders is a key factor for achieving NRM outcomes as regional NRM groups depend on landholders based in their sub-regions to undertake land management actions to up-scale broader NRM change for the region. Hence, the local level relationships based on trust and voluntary cooperation may be effective because they permit individuals to undertake daily exchanges and activities with a minimum of repetition and costly negotiation (Bromley 1993). Pretty and Ward (2001) add that social capital lowers these costs of working together and facilitates cooperation. This results in individuals within a society possessing the necessary confidence to invest in collective activities, assured that others will also do the same. They are also less likely to engage in rent-seeking actions that result in negative impacts such as resource degradation. Wallis and Dollery (2002) assert that social capital formed in the context of a cohesive society can lower transaction costs associated with markets, hierarchies and networks.

A possible solution to such dilemmas of NRM is to depend on a third party Government *Leviathan* to compel individuals to act collectively (Olson 1965). A second solution is to privatise the problem by assigning property rights to the resource, for example, by building fences in common grazing lands as a set of private grazing areas. A “third way” (Pretty 2003, p.1913) alternative is to rely on social capital, through social norms and sanctioning mechanisms so that a group can self-enforce without the strict regulation of an outside *Leviathan* (Ostrom 1990). Theoretical developments in the governance of the commons and work on the notion of social capital have shaped a great deal of this thinking (Ostrom *et al.* 2002;

Singleton and Taylor 1992). Building social capital therefore, may be one key aim of the regional NRM model.

Oliver (2004) asserts that as people learn what is normal and acceptable in a certain social setting, they build social capital and more importantly, such learning drives the positive 'trust accumulation loop' or virtuous cycle of learning (Cavaye 1999, p.28). As social capital lowers the transaction costs of working together, it facilitates voluntary cooperation. Individuals have the confidence to invest in collective NRM activities, knowing that others will also do the same. They are also less likely to engage in private actions with negative outcomes, such as resource degradation activities (Pretty and Ward 2001; Agrawal 2002).

### **5.2.3 Social Capital's Shadow**

Just as social capital has been widely lauded for its positive externalities and benefits, there are also costs associated with its presence. Portes and Landolt (1996) note that developing or maintaining a group's social capital can acquire a downside as a result of heavy personal obligations placed on members thereby making it hard for them to benefit from engaging and cooperating in other groups and networks.

Another negative aspect of social capital is that advantages obtained by one group as a result of its networks and relations may put other groups at a disadvantage. Granovetter (1985) explains that the development of cartels and other forms of collusion to restrict access to markets for the gain of the group is an example of such an occurrence. Hence, while social capital within one group might serve the interests of its members, it may cause harm to the rest of the community (Grootaert and van Bastelaer 2002). Bowles and Gintis (2002, p.425) state that "communities work because they are good at enforcing norms and whether this is a good thing depends on what the norms are". Fukuyama (2001) refers to these as *negative externalities* of social capital. For example, closely-knit terrorist cells, gangs and crime organisations rely heavily on strong social capital within their memberships to achieve a common purpose. However, the norms upon which they rely have highly detrimental effects on the society at large. Fukuyama (2001) identifies a 'radius of trust' – the larger the radius of *distrust*, the greater liability a group presents to the remainder of society.

Social capital, by its definition, should therefore include an element of common good. In line with Fukuyama's proposition, Cox and Caldwell (2000) assert that social capital is always positive and propose that forms of solidarity that reject transferable and general trust for localised trust, should not be classified as social capital. Accordingly, in this thesis, the position is taken that social capital is to be considered a positive addition to a community. The network itself is not negative, but it is the norms and behaviours that its members choose to promote which may be considered negative. As Putnam (1995, p.665) states, "social capital...networks, norms and trust – enable participants to act together more effectively to pursue shared objectives. Whether or not their shared goals are praiseworthy is, of course, entirely another matter".

When social capital is present, communities are able to draw on the benefits of a well-networked and trusting community, which can help them cope and adapt to change, socially, economically and ecologically. Governments can make inroads towards achieving the sustainability outcomes through the implementation of the regional NRM arrangements which promote collaborative engagement processes that foster trust and social capital development.

#### **5.2.4 Implications for Economic Welfare**

To apply the concept of social capital in an economic framework, it is important to identify how it is consistent with the concepts of economic welfare.

In the context of natural resource governance, a key task is to evaluate whether changes in environmental conditions are worthwhile to society. In economics, this is assessed by estimating the net welfare changes of a particular policy or program, such as by identifying what type of governance and decision making model is capable of best delivering policies and programs to achieve desired environmental and NRM objectives. In assessing the net welfare change, the benefits and the costs involved need to be considered. Differing levels of social capital which may arise under different governance models can be important to influence such positive and negative impacts.

Social capital is postulated as a key factor influencing economic welfare. Table 5.1 outlines the different relationships between social capital and various economic processes.

**Table 5.1: Linking Social Capital with Economic Processes**

<i>Approach</i>	<i>Relationship</i>
1. Production function	Social capital is a factor of production
2. Transaction costs	Transactions are easier in the presence of trust
3. Monitoring costs	Social capital allows cheap self-monitoring

(Source: Paldam 2000, p.636)

Each of these relationships may be important in producing NRM outcomes. The development of networks of trust and shared vision for environmental outcomes through the institution of regional NRM could potentially facilitate the emergence of self-monitoring processes. Increasing levels of social capital can reduce net transaction costs and therefore contribute to economic welfare. It can be viewed as a factor that can reduce the costs of monitoring and compliance associated with the promotion of improved land management activities, such as through the regional NRM process.

The regional NRM arrangements of interest in this thesis can therefore be viewed as a vehicle to foster the development of social capital, which in turn, can produce benefits in three main ways: (i) by reducing transaction costs; (ii) generating improved trust and cooperation; and (iii) the emergence of governance capital in a region.

### **5.3 THE EMERGENCE OF GOVERNANCE CAPITAL**

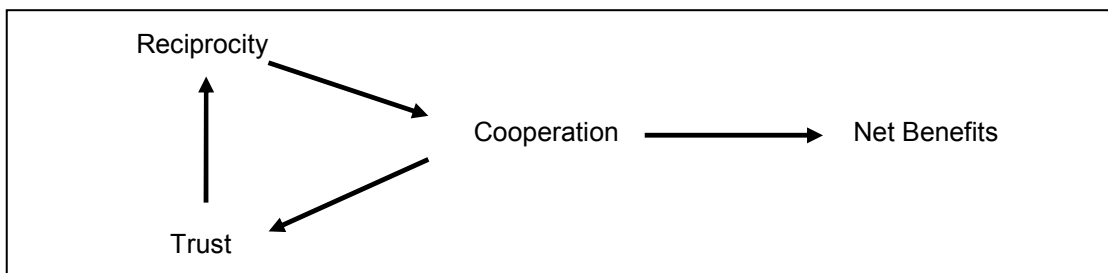
In this chapter, the main discussion has highlighted how the development of social capital is an important mechanism through which devolved governance arrangements such as regional NRM can generate benefits. The development and maintenance of these 'soft' institutions can play a critical role in the efficient functioning of an economy, as they essentially minimise the transaction costs associated with achieving certain outcomes such as those relating to NRM. However, the concept of social capital, though useful in providing a framework that can explain some of the 'soft' benefits at a general level arising from participatory and inclusive engagement processes, is still not able provide a sound conceptual platform to explain the benefits arising from specific governance arrangements such as regional NRM. It is evident

from the literature that a gap in the theory exists in this field specifically in relation to regional NRM.

To address this theory gap, a type of social capital of interest is proposed in this study termed regional *governance capital*. This might occur when a governance model such as regional NRM results in developing specific skills and engagement processes within a region. This can be likened to building a region's 'collaborative advantage' (e.g. Huxham 1996; Huxham and Vangen 2000) in achieving regional NRM goals and outcomes.

It was outlined in section 5.2.1 that social capital was similar to other forms of 'capital' as once it was created, it could yield an ongoing flow of benefits and be used for a variety of uses. This is consistent with the notion that once established to a certain level of maturity in a community, social capital represents the mechanism by which positive-feedback, or increasing-return dynamics could be harnessed to achieve NRM collective action outcomes (e.g. Marshall 2005). This may explain spontaneous cooperation evolving through a self-reinforcing cycle of positive feedbacks between trust, reciprocity and cooperation (see Figure 5.1).

**Figure 5.1: Social Capital Feedback Cycle**



(Source: Marshall 2001, p.151, after Ostrom 1998, p.13)

Moreover, Putnam *et al.* (1993, p.169) declare that "success in starting small-scale initial institutions enables a group of individuals to build on the social capital thus created to solve larger problems with larger and more complex institutional arrangements". In the context of the regional NRM arrangements of interest in this study, this represents the embodiment of the concept of governance capital, a specific *product* and *type* of social capital arising from the interaction, collaboration and participatory NRM engagement processes under the regional NRM



arrangements. A region's level of governance capital is also a function of its *institutional maturity*, that is, commensurate with the level of skills, capacity and engagement processes developed *over time* as a result of experiences gained and instituted programs and systems of governance (e.g. regional NRM). The more institutionally mature a region with respect to NRM, the higher the level of governance capital.

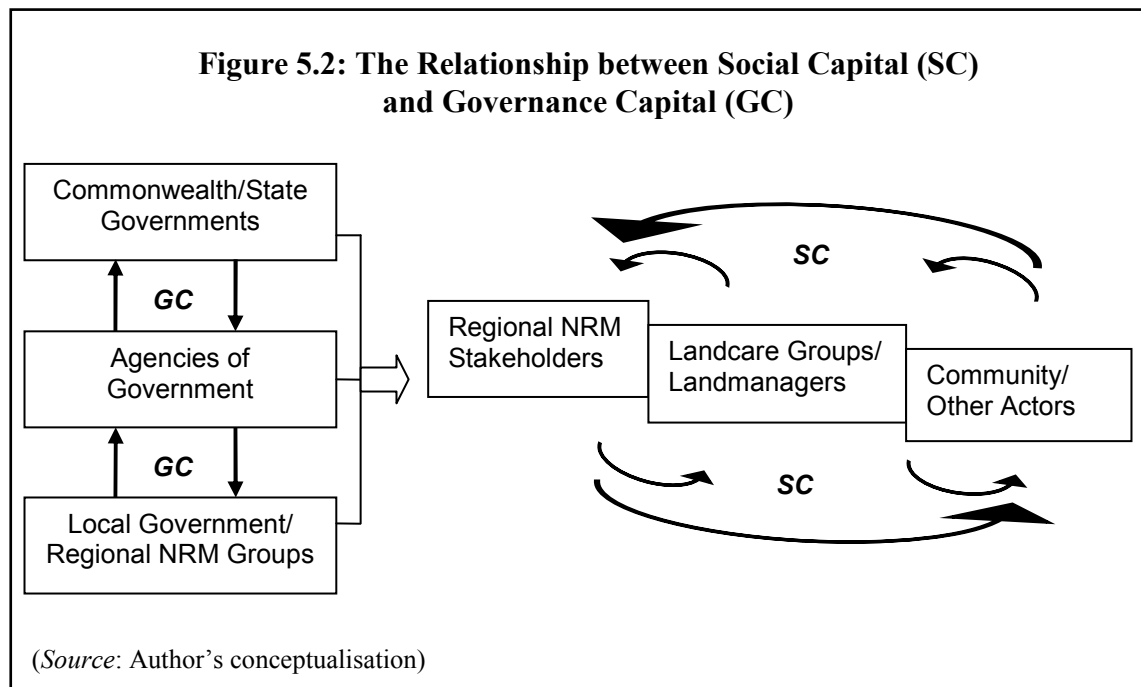
Figure 5.2 provides a conceptual framework which characterises governance capital. Unlike social capital which occurs between actors at the same level within a governance system, governance capital represents the vertical relationships between different levels and hierarchies of a nested governance system. The horizontal feedback arrows represent the level of traditional social capital enhancing processes (i.e. across catchment community), whereas the vertical arrows between different hierarchies represents governance capital.

This is consistent with concepts outlined by Coleman (1990), Grootaert and van Bastelaer (2001), Thomsen (2003), and Sekhar (2007), who note that to have an effective community-based resource management approach it is important to have both horizontal (across the community) and vertical (across external organisations and institutions such as different levels of government) links. Though traditional horizontal forms of social capital are important, without appropriate vertical articulations, the impact of community-based efforts will be limited (e.g. Grootaert and van Bastelaer 2001).

A region's level of governance capital represents a specific profile which captures the level of maturity and good working relationships developed between regional NRM organisations, regional stakeholders, and different tiers of government at all levels.

As it will become clear in the case study discussion in chapter 7, regional NRM groups are dependent on government funding in order to operate and to undertake NRM programs and regional planning activities. Funds are also tied to compliance obligations and relevant corporate governance and NRM plan accreditation processes. Implicit in this is good professional relations between relevant tiers of

government responsible for facilitating state regional NRM programs. A region with a higher level of governance capital will therefore be able to conduct the required planning and engagement processes with their local communities and sub-regional groups, and demonstrate compliance with corporate governance processes with lower levels of transaction costs and higher efficiency and effectiveness.



Although governance capital is a subset of social capital, there is one important difference that distinguishes governance capital from social capital. The former can be associated with a wide range of activities, programs, and initiatives. For example, social capital can be generated by ongoing interaction between members of a group who share common values and social norms of trust and reciprocity. Social capital can exist between the members of any group, regardless of the type of activities engaged in by the group. As outlined in section 5.2.4, negative externalities of social capital can indeed exist between groups engaged in crime and other activities which may cause harm to other members of a community. The proposed concept of governance capital is inherently a positive concept linked to the ability of a region to govern more effectively. Hence, the existence of regional governance capital provides a region with a collaborative advantage over other regions in governance matters such as NRM.

The existence of governance capital in a region has the ability to make the region more resilient to adverse impacts and more capable of engaging with development<sup>60</sup> opportunities that may arise. The accumulation of such 'capacity' in a region, perhaps resulting from processes of institutional transformations and periods of adaptive responses to various shocks and stresses imposed (through endogenous and exogenous factors), can be an invaluable resource which can be tapped to enable a region to be prepared for future uncertainties on a range of matters including NRM initiatives. Hence in this study, governance capital has been identified as one of the important outcomes that may emerge resulting from the social capital enhancing policies under the regional NRM governance model.

A region endowed with governance capital is one that can demonstrate resilience – able to withstand, absorb and adapt positively to social, economic and ecological change<sup>61</sup>. In the context of NRM, such a region not only copes with institutional and policy changes, but also is able to embrace potential opportunities (Rogers and Barker 2000) and respond by mobilising necessary resources to secure benefits. In essence, governance capital enables a region to adapt to change (Barr 2002) and is about developing a region's ability to manage change so that it can understand and cope with the internal and external influences on the direction of that change (Rogers and Spokes 2004). This provides the region with a competitive advantage consonant with Michael Porter's (1990) concept of location-based competitive advantage and the analytical concept of systemic competitiveness (Meyer-Stamer 1998; Esser *et al.* 1996).

Kilpatrick *et al.* (1998) assert that the nature of resilience is a result of regional communities embarking on a path of learning. Hence, the process of learning in regional communities through direct interaction and collaboration between community members can build social capital, which in turn can assist them to engage

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<sup>60</sup> Here 'development' refers to a range of potential actions which may include the development of infrastructure to support regional economic growth, actions which may impact on NRM activities or opportunities for funding or investment by government or industry in the region.

<sup>61</sup> The idea of resilience was also discussed in relation to adaptive management outlined in section 4.4, demonstrating the key interlinkages between the concepts in collaborative natural resource governance.

in new NRM processes (such as regional NRM arrangements). As these interactions necessarily occur within a social structure they may promote social capital if the interactions are sufficient in number and of a particular quality (Kilpatrick *et al.* 1998). Furthermore, learning communities are better able to engage with policy development, and to negotiate successful implementation of a policy if it has been developed to achieve mutual benefit (Rogers and Barker 2000). Abdalla and Kelsey (1996) argue that communities need to understand the decision making process, the trends and forces affecting change, and the degree to which they can influence change, while learning how to manage change as it occurs. This provides the community with some power and control over the decision making process. The concept of governance capital embodies these attributes.

By keeping a community informed and promoting and encouraging interactions among the community and between the community and the government responsible for the change, community learning can be achieved and community values understood and incorporated into decision making. In turn, knowledgeable, informed and empowered regional communities can assist in the successful adoption of improved land management practices. Through the establishment of regional NRM groups, the regional NRM arrangements represent the institutional avenue for developing regional governance capital through which transfer of knowledge and learning about natural resource governance processes between communities and different hierarchies of government can occur to enhance a region's collaborative advantage to achieve long term NRM outcomes.

## **5.4 SUMMARY**

At the regional level, the accumulation of social capital can in turn, result in the emergence of governance capital which can enable a region to become more resilient to adverse impacts and better able to capitalise on development opportunities.

Social capital consists of three key components: networks, trust and norms. A community rich in social capital is well-networked, trusting (while its members are trustworthy), and reliant on norms such as reciprocity. By utilising networks,

individuals in communities have greater access to support, information, resources, and opportunities to act collectively. Networks are fundamental to the realisation of positive social change in a community, as the denser the networks the greater the capacity for cooperation, and the greater the capacity to cope with change. Networks become powerful tools for government agencies in any attempt to introduce policy changes into a region.

As it was outlined in section 5.3, governance capital is the product of the vertical relationships between different levels and hierarchies of a nested governance system. Hence, a region's level of governance capital represents a specific profile which captures the level of maturity and goodwill between different tiers of government and regional organisations. Governments have an important role to play in the maintenance and enhancement of social capital and governance capital in regional communities. Governments have a responsibility to introduce institutional change policies that consider existing social capital, while providing resources and strategic policies that attempt to further enhance it in order to facilitate achieving long term regional NRM goals. Oliver *et al.* (2005, p.19) note that community engagement and collaboration processes are not an NRM "magic wand". However, by designing explicit social capital oriented policies, by providing resources to community groups that can potentially contribute to social capital and governance capital, and by re-evaluating policies with consideration of regional needs, government agencies can facilitate new networks, and increase trust. Regional NRM groups can especially play a key role by ensuring that decisions and investments do not contribute to the decline of social capital, and wherever possible contributes to the expansion of networks, by providing resources and support for networks to flourish.

Strong social capital and governance capital can increase the range of knowledge, skills, expertise, and support available to individuals, increasing their capacity to implement changed practices (Hofferth and Iceland 1998). Warriner and Moul (1992, cited in Gray *et al.*, 2000) suggest that new ideas are more likely to be adopted when land managers are part of a strong communication network, giving credence to the suggestion that rural social health has a direct impact on NRM decision making.

Different models of natural resource governance are introduced in chapter 6. In particular, an examination of the costs and benefits of the regional NRM model, including the role of social capital and governance capital in achieving NRM outcomes for a region is examined.

## 6. Towards a Regional NRM Model for Natural Resource Governance

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### 6.1 INTRODUCTION

The decentralisation of natural resource governance has become an important movement in the area of environmental planning and policy. As outlined in section 4.3.3, advocates argue that decentralising and devolving natural resource governance can improve the allocation of resources, cost recovery, and accountability, *inter alia*, and may also reduce inefficient processes in service delivery (e.g. Azfar *et al.* 1999). Cortner and Moote (1999) also affirm that decentralisation in the implementation of environmental policy can enhance fairness and equality, leading to improved trust and compliance, which results in more effective NRM strategies than a centralised regime. Coupled with the wave of decentralisation is evidence that centralised management of local natural resources has been problematic (Carlsson and Berkes 2005). Accordingly, Baland and Platteau (1996, p.244) observe:

Everybody seems to agree today that this centralised approach has been an outright failure in the sense that natural resources have not been better managed than before.

Following Oates's (1972) decentralisation principle, each environmental problem can best be solved at the lowest possible level where benefits and costs of action go together, which is echoed in the principle of subsidiarity (see section 5.3.2). The important advantage of decentralisation to the lowest appropriate level is the possibilities of tailoring the solutions to local circumstances, allowing better matching of preferences and costs. The lower cost of information and control is another potential advantage (Proost 1995).

For a regional governance model to appropriately address NRM issues, it is important to consider the institutional arrangements that influence NRM policy decisions. The role and choice of institutions will have implications for different benefits and costs, including transaction costs. The question therefore, is whether or not it is worth investing more on regional arrangements that have a higher initial investment (e.g. increased levels of collaboration and engagement, and costs of establishing new governance infrastructure), but foster the development of social and governance

capital that build stronger links with regional communities critical to delivering changed NRM practices. This contrasts with managing NRM programs centrally through existing agencies and mechanisms of government which is likely to involve lower upfront opportunity costs and transaction costs, but will generate lower levels of social and governance capital.

As inappropriate institutional arrangements can be a cause of ineffective regional governance, ongoing institutional adaptation and change may be important for dealing with NRM issues. There are many well-documented case studies (e.g. European Union environmental policy) that have demonstrated the importance of understanding continued “policy-oriented learning as both a part and an outcome of the interdependence of normative and institutional change” (Connor and Dovers 2004, p.211). One question is whether or not the institutional changes witnessed through the regional NRM arrangements represent the appropriate solution to improve natural resource management in a dynamic setting.

While decentralisation of NRM processes have been increasingly encouraged in Queensland through the regional NRM arrangements, the institutional arena in which this occurs is becoming more complex, with a greater number of stakeholders having input to policy development, making it harder to ensure that all programs are fully consistent. In addition there is also a legitimacy concern with non-elected community members having a significant influence on NRM policy (e.g. Lawrence 2004). A further aspect of complexity is whether the capacity and effectiveness for such forms of engagement would vary across government functions and whether there is a high variation existing within and between different sectors and regions.

Adjusting governance to the regional level generates additional costs and benefits. A regional NRM model will typically involve higher initial administrative costs than a central government approach given that it spreads administration that would otherwise be undertaken more centrally, across multiple regional NRM groups thus possibly sacrificing economies of scale in this function. On the other hand, the devolution of this function closer to ‘clients’ to bring about increased local



accountability and thus less of the inefficiencies associated with a highly bureaucratic, hierarchical arrangement associated with central government agencies.

The pattern of transaction cost changes is likely to be mixed. Models with higher levels of engagement will generate some increased transaction costs because of the additional time and negotiation involved. However, some governance models may generate indirect benefits in the form of increased trust, participation and engagement. These may in turn reduce other transaction costs.

There are several potential benefits of devolved governance models. Ultimately these may be reflected in improved levels of community satisfaction and environmental condition from outcomes such as more efficient use of resources and closer matching to community needs. This might be achieved in three important ways. First, better engagement may address problems of information asymmetry, where groups and agencies hold different pieces of information and mechanisms to reveal or coordinate information are not strong. Second, better governance may address principal-agent problems (see section 4.3.4). Devolving governance arrangements and giving communities more input into governance processes may help to minimise any discrepancies in incentives.

The third important way in which devolved governance arrangements might generate benefits is through contributions to the development of social capital (as highlighted in chapter 5). The development and maintenance of 'soft' institutions can be very important in the efficient functioning of an economy, because they essentially reduce the transaction costs of achieving certain outcomes. A particular form of social capital of interest is potential contributions to governance capital. This might occur when a governance model increases the skills and engagement processes within a region, making it more resilient to adverse impacts and more capable of engaging with development opportunities.

Different institutional arrangements can thus have different degrees of efficiency and effectiveness in achieving desired natural resource governance outcomes. Five governance models for NRM are outlined in this chapter. The principal focus of discussion will be on the regional NRM model, which is the interest of this study.

## **6.2 MODELS FOR NATURAL RESOURCE GOVERNANCE**

An analysis of the regional NRM arrangements of interest in this thesis needs to consider the relative cost and benefits of alternative institutional arrangements for natural resource governance. This will enable a clearer picture to be established and provide a basis to determine the appropriateness of such arrangements for achieving desired NRM outcomes. Five models of natural resource governance are outlined in Table 6.1. These are closely aligned with governance options proposed in a discussion paper (DNRM 2005) prepared by the Queensland Government as part of an analysis of future<sup>62</sup> policy options for natural resource governance in Queensland. The five models of natural resource governance as part of a continuum ranging from a centralised, top-down approach through to devolved decision making involving regional NRM groups are outlined in Figure 6.1. Each governance model is described in turn in the following sub-sections.

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<sup>62</sup> Future arrangements for natural resource governance made reference to arrangements post June 2007 when the NAP bilateral agreement between the Queensland and Australian Governments concluded.

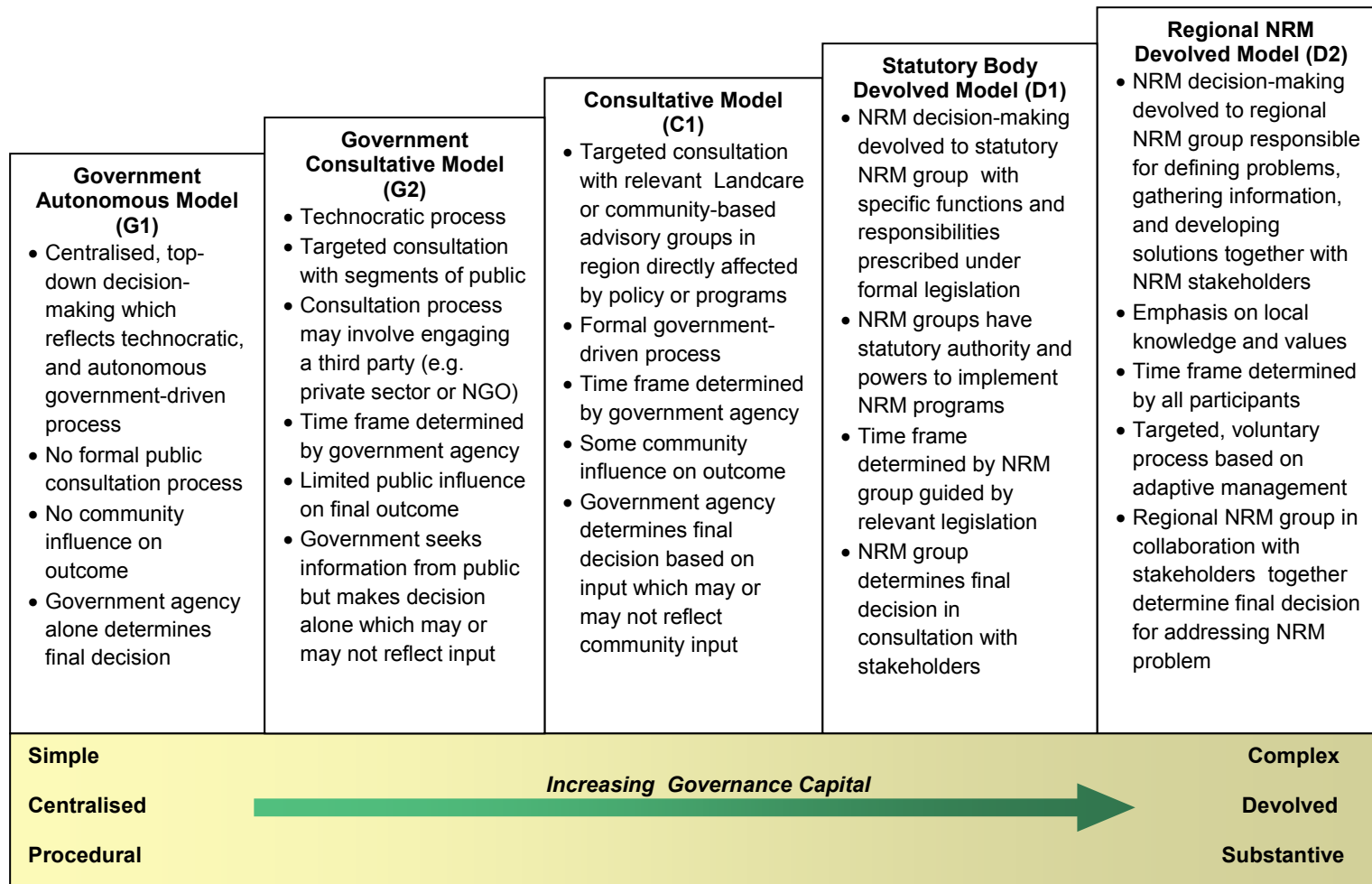
**Table 6.1: A Taxonomy of Natural Resource Governance<sup>63</sup>**

Model		Description
Government Autonomous (Government Model 1)	G1	Dissolve regional NRM groups and existing statutory NRM planning with program delivery activities subsumed within operations of central government.
Government Consultative (Government Model 2)	G2	Dissolve regional NRM groups with government agencies identifying NRM priorities as part of integrated NRM planning work, undertaking consultation and engagement of external providers (e.g. NGO, private sector) to carry out identified work.
Consultative Approach (Consultative Model 1)	C1	Dissolve regional NRM groups but facilitate a transition of regional NRM groups to community advisory bodies (e.g. NHT1, Landcare, local government associations) working within existing institutional structures and processes.
Statutory Body (Devolved Model 1 )	D1	Create a new system of community-based regional NRM planning administered by a series of new statutory bodies with the necessary statutory roles and revenue raising capacity (e.g. Catchment Management Authorities in Victoria and South Australia).
Regional NRM (Devolved Model 2)	D2	Use community-based regional NRM groups (e.g. FBA) to develop and implement NRM plans as part of NRM program delivery arrangements.

(Source: Adapted from DNRM 2005)

<sup>63</sup> The governance models are described in the context of the regional NRM arrangements in place at the time of writing.

**Figure 6.1: Five Models of Natural Resource Governance**



(Source: Adapted from Fleeger and Becker 2007, p.5)

### **6.2.1 Government Autonomous Model (G1)**

Under this model of governance, all regional catchment planning and implementation of NRM policy decisions resides with the relevant state government authority. This model is akin to the *Progressive* approach (see chapter 2) to governance where all policy decisions are developed and implemented in a top-down autonomous process with little or no input from the community.

From a public policy perspective, the main advantage associated with this approach is that existing institutional infrastructure and systems are already established within the government bureaucracy thereby reducing costs and efficiency losses. Hence, there would be lower administrative costs associated with administering NRM programs under this approach. In addition, central government planning and implementation can deliver the benefits of scale economies as homogenous NRM programs can be rolled-out across multiple catchment areas using existing government administrative and procurement arrangements.

A key presumption of this governance approach is that the worldview of the agency professional is both fully informed and “right” (Daniels and Walker 1996, p.73). Following this logic, government agency experts know best and the only participants needing to learn are the public. This reflects the traditional model of public involvement which tries to “inform and educate”, presuming that the expert decision maker simply needs to “impart knowledge” to a passive, receptive public (Wondolleck 1988).

Negative aspects of this model are associated with a lack of ability and capacity to tailor NRM programs to local knowledge and issues facing specific catchments and regions which may be critical for achieving desired NRM outcomes. For example, NRM programs developed may not be well suited to particular regions and lack of local community support and ownership resulting from top-down planning processes may erode social capital in the community, and have a negative impact by delaying or imposing costly implementation efforts.

Under this model, community engagement activities, and the potential for the incorporation of local knowledge and socio-political views to NRM programs would be extremely limited in scope and depth. Moreover, NRM planning under such a model has the potential to widen any potential rifts or reduce existing sentiment or goodwill between regional communities and the government. This may manifest itself in conflict or lack of cooperation during the implementation phase of a government-imposed NRM program and increase transaction costs. Hence, the lack of public participation and ownership can make it more likely that policy formulation and implementation may involve costly administrative or judicial forums to resolve disputes (Shrybman 1986; Priscoli and Homenuck 1986). Potential scale economies and efficiencies associated with uniform NRM policies and centralised administration for all regions may be more than offset by the increased transaction costs in implementation.

### **6.2.2 Government Consultative Model (G2)**

This model of governance can also be labeled a *private sector model*, and is similar to the Government Autonomous model outlined in section 6.2.1. The key difference concerns the involvement of a third party during the process of program implementation. It also shares similarities with the Consultative model (see section 6.2.3), but instead of engaging community-based NRM groups (e.g. Landcare groups), NRM programs and policies developed by government would be outsourced to specialist private sector organisations<sup>64</sup> for on-ground implementation.

This model differs from the Statutory Body model (see section 6.2.4), as it does not involve establishing separate statutory bodies to implement NRM programs. Private sector providers would be commissioned to implement NRM programs on a needs basis, as part of a broader NRM Plan prepared for the relevant catchment or region.

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<sup>64</sup> This may also include community-based organisations such as Landcare groups, but would be dependent on certain factors such as the capacity to deliver on NRM program requirements and outcomes.

Using NGOs or other organisations that have a good reputation and standing in the catchment community of interest can greatly enhance the likelihood of success in implementation of NRM programs. For example, Greening Australia and WWF were engaged to manage components of on-ground NRM initiatives for government agencies including the Queensland Government's Vegetation Incentives Program, and Round One of the National MBI pilot program.

One of the major driving forces behind the promotion of private sector involvement in traditional 'government' business (e.g. transport provision, water supply) is the failure of government enterprises to provide goods and services efficiently. Bennett (1995, p.426) notes accordingly:

Inflated cost regimes, poor quality of product or service and inflexibility in rapidly changing economic and social circumstances on the part of public sector operations are important factors in the push towards more private sector involvement.

Environment and NRM have not been traditional areas where private sector involvement has been sought as protected natural areas have been traditionally regarded as public goods under the domain of government provision. As discussed in section 4.2, the benefits that public goods generate are non-excludable and joint in consumption; hence they are not likely to be supplied by standard market channels. Bennett (1995, p.426) remarks that under such circumstances, "private provision is an untenable option".

However, Bennett (1995) also argues that under the appropriate circumstances, it is appropriate for the private sector to become involved in the process of supplying NRM services, particularly with respect to the supply of protected natural areas (e.g. national parks, nature reserves) both through the ownership or management of such areas or programs. However, he cautions that this does not mean the exclusion of public sector involvement in achieving the Pareto efficient level of supply. The ownership and management structure for protected natural areas needs to be determined by a case by case basis according to the level of benefits supplied.

Involving NGOs and other third party providers in the implementation of NRM programs can provide some independence and credibility from a catchment community point of view. This is especially important in regions where there have been conflict and negative sentiment between government and the local community over NRM policies or initiatives. External providers can therefore facilitate community acceptance of NRM policies and programs and assist in reducing transaction and administration costs associated with implementation.

Newell (2000) notes that governance functions are increasingly carried out by actors other than the state reflecting how the range and complexity of decisions modern governments have to make has expanded to such an extent that governments have looked to NGOs to carry out some of their work for them. This can be a helpful and efficient way of delivering services to the community. In the area of natural resource and environmental management, there is a growing emphasis on cooperative environmental governance, involving public-private partnerships between businesses, NGOs and within different sectors of government (Glasbergen 1998).

### **6.2.3 The Consultative Model (C1)**

This governance model reflects an approach similar to the program of Landcare which was discussed in section 3.1.1. Under this model, government would assume responsibility to lead the delivery of NRM programs, with community-based catchment management and NRM groups (including local government bodies) assuming community advisory roles to relevant government authorities in planning and implement NRM policies and programs. The type of advice could range from identifying regional priorities to commenting on proposed regional NRM policies and programs. As the name suggests, this governance model involves scaling back the level of local community decision making to a largely consultative role. Community-based advisory groups have no formal authority and would be engaged by government on a needs basis to act as the link to the local catchment community for the sole purpose of public consultation and provision of information and comment on the implementation of government-sanctioned NRM



programs. Fleegeer and Becker (2007, p.9) note accordingly that developing relations with community-based NRM entities allows government to "...capitalise on established local processes for facilitating public involvement, consensus building and community decision making".

A key benefit of this governance arrangement lies in the ability of government to tap into local NRM governance structures and promote interaction with voluntary community networks (e.g. landcare groups, local government associations) at the grassroots level, which in turn can generate and maintain social capital in the community vital for local buy-in. This allows government agencies to efficiently leverage local knowledge to inform NRM planning activities proposed for a region rather than embarking on developing a potentially lengthy community consultation process to identify and engage key NRM stakeholders in the region. The main thrust of this governance approach is to promote and facilitate engagement while developing social capital with existing landcare and community-based NRM groups on NRM planning activities and programs. Hence, by engaging with existing community groups and networks rather than establishing formal consultation processes over NRM issues, transaction costs and administration costs are comparatively lower under this governance approach than a centralised and top-down government approach (e.g. model G1, G2) .

However, such a model would also be dependent on the capacity and willingness of the local catchment community to undertake voluntary actions as landcare groups are predominantly staffed by volunteers from the local community and depend on financial support from various government agencies and other funding organisations to undertake NRM activities. As this governance approach would be highly dependent on the voluntary actions and local capacity of different catchment communities, there may be an inconsistency in the level of local catchment presence and skills in different regions, which can consequently impact on the ability to consistently manage consultation processes to inform the development of NRM programs and policies. In turn, this can affect the ability to meet NRM outcomes and targets for the broader region. This partly reflects the

mixed success of landcare where programs were more successful in certain regions.

#### **6.2.4 The Statutory Body Model (D1)**

The statutory body governance model involves establishing community-based regional NRM groups under legislation that are responsible for coordinating catchment planning and implementing NRM programs in respective catchment areas. These CMAs are locally driven with a board that reports to the relevant state government agency or Minister. They are independent, statutory authorities whose charter is to engage regional communities in the management of natural resources issues facing their catchment. In New South Wales (NSW) and Victoria where statutory NRM groups have been established, such groups combined the roles of the former River Management Boards, Catchment and Land Protection Boards, Native Vegetation and other NRM advisory groups such as salinity plan implementation groups and water quality working groups.

Under this model, regional NRM groups are responsible for engaging with regional communities in the management of NRM issues facing the region at the catchment scale, and are the primary means for delivery of funding from state and federal governments to assist land managers to better manage natural resources and the environment. As part of this process, statutory groups are also required to work with their communities to prepare statutory catchment management plans and manage incentive programs to implement these plans. In Australia, only the three states of NSW, Victoria, and South Australia have established regional NRM groups or CMAs responsible for undertaking natural resource governance functions underpinned by specific legislation. The other states have opted to establish non-statutory bodies. There is no direct legislative base for catchment management in Queensland, Western Australia and Tasmania. There is a range of legislation that partly covers catchment management in the Australian Capital and Northern Territories (HRSCEH 2000). A comparison of regional NRM groups between Australian states is provided in Table 6.2.

Under a statutory governance arrangement, additional costs are incurred in terms of drafting and amending or enacting relevant legislation which outlines processes for devolving statutory powers to regional groups. In addition, there will also be significant costs associated with monitoring, regulation and enforcement activities. A negative aspect associated with the statutory model involves potentially creating a conflict situation with the community, which may come to view regional NRM groups as a “fourth tier of government” (Robins and Dovers 2007, p.118). Given the negative relationships which have existed in certain catchment communities with respect to past government NRM policies, this approach may further erode social capital by exacerbating existing negative sentiment (e.g. loss of trust) towards the government and create additional conflict over NRM for sensitive regional communities.

**Table 6.2: Comparison of Regional NRM Groups between Australian States**

State	Name and number of regional bodies	Statutory Status	Legal Responsibilities	Coordinating Lead Agency
<b>New South Wales</b>	Catchment Management Authorities (13)	Statutory	Support development and implementation of Property Vegetation Plans under the <i>Native Vegetation Act 2003</i>	Department of Natural Resources
<b>Victoria</b>	Catchment Management Authorities (10)	Statutory	Responsible for beds, bank and floodplain of river and the <i>Catchment and Land Protection Act 1994</i>	Department of Sustainability and Environment
<b>Western Australia</b>	Regional NRM Groups or Catchment Councils (6)	Non-Statutory	N/A	Department of Agriculture and Food
<b>South Australia</b>	Regional NRM Boards (8)	Statutory	Comprehensive statutory powers for planning and managing natural resources, particularly water allocation planning and ensuring compliance for soil conservation, pest plants and animals and biodiversity	Department of Water, Land and Biodiversity
<b>Queensland</b>	Regional NRM Groups (14)	Non-Statutory	N/A	Department of Natural Resources and Water

<b>Tasmania</b>	Regional Natural Resource Management Committees (3)	Non-Statutory	N/A	Department of Primary Industries and Water
<b>Australian Capital Territory (ACT)</b>	ACT NRM Board (1)	N/A	The ACT government is recognised as the regional body for NHT funding purposes. An advisory body provides guidance to the relevant Territory Minister.	ACT Government
<b>Northern Territory (NT)</b>	NT NRM Board (1)	N/A	The NT government is recognised as the regional body for NHT funding purposes. An advisory body provides guidance to the relevant Territory Minister.	NT Government

(Source: Adapted from Pannell *et al.* 2007, p.2; ANAO 2008, p.64; Robins and Dovers 2007, p.113)

In addition, despite statutory powers being assigned to CMAs in relation to enforcement, experience in NSW and Victoria suggest that many CMAs are opting not to exercise enforcement powers (Binney 2005, *pers. comm.*). Some critics also question the capacity and technical skills of regional NRM groups, arguing that the portfolio of responsibilities devolved to them are too wide and that the skills base of their boards are too narrow (ABC 2002). Robins *et al.* (2005) comment that some regional NRM groups risk becoming marginalised as they take on statutory compliance roles under regulations such as the case in NSW with vegetation clearing. Robins and Dovers (2007) add that the transfer of compliance duties to regional NRM groups may compromise groups' primary roles of local engagement and there is also potential to politicise regional arrangements through the process of appointing of board members, designation of priority issues, and allocation of resources.

Furthermore, as regional NRM groups would be handed responsibility for public funds, addressing issues of public accountability and equity will be paramount (Reddell 2002a; Bulkeley *et al.* 2003). From a corporate governance perspective, a statutory approach offers more safeguards and stricter accounting<sup>65</sup> procedures

<sup>65</sup> For example, the Queensland Department of Natural Resources and Water finance and procurement procedures require that a minimum of three quotes for the provision of external

consistent with government-type entities which can limit risk in contrast to a non-statutory regime where regional groups have more flexibility and discretion over NRM expenditure. There is evidence to show that non-statutory groups generally spend most of their budgeted expenditure for on-ground NRM programs which is in contrast to statutory groups which generally do not manage to spend most of their funding (Orth 2008, *pers. comm.*). This however, begs the question of whether appropriate monitoring and evaluation frameworks are in place to ensure accountability of NRM expenditure especially in relation to non-statutory groups which take pride in their record of spending most<sup>66</sup> of their on-ground NRM project funds (Orth 2008, *pers. comm.*) and in ensuring that it is not “wasted in unnecessary administration” (Webster 2008, p.196).

On the positive side, under a statutory regime, regional groups have most of their key duties and responsibilities clearly prescribed under legislation and this can ensure that NRM planning processes and projects are implemented in a regulated and systematic manner. A statutory model allows roles, accountabilities and responsibilities to be clearly defined, clarifies operational structure and function, and provides a sound basis to support organisational functions (DNRM 2005). An example of some of the key duties and responsibilities of CMAs in NSW is outlined in Table 6.3.

In addition, under a statutory model, regional groups would also be provided with base funding from the relevant state government agency to provide certainty for staffing, and operational and administrative functions. This is in contrast with non-statutory regional NRM groups (e.g. Queensland, Western Australia) that continue to be highly dependent on government drip-feed funding in order to continue to function. This has been a significant issue for regional NRM groups as they face a high level of corporate knowledge loss from high staff turnover (LWA 2006a), and

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consulting services is obtained which are independently assessed based on a set of approved terms of reference criteria.

<sup>66</sup> Approximately 90% of FBA’s 2006-07 budget was spent on NRM projects (Webster 2008).

uncertainty over short-term funding arrangements targeting what are essentially long-term outcomes.

**Table 6.3: Key Duties and Responsibilities of CMAs in NSW**

<ul style="list-style-type: none"> <li>Preparing catchment action plans and associated investment strategies, in consultation with local government and the catchment's communities;</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring these catchment action plans integrate and build on the current catchment blueprints and regional vegetation management plans;</li> </ul>
<ul style="list-style-type: none"> <li>Recommending and managing incentive programs to implement catchment action plans and maximise environmental outcomes;</li> </ul>	<ul style="list-style-type: none"> <li>Providing landholders, including indigenous landholders, with access to data needed to prepare Property Vegetation Plans (PVPs) and implement catchment action plans;</li> </ul>
<ul style="list-style-type: none"> <li>Allocating funds to support development of PVPs and for PVP-based incentive programs;</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring performance against catchment action plans and certified PVPs;</li> </ul>
<ul style="list-style-type: none"> <li>Developing transparent procedures for the CMA to consider and resolve local disputes related to implementing the catchment action plans;</li> </ul>	<ul style="list-style-type: none"> <li>Providing education and training on natural resource management, especially vegetation management;</li> </ul>
<ul style="list-style-type: none"> <li>Certifying or facilitating certification of PVPs;</li> </ul>	<ul style="list-style-type: none"> <li>Other responsibilities delegated by the Minister.</li> </ul>

(Source: NSW Department of Infrastructure, Planning and Natural Resources, n.d., p.2.)

## 6.2.5 Regional NRM Model (D2)<sup>67</sup>

The regional NRM model consists of establishing a network of non-statutory community-based regional NRM groups responsible for coordinating catchment-scale planning and implementing NRM programs in respective catchment areas. The groups are locally driven with a board that is responsible for overseeing the delivery of a range of NRM programs in the relevant catchment area. They are independent, non-statutory organisations with strong links to their catchment communities. A key role of regional NRM groups is to develop NRM Plans that guide investment in regional NRM programs. Under this model, regional NRM groups are responsible for engaging local communities in the management of NRM issues facing the region and represent the primary means for delivery of funding from state and federal governments towards improving NRM outcomes in line with relevant NRM plans. This model of governance is similar to the statutory body

<sup>67</sup> This is the natural resource governance model of interest in this study.

model (D1), but regional NRM groups do not have a statutory basis and have no revenue raising or regulation powers. Accordingly, non-statutory regional NRM groups also have more discretion over NRM expenditure and are not subject to the strict stricter accounting procedures consistent with government-type entities as outlined in section 6.2.4.

Under this governance arrangement, additional costs are incurred in terms of establishing independent regional NRM groups and the associated corporate governance frameworks required by state and commonwealth government funding agreements. In contrast with a government-centric models (e.g. G1, G2), however, the regional NRM model is more likely to build stronger levels of trust and cooperation with NRM stakeholders since they are not perceived by the community as an agency of government. This in turn, can reduce costs associated with program implementation.

Further discussion of the potential costs and benefits of the regional NRM model is outlined in section 6.3. This is followed by an outline of an analysis framework which provides a basis for the comparison of transaction costs between two representative (model G1 and D2) governance models for NRM.

### **6.3 RATIONALE FOR THE REGIONAL NRM MODEL**

An analysis of the regional NRM model and the cost effectiveness of regional NRM groups require some assessment of the different impacts, both positive and negative, that are generated. While it is relatively easy to assess direct financial costs, many other impacts, such as influences on adoption rates of best management practices, are much more difficult to ascertain. An understanding of what motivates landholder behaviour can be important in identifying the extent and linkages between impacts. The relative costs and benefits to landholders of the regional NRM model are explored in the following section.

Some costs of the regional NRM model include transaction costs (e.g. costs and time associated with meetings, travel, preparation, and administration) and related opportunity costs. In the same respect, an analysis framework also needs

to identify and estimate the magnitude of benefits of the model, which may include efficiency gains, development of social capital, reduced conflict, and improved long-term planning outcomes. It is also important to note that some of the costs and benefits in NRM are not reflected in traditional markets, and may require specialised valuation techniques<sup>68</sup> to be properly measured.

The cost of delivering NRM through the regional NRM model is likely to be higher than traditional centralised government models. These costs primarily comprise static and dynamic transaction costs, transformation costs<sup>69</sup>, and other direct costs associated with institutional change such as establishing regional NRM groups and their associated governance systems. From an economics perspective, key issues to consider in the analysis of the regional NRM delivery model include the following:

- Any additional costs in relation to additional benefits of using regional NRM groups ;
- Efficiency benefits of regional NRM arrangements in relation to alternative models of NRM; and
- Any significant changes in the cost effectiveness of NRM planning or compliance matters through a regional NRM group as opposed to undertaking programs through central government agencies.

The problem of assigning tasks across different levels of governance has revolved largely around the principle of subsidiarity. Marshall (2001) asserts that the principle is not concerned with comparing the costs of having a certain governance function performed more or less centrally within an organisational hierarchy; Should a function be able to be undertaken less centrally, he remarks:

...then it should be, regardless of whether the cost is calculated to be higher. The implication is that any calculated increase in costs will be more than compensated eventually by better outcomes. In contrast, modern policy makers tend to be discouraged

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<sup>68</sup> The application of specialised valuation techniques such as non-market valuation to estimating transaction costs have been suggested by McCann *et al.* (2005). This is an area identified for future research.

<sup>69</sup> A discussion on static and dynamic transaction costs and transformation costs (Challen 2000; Marshall 2005) is outlined in section 6.5.



from devolving governance functions by expectations that the cost of governance will increase as a result...what might appear to be disordered and costly in the short term may in fact turn out to be crucial for adaptive efficiency over the longer term. These longer-term benefits are nevertheless unpredictable in any tangible sense and consequently tend to be overlooked in the mechanistic calculations of modern policy analysts (Marshall 2001, p.200).

However, policy analysts typically emphasise the higher levels of transaction costs associated with increasing collaboration with stakeholders in the initial stages of project planning. Hanna (1995) points out that a collaborative or 'co-management approach', such as the mode of governance characterising the regional NRM arrangements, will in the initial stage require higher costs as it takes more time and costs for community education and training<sup>70</sup>. However, she argues that once the community becomes self sufficient to manage the resources this management cost declines.

Policy analysts do not recognise that transaction costs in the later stages of governance (e.g. policy implementation and enforcement) can often be reduced when *ex ante* collaboration with lower level stakeholders is increased. Hanna (1995) notes that involvement of landowners or resource users in this stage creates a stake in the outcome and reduces uncertainty about the process. Consequently, there is increased legitimacy and *ex post* costs of monitoring and enforcement could be reduced. Lower costs may also result from a likely greater compatibility of the policies developed with local conditions (Hanna 1995). These arguments are consistent with the transaction cost analysis framework outlined by Birner and Wittmer (2004) which is introduced in section 6.4.

Collaborative governance through regional NRM processes can also avoid much of the cost and delays associated with administrative or judicial resolution of disputes that frequently accompany implementation and enforcement of policies developed within a central government hierarchy (Shrybman 1986). Priscoli and Homenuck

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<sup>70</sup> Conversely, a centralised approach is associated with low initial program design costs but high on-costs associated with implementation, monitoring and enforcement as the management system may have little legitimacy with the user groups.

(1986, cited in Marshall 2001, p. 201) declare accordingly that “...consultation for complex and difficult decisions does not lengthen the process. In fact, the reverse may be true; consultation may prevent lengthy litigation and other delays”. Moreover, Qureshi and Harrison (2001, p.111) maintain that if costs are made clear, landholders may be convinced to change their NRM practices by a combination of suasive measures and financial incentives, thus “avoiding the long lead-time, enforcement cost and social disharmony of compulsion by legislation or regulation”.

In addition, the mechanistic calculations undertaken by mainstream economic methodology (i.e. comparative statics) underpinning conventional cost-benefit analysis used to assess the value of collaborative actions often ignores the benefits of robustness in complex adaptive social-ecological systems<sup>71</sup> and consequently fails to account for the differences in the increasing-return or positive-feedback implications associated with deciding whether or not to devolve a governance function to lower levels (e.g. Marshall 2001; 2007). Community-based governance arrangements such as regional NRM also have the potential of solving NRM dilemmas by internalising the high information and transaction costs. Communities have an in-built incentive of social capital that can be employed to address problems caused by asymmetrical information and lower opportunity costs of their time than that of state machinery (Adhikari 2001). The community also has at its disposal the requisite social coercive mechanisms to influence compliance.

The following section further explores the benefits and negative aspects of the regional NRM governance model.

### **6.3.1 Benefits and Costs of the Regional NRM Model**

The regional NRM model has some potential advantages over other governance models. In theory, a devolved governance approach such as regional NRM is more efficient because those directly concerned with NRM will be directly involved with

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<sup>71</sup> This refers to strengthening of capacity at lower levels to exercise governance functions self-reliantly in accordance with the subsidiarity principle, which may be critical for adaptive efficiency in achieving NRM objectives (Marshall 2007).

policy delivery and implementation, and the inefficiencies of government can be avoided presumably when regional NRM groups are established (Lane 2006). The Wentworth Group (2002, p.3) commented accordingly that under such an approach, there would no longer exist the “bureaucratic red tape...strangling on-ground action”. Unlike programs such as Landcare, the regional NRM model adopts a more strategic approach towards the funding of programs and initiatives that have been identified as priority actions for a region. Hence, resources and actions are more effective and better targeted towards achieving environmental outcomes rather than attempting to stretch funds too thinly over a large area in a ‘vegemite approach’ (e.g. Pannell 2000) that characterised the Landcare movement and the first phase of the NHT program. The Landcare experience highlighted the high transaction costs and difficulty in governing and achieving consistency across a large number of community and catchment management groups across the country. Under the regional NRM arrangements, funding for NRM programs are channeled directly to regional NRM groups that have prepared NRM plans outlining proposed on-ground investments in programs to address environmental and NRM priorities in the region of interest.

The regional NRM model reflects the focus in recent years on devolution to regions and greater community involvement in decision making processes. This suggests that the key benefits of these programs should be an improvement in the efficiency and cost effectiveness of NRM (because it is better tailored to local and regional circumstances), in the generation of more cooperative behaviour of landholders, and in changing attitudes and beliefs (e.g. generating social capital) towards improved NRM practices.

Another potential benefit of using regional NRM groups is that it permits more innovation in the manner by which NRM issues can be tackled. This is possible by allowing variations in the running of NRM programs between different regions (in comparison to governments which tend to have uniform policies for all regions), and by trialling new approaches to NRM. Differences may emerge between regional NRM groups, where different governance styles have already been

evident in the regional arrangements in Queensland. To date, the on-ground evidence for these types of benefits being realised have been limited due to the very nature (i.e. longer timeframes to realise NRM landscape change) of achieving measurable environmental change. This is not surprising as the resources invested in designing and implementing collaborative approaches to natural resource governance such as regional NRM have not been allowed sufficient time to prove themselves (e.g. Marshall 2001; Rhoades 2000; Margerum 1999; Bellamy *et al.* 1999; Dovers 1999; AACM 1995). In the Report of Inquiry into Catchment Management (Commonwealth of Australia 2000a), it was noted that environmental problems confronting catchment systems in Australia would require generations to address.

An additional benefit of the regional model is that there is the potential for introducing some competition about managing NRM - both between the NRM groups, and between each group and the government. This does not really seem to be the driving rationale for the proposal though, and given the reliance of NRM groups on government funding, it is unclear how much real competition will emerge.

The regional NRM model may be offsetting costs against gains in efficiency. Regional NRM is a social and environmental experiment, and a long-term investment in developing the capacity of regional NRM groups is necessary (Paton *et al.* 2005). The short-term costs may be as high as those of traditional regulatory approaches (Lane 2006). Lane (2006, p.5) reasons that a regional NRM approach to governance:

...requires different skills. Planning solutions cannot be imposed (vertically) from above; they must instead be negotiated (horizontally) with multiple players, including government agencies, community and non-government groups...

These actors all have differing capabilities, degrees of authority, and power (Hamel *et al.* 1999). McCann *et al.* (2005) argues that there are trade-offs among costs over time. For example, a policy or program may incur higher initial transaction costs as part of a broader stakeholder engagement process and have lower

litigation and non-compliance costs later on (e.g. Edgell 1998; Colby and Pearson d'Estree 2000).

As previously discussed (see section 4.6), some costs of the regional NRM model include transaction costs and opportunity costs. Marshall (2003; 2005) argued that the costs of institutional alternatives are unlikely to be limited to only transaction costs and proposed that transformation costs (i.e. production and abatement costs) also need to be considered in analyses of institutional choice. McCann *et al.* (2005) also discuss the need to account for transformation costs when evaluating institutional options. Challen (2000), in outlining a normative economic framework<sup>72</sup> for analysing policy choices between alternative institutional options, argued that current institutional choices create future path dependencies and thereby affect future costs associated with changing to new institutional structures. Reference is made to what is termed 'static' and 'dynamic' transaction costs, which are characterised as the costs of decision making within a given institutional structure, and costs incurred in effecting institutional change (i.e. cost of moving to a new institutional structure), respectively.

McCann *et al.* (2005, p.528) note that, despite the importance of understanding the magnitude of transaction costs associated with environmental and natural resource policies, "few studies to date have attempted to actually quantify transaction costs". Williamson (1996, p.5) adds that this may be because estimating transaction costs represents a "formidable" challenge. In the analysis of regional NRM of interest in this study, such costs include the cost of the overarching governance framework for implementing the regional NRM arrangements, which comprise the costs of establishing and implementing the NHT2 and NAP funding programs, costs associated with establishing and operating regional NRM groups as the key delivery mechanism, and costs of collaboration and community engagement which is the cornerstone of this community-based governance approach.

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<sup>72</sup> Challen's (2000) framework for institutional choice analysis is presented in section 6.5.

There is little evidence available to suggest that the regional NRM model has generated increased efficiencies in resource management. While the NRM groups such as the FBA will deliver a number of outcomes, these are largely driven by the allocation of government funding, and it is unclear if the allocation of the same funds through different processes would deliver inferior outcomes. The key analytical issue is whether the regional NRM model can generate more benefits (e.g. efficiencies, cost effectiveness, increased social and governance capital) compared to other models. Here, six key elements of this process that may generate improved outcomes are explored in turn.

### **1. Tailoring NRM plans and outcomes to local knowledge**

There are often arguments advanced that engagement with stakeholders allows NRM management to be better integrated with local knowledge. This notion builds on theory advocating the benefits of public participation in natural resource governance. Local knowledge provides valuable insight as local communities are seen as “being well-informed about local environmental, technical, economic and social conditions” (Marshall 1999, p.3), helping to address problems of information asymmetry. Community-based strategies such as regional NRM are founded on the assumptions that local people have intimate knowledge about their environment and they will better protect them if given authority over their management (Gjertsen and Barrett 2004).

While it has been argued that government policies with respect to NRM in Australia and elsewhere have led to unsustainable results, government can also play an important role in fostering sustainability (Koontz 2006; Young *et al.* 1996). Government can recognise community rights to make resource-use decisions and rules tailored to the local context (Ostrom 1990). Structures and institutions that increase government transparency and accountability can strengthen citizen empowerment to achieve NRM objectives (Lyons *et al.* 2001). In addition, government can also establish institutions to encourage changes to individual on-ground behaviour and encourage policy changes that address local environmental issues (Rich *et al.* 1995).

Collaborative, 'bottom-up' processes have arisen as part of a trend toward greater valuation of local knowledge (Blumenthal and Jannink 2000). A greater emphasis has been placed on the technical and cultural knowledge of citizens in a search for solutions or improvements to local NRM problems (Dietz and Stern 2008; Chambers 1989, Chambers *et al.* 1989; Gray 1989, Scoones and Thompson 1994, Thrupp *et al.* 1994). Such bottom-up approaches can catalyse a cycle of action wherein land managers are empowered and encouraged to use their local knowledge to determine the problems that affect them and identify possible solutions (Vanclay and Lawrence 1995).

The role of local knowledge in rural development has been widely researched in developing countries (Rhoades 1984; Warren *et al.* 1989; Scoones and Thompson 1994). It is viewed as a critical source of information and insight about local farming systems, culture, and beliefs. The skills and knowledge farmers gain from adapting ideas to their local conditions often form the basis for change in rural communities (Millar and Curtis 1999). Such knowledge relies strongly on past experience, intuition, and the environment (both physical and social) in which it evolves (Chambers *et al.* 1989; Reijntjes *et al.* 1992).

Vanclay and Lawrence (1995) add that devolution approaches effectively tap into farmers' 'indigenous technical knowledge', or local knowledge of things such as weather cycles and vegetation growth. Indigenous technical knowledge, and farmers' knowledge of their own farming systems can be valuable to the process (Jennings *et al.* 2001), and very relevant to the local management of natural resources. Baland and Platteau (1996) contend that local knowledge is vital in formulating rules and monitoring mechanisms that take equity as well as efficiency considerations into account, and therefore are likely to receive wider support from local citizens or resource users. In turn, policy decisions can be enriched by local knowledge adding value to the outcomes (Dugdale and West 1991). Involving the catchment community in resolving resource management problems also leads to better solutions due to the richness of local knowledge (Bennett 2003). Increased

public participation also decentralises problem-solving and thereby allows many more institutional and technical 'experiments' to be carried out (Marshall 1999).

However, most NRM issues are complex and require specialised technical knowledge that is not always available at the local level. It is arguable therefore, that devolving decision making to the regional level may not always lead to optimal outcomes due to a lack of local technical capacity with respect to NRM. Lane (2006) notes accordingly that there are reported cases where decentralised NRM has resulted in undemocratic decision making processes and an inequitable distribution of resources due to the variation in the skills and resources inherent in different regions.

## **2. Capacity building**

Capacity building is often advanced as a key goal of regional engagement. As a primary goal, capacity building is unlikely to generate greater efficiencies, as it suggests that land managers need to become responsible for a wider range of outcomes rather than specialising in particular production outcomes. Instead, capacity building is more likely to have indirect benefits, as it may make landholders more receptive to new information and help them to become engaged in negotiation processes.

Following on from the foregoing discussion, public participation through the regional NRM model can be viewed as a means to facilitate 'community empowerment' which results from the use of local knowledge, opportunities for this knowledge to be enhanced through learning-by-doing, and through establishing 'community ownership' of the opportunities or problems facing a group and of the strategies devised for addressing them (e.g. Pretty and Shah 1997). Learning-by-doing provides citizen groups with the opportunities to develop 'capacity' in areas such as organising, accessing information, analysing problems, developing solutions, consulting, negotiating, resolving conflicts, monitoring, and sanctioning (World Bank 1996). In line with the principle of subsidiarity, the regional NRM model has seen some formal NRM authority devolved to regional NRM groups which will provide a platform for the development of capacity for



community-based NRM groups to undertake NRM planning and implementation of programs relevant to the region of interest.

### **3. Improving cooperative behaviour**

Community-based programs are often encouraged as ways of increasing levels of cooperation between landholders. Cooperation can come about through a variety of routes. Sometimes it can be wholly voluntary, sometimes it can be wholly dependent on externally-provided incentives, and often it involves a substantial predisposition to cooperate voluntarily but reinforced by external incentives. A key reason for why cooperation is desirable is because NRM is typically concerned with joint production associated with conserving common-pool resources. While there are some areas where cooperative behaviour is desirable, the key issue is that there are many management actions with joint production outcomes. Joint outcomes can be maximised through a number of mechanisms such as via external incentives generated by market-based instruments, and do not automatically require explicit (i.e. voluntary) cooperation. However, it needs to be recognised that the transaction costs of administering and enforcing such external instruments may prove prohibitive unless most of the individuals involved already feel a reasonably strong motivation to cooperate voluntarily (i.e. level of external monitoring and enforcement kept sufficiently low enough for transaction costs to remain affordable).

Meinzen-Dick and Knox (2001) assert that the main justification for devolving NRM functions through community-based programs has been that it allows for closer matching of interventions with the norms of each community, thus reducing the need to enforce them coercively. Marshall (2004), in his review of implementing land and water management plans in a region of the Murray-Darling Basin, states that farmers are more likely to cooperate in implementing a plan that they helped create; and secondly, they are more likely to cooperate with a community-based hierarchy in implementing a plan than they are with a government hierarchy. Hence, addressing the need for greater community involvement and perceptions

of government may play a key role in achieving desired outcomes under the regional NRM governance model.

#### **4. Changing behaviour through improved knowledge**

A key argument for the use of regional processes is that it improves the process of knowledge diffusion to land managers. Better information is likely to improve sustainability (avoiding negative impacts on-farm) because it is in landholders' financial interests. The provision of better information about spill-over effects (negative impacts off-farm) will not automatically lead to management changes, but may make landholders more receptive to suasive arguments, cooperative agreements or other mechanisms addressing the issues.

#### **5. Improved take-up and compliance**

A major benefit of regional NRM arrangements is that higher levels of interface and suasion can improve take-up and compliance. The current focus of the NRM groups appears to be suasive methods, which are aimed at changing perceptions and priorities about the environment through information provision, education programs and social recognition and pressure schemes. Suasive measures have the benefit of better informing people about the implications of their actions (Proctor *et al.* 2007; Comerford 2004). It is likely that there are real benefits to engaging landholders at a group level – in terms of encouraging NRM practices and compliance.

Employing non-statutory regional NRM groups under the regional NRM model also offers a clear mechanism to develop and build a trust relationship that encourages participation in NRM programs. For example, there was strong anecdotal evidence reported by Rolfe *et al.* (2005) that landholders involved in a market-based instrument (MBI) pilot project <sup>73</sup> in central-western Queensland were

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<sup>73</sup> This project aimed at establishing east-west landscape linkage corridors for addressing environmental issues of landscape fragmentation for managing farm-level biodiversity protection in the Southern Desert Uplands region of Central Queensland. The key research question was how to design a conservation auction process where landholders were expected to compete on price, but where cooperation was also needed to ensure corridors linked at property boundaries. Hence, it was critical that landholders were able to trust the organisation facilitating the process in order to achieve the optimal outcome.

uncomfortable dealing with government, and that an independent body such as a regional NRM group was more appropriate.

## **6. Reduced conflict over resource management**

A key benefit of the regional NRM governance model is that it has the potential to reduce conflicts between landholders and government over resource management. This is because it provides both groups with a third party to act as an intermediary negotiator, reduces the likelihood of political backlash (Bennett 2003), and provides a mechanism for negotiating changes in resource management. Increased public participation can also make it more likely that policy formulation and implementation can proceed without needing to resolve disputes in costly administrative or judicial forums (Shrybman 1986; Priscoli and Homenuck 1986).

### **6.3.2 Criticisms of the Regional NRM Model**

The regional NRM model appears to be a compromise between a Landcare model (which emphasised community engagement) and a regional governance model (which could be expected to have more discrete powers). The difficulties facing regional NRM groups is that they have no enforcement or price setting powers, so their actual management powers over NRM issues are quite limited.

One of the key criticisms of the regional NRM model implemented under the NHT2 and NAP framework is the potential for poor funding allocation decisions due to low levels of effective controls over funding allocations. Pannell (2008) asserts that there was no consistent framework for planning and prioritisation under the NHT2 and NAP programs which resulted in poor investment decisions and a wide variation between NRM regions in the approach used. Furthermore, the accreditation of NRM plans and process for approving funding under the NHT2 and NAP programs did not require regional NRM groups to make good use of scientific information in the formulation of investment priorities and programs despite repeated calls in various reviews and inquiries commissioned by government (Pannell 2008).

In the case study of interest in this research, the FBA's NRM plan<sup>74</sup> undertook a risk analysis approach to determine highest priority targets, and assessed "which actions contributed most to achieving these targets" (McDonald *et al.* 2005, p.43). For example, it proposed the rate of clearing, and extent and distribution of native vegetation cover as key indicators. In-stream habitats, riparian zones, and freshwater wetlands targets received a very high priority rating (Score 1). Biodiversity conservation and ecosystem health resource condition targets received a high priority rating (Score 2), while resource condition and management action targets for conserving species diversity received a low priority (Score 4).

However, the targets identified in NRM plans prepared by the FBA and other regional NRM groups appear to be unrealistic and it is difficult to see how these would be linked with the outcomes of on-ground NRM programs funded by small temporary grants. While some NRM targets appear to be set too high, other targets are set too low which may be the result of intense pressure from industry groups not keen to alter production to meet targets. Another issue is that cost is not normally included as part of the considerations in setting priorities. Pannell (2008, p.4, emphasis added) comments:

Environmental targets should be consistent with the known bio-physical information about the asset's response to management, the known behavioural responses of land and water managers to policy interventions, and the resources available under the program...you cannot select such targets unless you have undertaken high-quality analysis of the investment options. In the NAP and NHT, the program required...[regional NRM groups]...to specify targets, but did not require those targets to be in any way *realistic*. Indeed, in some ways realism was discouraged within the guidelines imposed. Not surprisingly, "80 out of the 163 resource condition targets identified in the plans [of eight regions examined] did not meet the identified criteria in terms of being measurable or having a specific timeframe" (ANAO 2008, p.19).

This is consistent with criticisms leveled at regional NRM groups' planning and prioritisation frameworks, which have not made good use of scientific information when formulating their investment priorities and plans, and also did not undertake adequate monitoring and evaluation of NRM actions to validate management

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<sup>74</sup> The FBA case study is outlined in chapter 7.

decisions. However, this was not entirely due to the intentions and actions of regional NRM groups, who were under pressure to complete projects. In particular, Pannell (2008, pp.2-4, emphasis added) notes:

...they did not use adequate information about the link between proposed actions and environmental outcomes. They were not provided with technical support to do so and they were *not required* to demonstrate that they had done so in the course of plans being accredited by government...[regional NRM groups] were under severe time pressure to complete their planning processes and commence spending the money, irrespective of the quality of those plans...[Regional NRM groups] did not undertake monitoring and evaluation...The programs *did not require* them to do so. Monitoring in NAP and NHT focused on accountability for funds spent, but neglected the achievement of environmental outcomes. This focus sent a message to [regional NRM groups] that government was not really concerned about achievement of outcomes, only with spending the money.

Key deficiencies associated with the regional NRM model can be summarised as:

- Poor and misinformed decisions on funding allocations coupled with lack of appropriate monitoring and evaluation regimes (e.g. Pannell 2008).
- High transaction costs of establishment and governance (e.g. ITS Global 2006).
- Untested systems of governance based on the deliberations of unelected representatives (e.g. Lawrence 2004) – boards of regional NRM groups are not elected, hence unclear what is the real legitimacy and political power base. This gives rise for the potential to hand responsibility for public resources to community elites and unauthorised groups which may exclude key stakeholders (ADB 2003; Beierle and Konisky 1999; Yandle 2003; Lawrence 2004).
- Regional consensus type approaches often means that boards are susceptible to rent-seeking behaviour (e.g. Robins and Dovers 2007), which may lead to issues of power, conflict and accountability (Pannell 2008; Reddel 2002a; Bulkeley *et al.* 2003; Casey 2003; Bryan 2004; Lane *et al.* 2004).

- Limited and variable capacity and skill base in different NRM regions (e.g. Pannell 2008; Robins and Dovers 2007), which raises the question of whether the regional NRM groups are a way of improving skills in a region.

Given that governments have a number of other NRM initiatives in place, it is clear that only a small proportion of NRM responsibilities are being devolved to regional NRM groups. If the regional NRM model can generate significant efficiencies, a key question therefore is why it is not used to address all NRM issues.

Marshall (2008, p.2) adds that regional NRM groups are already under pressure to meet bureaucratic reporting requirements and related responsibilities (e.g. demonstration of upward accountability to governments funding them) and this risks them “becoming perceived by their constituents as extensions of government”.

Other criticisms associated with the regional NRM model relate to economic efficiency concerns, namely that there are potentially higher governance costs and transaction costs associated with effectively maintaining a separate layer of administration. These costs will tend to increase with the number of organisations to support, which is one reason why there has been a move away from the atomistic Landcare approach towards the regional NRM model.

Such cost factors stem from the participatory and engagement processes associated with this model. Bennett (2003) asserts that involvement of catchment communities in NRM planning rapidly increases the costs of the planning process, is likely to be a constraint on optimal catchment plans, and may well retard catchment remediation measures and increase their cost. Participatory processes may also add to the costs and time of project delivery with no guaranteed final impact or improvement (e.g. Dovers 2000; UNDP 2000; Robinson 1993). Marshall (1999, p.12) adds that there have also been general concerns raised that the costs of increased public participation can be “prohibitively high”. Marsden, Oakley and Pratt (1994, p.154) noted that participatory processes generally lead to slow, over-complicated decision processes which are “so extended and non-directional that nothing appears to happen”. An evaluation of participatory approaches in forestry

and water sector projects undertaken by the Operations Evaluations Department at the ADB (2003, p.3) note similar concerns:

While participation has mainly been viewed as a positive force promoting improved design, implementation and operation, it has also been subject to criticism. Issues have related to the difficulty of establishing genuine participation; the potential for elites to hijack participatory processes for their own ends; manipulation of participatory processes by government staff and consultants; and reduced obligation on governments to provide services to society. The presumed need for consensus in participation can artificially disguise mutually exclusive interests within a community, leading to potential problems if not the breakdown of the process.

In contrast, it has been argued that well-designed participation processes can facilitate greater achievement of goals in less time and at lower cost than would otherwise be possible (Marshall 1999). This is consistent with arguments supporting devolved governance arrangements such as those associated with regional NRM which have the potential to foster the development of social capital and governance capital (see chapter 5). The World Bank (1996) observed accordingly that when the institutional setting is appropriate, participatory, community-based programs actually cost less and are quicker to implement. It is also important to acknowledge however, that the level of conflict differs for different communities which consequently influence participatory engagement processes. Some communities have shared interests (e.g. farming communities) and generally have lower levels of conflict. Other communities may have divergent interests and varying levels of social capital. The varying levels of social capital provide an indication of how successful the community is in managing the conflict. A regional NRM approach may not be as effective (or may require more effort in planning and resources) in communities which possess lower levels of social capital and higher levels of conflict.

In the following section, a comparative transaction cost framework is presented which provides a theoretical basis for undertaking an analysis between alternative natural resource governance approaches and offers insights to guide the case study analysis.

## **6.4 A FRAMEWORK FOR COMPARATIVE INSTITUTIONAL TRANSACTION COST ANALYSIS**

A key focus of this study is on a cost effectiveness analysis of regional NRM. This is achieved by undertaking a comparative transaction costs analysis between different models of governance in relation to achieving desired NRM outcomes. In particular, the analysis between a government-centric NRM approach and a regional NRM co-management approach is important to demonstrate broad costs and benefits between the two broad approaches.

A cost effective program maximises the NRM or environmental outcome for the resources being expended, or it achieves a set level of environmental improvement at the least cost (Latacz-Lohman 2000, p.9). This is more practical than assessing economic efficiency, which assesses the net marginal benefits and costs of the environmental or NRM improvement. Latacz-Lohmann (2000, p.8) notes that accurately identifying and measuring all the costs and benefits, together with quantifying marginal values of environmental measures for NRM programs, is a very difficult task. This is largely due to the difficulties of identifying project outputs and measuring associated community or public benefits. Given the constraints of such parameters in relation to matters of environmental and natural resource management, this makes cost effectiveness analysis more of a practical criterion for assessing a program<sup>75</sup>.

This section outlines an analysis framework proposed by Birner and Wittmer (2004) for comparing NRM governance models. This is based on the discriminating-alignment hypothesis following Williamson (1991), according to which transactions that differ in their attributes are aligned with governance structures that differ in their costs and competence in order to achieve an economising result. In particular, a comparative theoretical analysis of levels of transaction costs incurred by a hypothetical central government model and the regional NRM model (e.g. model G1 and D2, respectively, see section 7.2) is

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<sup>75</sup> Evaluations of other Australian NRM programs also adopted a cost effectiveness criterion due to these reasons (e.g. BushTender MBI pilot program in Victoria).



presented which provides an analytical base to inform the case study analysis in this study.

#### **6.4.1 Types of Transaction Costs in NRM**

Transactions in NRM activities can mostly be related to production and regulation activities. Birner and Wittmer (2004) assert that 'production' has to be interpreted in a wider sense than is usual in the industrial sector as prescribed by the literature (e.g. Williamson 1985, 1999). The conservation of natural resources can be considered as the production of nature products and services (e.g. ecosystem services). This production is typically achieved by placing regulations on competing resource uses such as on agriculture, forestry and fisheries by declaring protected areas and regulating rates of resource extraction. In the analysis framework proposed by Birner and Wittmer (2004), regulation and production functions are not distinguished, but are expressed in relation to: (i) decision making with respect to NRM, and (ii) the implementation of the management decisions in NRM.

Under this framework, they distinguish between *transaction costs of decision making*,  $T_D$  (e.g. data collection, community engagement), and transaction costs that are necessary for their implementation,  $T_I$  (e.g. monitoring of NRM practices). To assess the comparative advantage of different governance models, production costs arising under each model also needs to be taken into account. Production costs refer to both opportunity costs (e.g. production foregone due to NRM activities) as well as implementation costs (e.g. cost of NRM activities such as fencing, planting trees etc.).

The transaction costs of decision making arising under a particular governance model,  $x$ ,  $T_D^x$ , consists of: (a) the costs of acquiring the information necessary to make appropriate decisions, and (b) the costs of coordinating decision making if different individuals and groups are involved. This category of transaction costs

includes resources spent on meetings and settling conflicts and the costs arising from delayed decisions<sup>76</sup>.

Since the quality of decisions reached is influenced by the transaction costs spent on decision making, this trade-off is captured under the category of decision-failure costs – the costs resulting from sub-optimal decisions. Birner and Wittmer (2004) include the sum of the transaction costs of decision making and decision failure costs as *decision costs*,  $(T_D^x + F_D^x)$ .

Identifying appropriate governance decision making structures where there are conflicting values and interests such as in the area of NRM is a fundamental problem in public choice theory. Birner and Wittmer (2004) suggest that decision-failure costs may be considered as the deviation from a social welfare function, but note that no procedure exists that makes it possible to aggregate individual interests to a social welfare function if some basic principles such as the absence of a dictator are satisfied (e.g. Arrow 1950). In *The Calculus of Consent*, Buchanan and Tullock (1962) offer a possible approach to address these issues. They distinguish costs of decision making, which correspond to the transaction costs of decision making as defined above, and ‘external costs’, which arise if collective decisions negatively affect the interests of the individual. The decision-failure costs involved in NRM decisions can be likened to these external costs.

Buchanan and Tullock (1962) assert that the external costs can be avoided if the *unanimity rule*<sup>77</sup> is used in decision making. However, this is likely to increase decision making costs, given that the decision which is optimal for an individual is influenced by the trade-off between the costs of decision making and the external costs for the decision (Buchanan and Tullock 1962). Birner and Wittmer (2004) note that in principle, the concept of external costs in the approach of Buchanan

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<sup>76</sup> Birner and Wittmer (2004) assert that any irreversible effects and damage (e.g. decline in biodiversity in a protected area) resulting from decision delays need to be included in the category of decision-failure costs. This will be dependent on the number of actors or stakeholder groups involved in a particular governance model, and on the inherent conflicts or interests between them.

<sup>77</sup> Following Buchanan and Tullock (1962), the unanimity rule makes reference to the situation where all individuals have to participate in decision making and have to consent.

and Tullock is capable of addressing all types of preferences individuals may have in a decision making process on NRM issues. However, due to the problems of comparing economic and non-economic objectives within the same framework, it needs to be acknowledged that the “possibilities for applying this approach for deriving practical implications on decision making procedures remain limited” (Birner and Wittmer 2004, p.670). They propose that an assessment of appropriateness of decision making structures should combine the efficiency considerations of economic theory with participatory approaches developed in other disciplines, such as deliberative democracy (Wittmer *et al.* 2004; Birner and Wittmer 2004). This interdisciplinary approach deals with the improvement of decision making but, unlike transaction costs economics, allows for the fact that individuals may alter their preferences or accept reasons for collective action even if they do not find them “maximally advantageous” (Fung and Wright 2001, p.19). Accordingly, the process of deliberation offers an opportunity to address the problem identified by Arrow (1950) while providing a mechanism to reach consensus as prescribed by Buchanan and Tullock (1962).

Transaction costs of implementation,  $T_I^X$ , occur in the implementation of both regulatory and production decisions in NRM. The transaction costs of implementing regulatory decision are influenced by:

- The incentives to comply with the regulatory decision made;
- The presence of asymmetric information on the regulated issues;
- The measurability of the outcome;
- The possibilities for the use of social control for monitoring; and
- The damage caused where there is noncompliance with the regulations.

The incentives for compliance are dependent on the direct and indirect benefits of compliance as compared with defection. These include the costs<sup>78</sup> due to rent-seeking and other opportunistic behaviour such as shirking free-riding and moral hazard that occur under different governance structures.

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<sup>78</sup> Ostrom (1993) refers to these types of costs as ‘strategic costs’.

Incentives for compliance in NRM matters are largely influenced by the legitimacy with which affected groups (e.g. catchment community) attach to management decisions (Birner and Wittmer 2004). Participation in decision making is a key mechanism to create this legitimacy (e.g. Mansuri and Rao 2004; Hanna 1995). The need to create incentives for compliance is essential in NRM because the number of resource users is comparatively large and spatial extension makes monitoring costly. Moreover, information asymmetry is caused not only by spatial extension and difficulties in measuring the outcome, but also by the difficulty in distinguishing the extent to which an undesired state of the environment is caused by noncompliance of the resource users or by natural factors such as climatic or biological calamities (Birner and Wittmer 2004). If implementation problems lead to a deviation from the NRM objectives set in the decision making process, this resulting damage can be likened as implementation failure costs ( $F_I^x$ ).

Subsequently the process of implementing management decisions, *implementation costs*, can be expressed as the sum of the transaction costs of implementation, the implementation failure costs, and the production costs ( $P^x$ ):

$$P^x + F_I^x + T_I^x \dots\dots\dots(6.1)$$

A governance model x is more efficient than a governance model y if the sum of the decision and implementation costs for governance model x is lower than that for y:

$$(T_D^x + F_D^x) + (P^x + F_I^x + T_I^x) < (T_D^y + F_D^y) + (P^y + F_I^y + T_I^y) \dots\dots\dots(6.2)$$

The literature on comparative efficiency of governance structures (e.g. Williamson 1991) typically express costs in terms of governance costs and production costs, where governance costs ( $G^x$ ) can be expressed as:

$$G^x = T_D^x + F_D^x + T_I^x + F_I^x \dots\dots\dots(6.3)$$

Hence, a governance model x is more efficient than a governance model y if the sum of governance costs and production costs for x are less than that of y:

$$G^x + P^x < G^y + P^y \dots\dots\dots(6.4)$$

It is important to note that the comparison of costs as outlined in the framework above is only possible if benefits attained are assumed to be held constant. Hence, costs arising from different governance models need to be considered with respect to achieving a certain resource conservation or NRM objective, which determines the available benefits (cost effectiveness analysis) (Birner and Wittmer 2004). The different levels of benefits attributable to different governance models can be included as costs (benefits foregone) of the alternative governance models. The establishment and operation of institutions do not only incur costs, but may also lead to benefits, such as development of social capital resulting from participatory decision making processes. Birner and Wittmer (2004) state that under the analysis framework outlined above, such benefits need to be deducted from the costs arising for the transaction.

#### **6.4.2 Attributes of Transactions in NRM**

Three key attributes of transactions was identified by Williamson (1985), namely asset specificity, frequency, and uncertainty. However, McCann *et al.* (2005) assert that these factors which are assumed to affect transaction costs, and thus decision making in the private (i.e. frequency, uncertainty, and asset specificity), may not be the most important factors for environmental and natural resource policy. Other factors, such as monitoring technologies (Fullerton 2001), property rights (De Alessi 1983; Allen 1991), and other institutions (North 1990), may also be crucial. Birner and Wittmer (2004) suggest two additional attributes with particular relevance to NRM policy matters: (i) *care versus effort intensity*; and (ii) *contest intensity*. These attributes are outlined in turn below in relation to NRM issues.

##### *Specificity*

In the economic literature on industrial production, Williamson (1985, p.53) refers to “site specificity” and “asset specificity” as limitations on the use of investments for different purposes which result in “lock in” or “hold up” problems. In NRM, physical assets such as river catchments, forests and vegetation can be classified as site specific. In the same respect, Birner and Wittmer (2004) argue that the extent to which a species is endemic and endangered is a form of asset specificity since

threat of irreversible damage or reduction in biodiversity in these areas can cause hold up problems. They also assert that transactions in NRM differ in the required specificity of human resources for achieving NRM outcomes (e.g. Steelman and Ascher 1997).

### *Uncertainty*

In matters concerning NRM, a high degree of uncertainty exists due to the complexity and range of factors (e.g. climate variability, human activities) that can influence outcomes. Threats to natural resource assets can stem from man-made or natural causes, which may result in reversible or irreversible effects.

### *Frequency*

The frequency of transactions in NRM depends on the type of decision. Day-to-day operational decisions can be considered as frequent, with more strategic decisions considered less frequent (Birner and Wittmer 2004). Most activities carried out to implement management decisions are frequent, ranging from daily to seasonal depending on the NRM setting.

### *Care intensity*

Following Fenoaltea (1984), Birner and Wittmer (2004) propose ‘care intensity’ versus ‘effort intensity’ as an additional attribute in NRM problems. Care-intensive transactions are defined as: “activities that are difficult to monitor because they involve carefulness, watchfulness, and diligence and, therefore, leave ample room for shirking or even sabotage” (Birner and Wittmer 2004, p.673). An example of a care-intensive activity in Australian NRM is the monitoring of the forest to prevent bushfires. In contrast, effort-intensive activities require physical labour as opposed to care and diligence and hence, are easier to monitor (Fenoaltea 1984). In NRM, effort-intensive transactions are more typical in production activities (e.g. erecting of fences along riparian areas) than in conservation activities, though it needs to be recognised that certain activities can be associated with joint outcomes.

### *Contest intensity*

Given that transactions concerning NRM are often contested among different interest groups, Birner and Wittmer (2004) also propose the attribute of 'contest intensity' which relates to issues of scarcity of the resource system and to the extent to which NRM objectives require restrictions on resource use. The rights and claims that stakeholders have within a governance structure in operation prior to a devolution process greatly influence the degree to which transactions will be contested under any reformed governance structure (Birner and Wittmer 2004).

### **6.4.3 Transaction Costs of Different Governance Models**

In analysing alternative governance models in accordance with the discriminating-alignment hypothesis consistent with the above cost categories, Birner and Wittmer (2004) propose a framework for analysing comparative transaction costs in NRM using two representative governance models<sup>79</sup>: the pure state sector model (e.g. Government model, G1) and co-management (e.g. Regional NRM model, D2).

In this analysis framework, it is necessary to distinguish between state sector and non-state sector governance models. Organisations in the state sector, which include both political decision making and administrative bodies, are different from other organisations as they are typically financed by public monies (i.e. taxes) and have coercive or regulatory powers. However, state agencies may also enter into voluntary agreements with organisations outside the state sector and can result in hybrid<sup>80</sup> governance structures involving state and non-state parties (Birner and Wittmer 2004, p.672).

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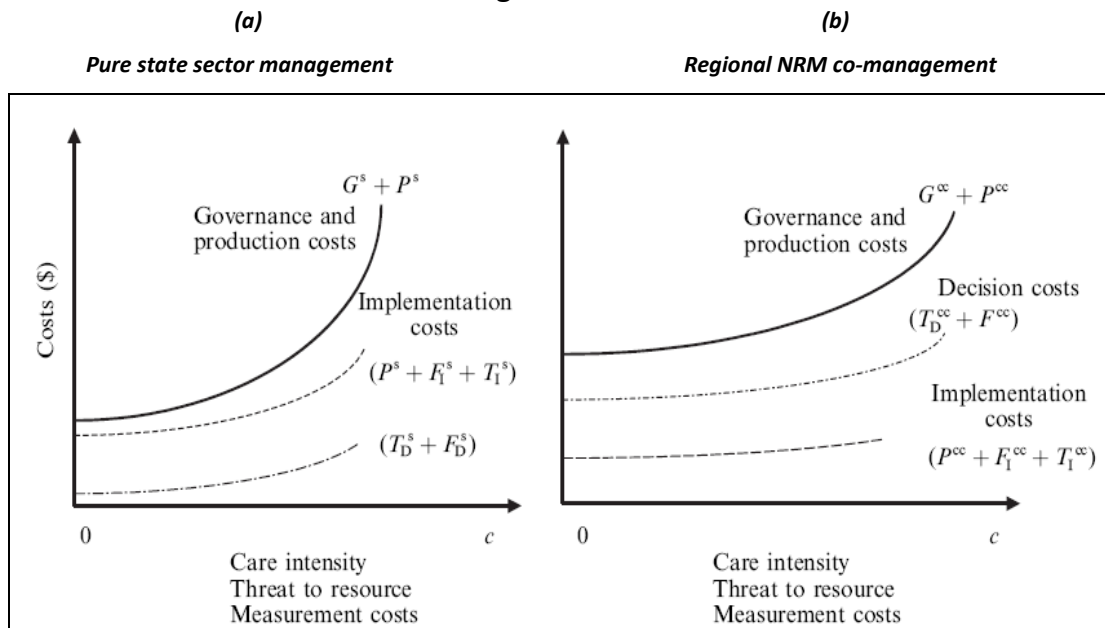
<sup>79</sup> In the economics literature, a typical distinction exists between the state sector and private sector. Some writers suggest the inclusion of a third sector model by introducing a collective-action sector (Uphoff 1986) or a civil society (World Bank 1997). As it is difficult to outline a clear differentiation between these sectors for comparative analysis using criteria such as profit motive, competition, or the prevalence of cooperative coordination mechanisms, Birner and Wittmer (2004) only use state and non-state sectors in their analysis framework.

<sup>80</sup> The role of hybrid structures, such as co-management arrangements (e.g. Regional NRM model as outlined in this thesis) are of particular importance in NRM matters (e.g. Kuperan *et al.* 1999; Borrini-Feyerabend *et al.* 2000).

Following Williamson (1991), Figure 6.2 describes the comparative efficiency of different governance structures with governance-cost curves. Birner and Wittmer (2004) define a variable,  $c$ , representing the key attributes of transactions in NRM. These include the specificity and threats to the natural resources in question (uncertainty); the care intensity of the implementation activities; and the contest intensity of the management system. Increased incidences of these attributes are assumed to have similar effects on the curves.

The sum of governance costs and production costs ( $G^x + P^x$ ) change with changing values of  $c$ . Figure 6.2(a) represents the hypothetical transaction costs of pure public sector (state) governance ( $G^s$ ), and Figure 6.2(b) the hypothetical transaction costs of co-management – a hybrid governance structure involving both state and non-state organisations ( $G^{cc}$ ).

**Figure 6.2: Comparative Costs between Public Sector Governance and Regional NRM**



(Source: Birner and Wittmer 2004, p.677)

For low values of the variable  $c$  the decision costs of state management ( $T_D^s + F_D^s$ ) are lower than those of co-management ( $T_D^{cc} + F_D^{cc}$ ). This can be assumed to be because co-management involves the costs of coordination and joint decision making, which implies that the transaction costs of decision making ( $T_D^{cc}$ ) are higher than under pure state management. Birner and Wittmer (2004, p.677) state



that with increasing values of  $c$ , decision-failure costs under a pure public sector management model of governance are likely to increase more rapidly than under co-management as the likelihood of making suboptimal decisions may be higher due to the following reasons:

- the state agency has less site-specific idiosyncratic knowledge than do local organisations, either on the natural conditions, or on local issues that can affect different NRM stakeholders; and
- the damage (e.g. irreversible environmental damage, species loss) caused by suboptimal decisions is higher the more vulnerable the landscape, or the more endangered the species (indicated by increasing values of  $c$ ).

The sum of the implementation costs of co-management,  $(T_1^{cc} + P^{cc})$  is likely to be lower than those under state management  $(T_1^s + P^s)$  at higher levels of  $c$ . The transaction costs of implementation ( $T_1$ ) are lower because local communities can use “social control” to address problems of asymmetrical information (Birner and Wittmer 2004, p.677). Increasing care intensity, which is indicated by increasing values of  $c$ , results in measurement problems for the state. If the co-management arrangement is such that the local residents are residual claimants of the benefits of nature conservation, for example income from ecotourism (e.g. Furze *et al.* 1996), they will have more incentive than state agencies to properly undertake care-intensive activities. These factors reduce the transaction costs of implementation in a co-management model. Participation and local involvement in decision making will further reduce the transaction costs of implementation as it increases legitimacy and ownership of decisions under co-management. With increasing contest intensity, the costs of decision making under co-management may increase more than they do under state management, but this increase is likely to be more than compensated for by reduced implementation costs (e.g. Birner and Wittmer 2004; Kuperan *et al.* 1999; Hanna 1995). This results from higher levels of compliance as co-management is more likely to lead to a mediation of conflicts (e.g. Borrini-Feyerabend *et al.* 2000), which reduces the need for monitoring. Moreover, local communities typically have opportunity costs of family labour that are generally lower than those of government agencies,

which reduces the production costs ( $P$ ) in co-management compared with state management (Birner and Wittmer 2004). Kuperan *et al.* (1999) found in the case of fishery management that a co-management approach had higher costs associated with decision making, while centralised state sector management had higher ongoing enforcement costs.

A co-management model may save on monitoring costs for state agencies, but local groups have to invest in additional time and resources in the form of stakeholder engagement meetings and in conservation activities. Hence, co-management typically shifts transaction costs from state agencies to local users (Birner and Wittmer 2004). This transfer of costs is an important reason why co-management is more likely to succeed if there are tangible benefits for the local community and landholders. More specifically, the literature suggests that in the case of NRM where the majority of land is held privately, landholders will need to see tangible financial benefits before adopting conservation or other NRM actions (e.g. Webb 2004; Cary and Wilkinson 1997). In the case of public goods, such as the production of ecosystem services through improved NRM practices, the creation of such benefits is a major challenge.

The following section presents an overarching cost effectiveness framework for comparative institutional choice analysis that considers costs of institutional path dependency.

## **6.5 A FRAMEWORK FOR COMPARATIVE INSTITUTIONAL CHOICE ANALYSIS**

A cost effectiveness analysis of regional NRM would not be true to the principles of the 'imperfect rational' branch (see section 4.7.1) of NIE espoused by North (1990) and others if it did not consider the transaction cost implications of institutional path dependency. The recognition that past institutional choices can affect future institutional options has direct implications for the role of adaptive management (see section 4.4) and considerations of transaction cost.

This section outlines a comparative institutional framework for adaptive natural resource governance initially developed by Challen (2000) and extended by

Marshall (2003; 2005). In particular, a transaction cost analysis framework is presented. This framework explicitly accounts for factors related to institutional change and path dependency, and offers further analytical rigour to inform the case study analysis in this thesis.

### 6.5.1 'Static' and 'Dynamic' Transaction Costs

Challen (2000) identified two types of transaction costs: (i) *static* transaction costs; and (ii) *dynamic* transaction costs. The former refer to "the costs of decision making within a given institutional structure, while the latter are those "costs incurred in effecting institutional change" (Challen 2000, cited in Marshall 2005, p.64). Two types of dynamic transaction costs were also identified<sup>81</sup>: (i) *institutional transition costs*; and (ii) *institutional lock-in costs*. The first of these arise from the cost of decision making and implementing an institutional change in the current period within the existing institutional structure. These costs include the following (Challen 2000, p.7):

- research and institutional design;
- negotiation, bargaining and decision making;
- political repercussions to decision makers;
- institutional creation, including the drafting of legislation, policies, and regulations;
- implementation, including establishing regulatory organisations and undertaking education programs;
- redundancy of organisations and human capital associated with pre-existing institutional structures;
- social displacement of individuals and firms affected by institutional change;
- compensation payments to individuals or firms disadvantaged by institutional change;

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<sup>81</sup> Challen (2000) actually described these dynamic transaction costs as "transition costs" and "intertemporal opportunity costs", respectively. The names outlined here adopt the terminology used by Marshall (2005) which enhances the link to the concept of path dependency and idea of "lock-in" (e.g. Arthur 1989).

- costs associated with lobbying and rent-seeking behaviour of interest groups; and
- increased perceptions of sovereign risk and policy uncertainty.

As current institutional choices create future path dependencies which affect institutional transition costs of shifting to new institutional structures, Challen (2000) argues that these costs tend to increase as property rights are devolved and reduce as property rights are centralised. Challen (2000, p.7) elaborates below:

...opportunities for institutional reform are constrained by the current institutional structure. The constraints arise through a current institutional structure determining the costs of transition to alternative structures. An institutional *status quo* determines the processes for institutional change and also creates vested interests for certain groups within society who resist institutional changes that threaten these interests. Where the holders of these interests have the ability to impose costs on the political decisions makers for institutional reform, they can influence the costs associated with certain options for reform...

This leads to the second type of dynamic transaction costs – institutional lock-in costs. These arise when institutional change in the current period increases the institutional transition costs of potential future institutional transformations. Challen (2000) argues that positive institutional lock-in costs represent a loss of quasi-option value since increased future institutional transition costs reduce the capacity to ‘correct’ a current institutional structure in response to learning and new knowledge. These costs can be described as those associated with reducing adaptive efficiency in the face of future uncertainty. Marshall (2001) reveals that this conclusion differs to North’s (1990) claim that adaptive efficiency increases by devolving institutional choice as reviewed in section 4.3.3. Accordingly, the level of institutional lock-in costs resulting from decentralising property rights in a given setting will be dependent “on how positive and negative implications weigh up against one another in that setting” (Marshall 2005, p.66). The devolution of institutional choices may increase adaptive efficiency on one level while decreasing it on another.

On the basis of the above discussion, Challen (2000) argues that the optimal institutional arrangement is one that minimises the sum of static transaction costs,

institutional transition costs, and institutional lock-in costs in achieving a policy objective. However, Marshall (2003; 2005) claims that this criterion fails to account for all types of costs potentially affected by an institutional choice. In particular, Marshall (2003, p.4; 2005, p.67) asserts that institutional choices also influence production costs (i.e. abatement costs), which he terms “transformation costs”, in addition to the transaction costs outlined in the above framework, and should also be considered in evaluating the effects of different institutional options. McCann *et al.* (2005) state that transaction cost advantages of an institutional alternative may be overshadowed by transformation cost disadvantages. Consequently, Marshall (2005) proposed a revision of Challen’s (2000) original framework to account for the effects of transformation costs on alternative institutional choices.

In the revised framework, Marshall (2005, p.67) also identifies static and dynamic types of transformation costs, and defines them as follows:

- Static transformation costs – costs of operating a given technology under a given institutional structure;
- Dynamic transformation costs – costs arising from the influence of a given institutional change on individuals’ choice of technologies.

Two types of dynamic transformation costs can be identified consistent with Challen’s (2000) original framework. The first type, “technological transition costs”, comprises those costs incurred resulting from the influence of a particular current institutional choice on individuals’ current choice of technologies (Marshall 2005, p.67). The second type, “technological lock-in costs”<sup>82</sup>, are those incurred due to the technological choices arising from a current institutional change creating path dependencies in technology adoption (Marshall 2005, p.67). Technological lock-in costs can also be associated with a loss of quasi-option value as they can potentially reduce the rate of future technological and institutional experimentation.

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<sup>82</sup> Marshall (2003, p.4) actually described this second type of dynamic transformation cost as “intertemporal abatement costs” which was consistent with Challen’s (2000) original reference to dynamic-type transaction costs.

When Marshall's (2005) additional cost categories are considered, the cost effectiveness analysis in institutional choice involves identifying the institutional alternative that minimises the sum of transaction and transformation costs in achieving a policy objective. More specifically, this translates to minimising the sum of all the costs incurred in the following groups, measured in monetary terms:

$$\begin{aligned}
 &\text{Static transaction costs} \\
 &+ \\
 &\text{Institutional transition costs} \\
 &+ \\
 &\text{Institutional lock-in costs} \\
 &+ \\
 &\text{Static transformation costs} \\
 &+ \\
 &\text{Technological transition costs} \\
 &+ \\
 &\text{Technological lock-in costs}
 \end{aligned}$$

Although this revised framework represents an advance, its empirical application poses a formidable challenge for adaptive managers faced with current institutional choice policy dilemmas. Challen (2000) recognised that application of the framework would not be possible without robust techniques and methods for *ex ante* transaction cost estimation. Estimating *ex ante* static transaction costs and *ex ante* institutional transition costs represent the key challenge in empirical application of this framework due to:

...uncertain functional relationships between the costs and their determinants, many costs being implicit or indirect, and many costs not being easily quantified in dollar terms (Challen 2000, p.192).

Marshall (2005) argues that significant advances have been made in developing typologies of transaction costs that provide a guide to *ex ante* transaction cost estimation, such as those advanced by McCann *et al.* (2005) and Thompson (1999). It will be critical for adaptive managers to examine approaches for transaction cost measurement that are not based on assumptions of comparative statics – which do not appropriately consider implications for institutional change and path dependency – such as the application of “inductive” methods (Marshall 2005, p.69).

Despite the challenges of measuring transaction costs for application in this framework, Challen (2000) argues that the framework offers a systematic logic to guide many existing *ad hoc* approaches for policy analysis and suggests pathways for future research to address the deficiencies. The framework also offers a significant theoretical contribution towards a contemporary theory of institutional economics consistent with North's (1990) imperfect rational school of NIE advocated in this thesis.

The analytical framework outlined above and the comparative transaction cost analysis framework outlined in section 6.4 provided a sound theoretical foundation for informing institutional choices for NRM. However, *ex ante* estimation of the different types of transaction costs identified in these frameworks poses considerable difficulties and costs in itself. NRM policymakers require simple, yet practical decision frameworks to inform long-term institutional policy and planning choices for NRM. Such frameworks must also consider indirect benefits such as the generation of social capital and governance capital, and the potential for adaptive efficiency, which can offset certain types of transaction costs. A natural resource governance decision support tool is advanced as one possible framework. This is outlined in the following section.

## **6.6 INSTITUTIONAL CHOICES FOR NRM – A DECISION SUPPORT TOOL**

In Australia, government agencies are usually the initiator of NRM programs and community engagement activities (Oliver 2004). Implicit in this function is the ability to match a specific institutional and governance system to a particular NRM problem and context. As outlined in section 6.2, there exists a range of possible natural resource governance arrangements and selection of the appropriate mechanism will have a direct bearing on the ability to achieve NRM objectives. Different arrangements may be appropriate for different settings (e.g. Barrett *et al.* 2004; Ostrom *et al.* 1999). Gjertsen and Barrett (2004) assert that little analytical work has been conducted that explores how a particular institutional arrangement may be more effective than another. The selection of specific institutional and governance frameworks involves a range of complex factors

including costs and benefits associated with different structures, related consultation and engagement processes inherent in each model, and effects on institutional path dependency inherent in current institutional choices.

The choice of particular institutional arrangement or governance model also needs to consider aspects of path dependency and opportunities for adaptive efficiency as outlined in the foregoing discussion. Following the institutional choice considerations outlined by Challen (2000) and North (1990), Marshall (2001, p.183) calls for a theory of institutional path dependency that:

...would recognise that devolution of institutional choice increases adaptive efficiency in one way (i.e. by increasing the rate of institutional experimentation and learning) but reduces it in another (i.e. by strengthening the influence of vested interests). Identification of the level of devolution that is adaptively efficient overall would therefore involve a trade-off...it is also clear that the respective strengths of the opposing considerations will differ from one context to another. Hence there remains an important need to identify and/or develop heuristics or 'design principles' that can help to locate the adaptively efficient trade-off in any given context.

Figure 6.3 proposes a decision support tool that seeks to address such a need by offering a simple framework to guide NRM decision making over the choice of appropriate governance arrangement for achieving NRM outcomes. The decision support tool is a key contribution of knowledge in this thesis.

The initial concept was influenced by the work of Vroom and Yetton (1973), who were interested in the role of employees in workplace decision making. Lawrence and Deagen (2001) adapted the model to investigate the role of citizen participation in forestry, and Oliver (2004) modified the model for examining government-community partnerships in Australian NRM. In this thesis, the decision tree of Lawrence and Deagen (2001) and Oliver (2004) was adapted and modified to link community engagement processes with respective governance structures for achieving NRM outcomes. The decision tool presented below was developed using Lawrence and Deagen (2001) and Oliver (2004) as a foundation as these frameworks were developed for specific application in the area of NRM. In particular, Oliver (2004) developed his decision tool based on a case study of a regional NRM group in southeast Queensland, and hence had direct relevance to



the regional NRM focus of this thesis. The decision support framework outlined in section 6.6.1 below offers guidance to decision makers on the potential utility of the five models of governance presented in this thesis (section 5.2). The framework can offer insight and recommendations on the appropriateness of different governance structures and provide a framework to inform processes of NRM institutional and governance reform<sup>83</sup>.

### **6.6.1 Which Model? Decision Support Tool Logic**

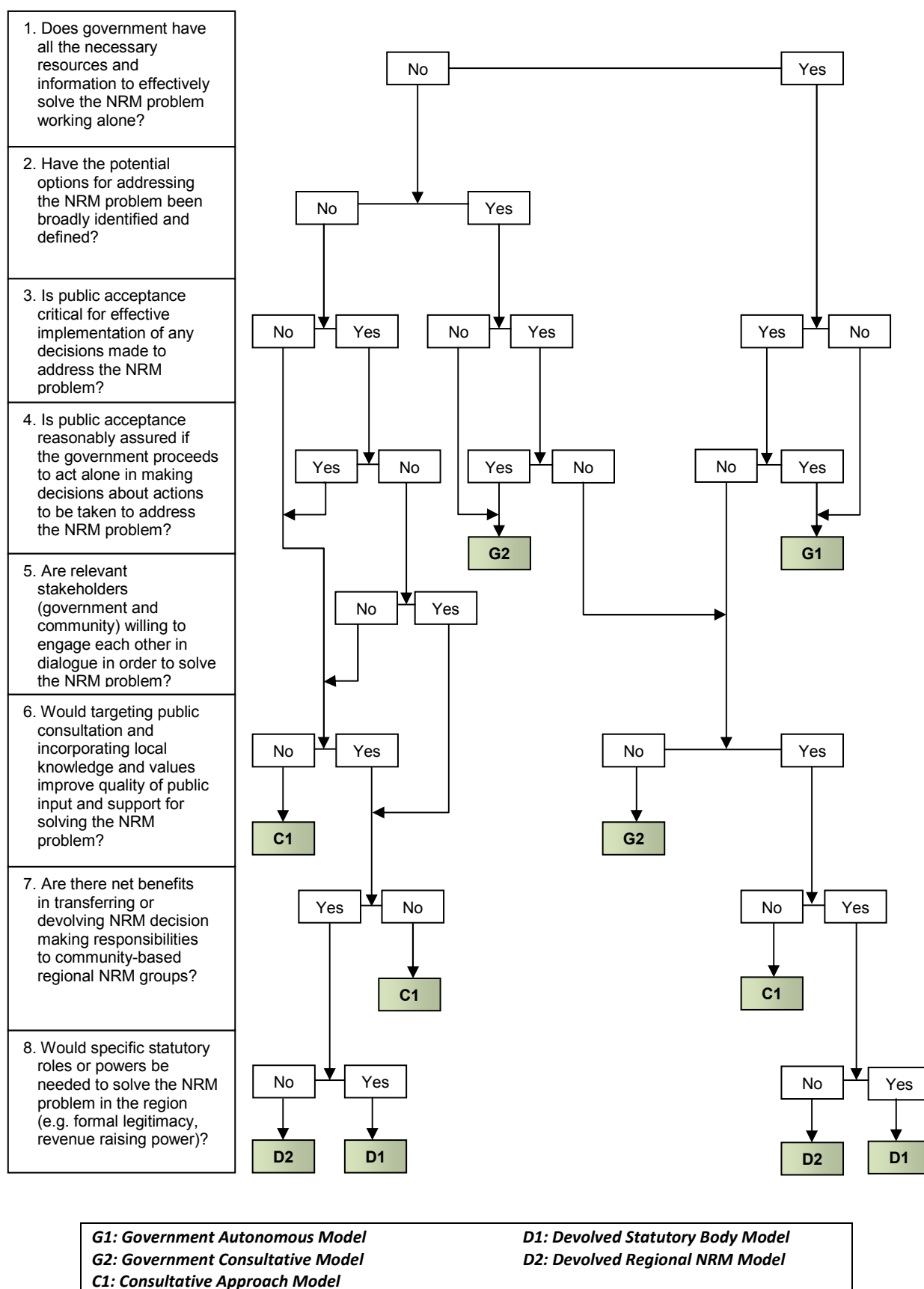
The natural resource governance decision support tool comprises a series of eight questions which systematically layers a range of issues that are important considerations in NRM decision making. In particular, the questions closely relate to issues surrounding the degree of community or stakeholder participation, support, and engagement over NRM policies and decisions as discussed in section 2.2. This in turn has implications for the implementation of decisions, especially in relation to considerations of cost effectiveness and transaction cost as presented in section 6.4.

The decision support tool guides policymakers through a range of closed-ended “yes” or “no” questions. The questions are designed to guide NRM policymakers along different paths yielding potential recommendations for choice of governance instrument. The path to each subsequent question is contingent on the nature of the response to previous questions. Eight questions yield a total of ten suggested options reflecting the five models for natural resource governance presented in this study.

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<sup>83</sup> Although it is acknowledged in this thesis that institutional path dependency can affect transaction costs and transformation costs associated with particular institutional choices, the decision support tool developed in this research does not explicitly include path dependency considerations, although such considerations should be implicit in the institutional choices of adaptive managers as described in section 6.5. The complexity and challenge of integrating such an analysis into a practical decision framework is beyond the scope of this study. Furthermore, the decision support tool also assumes that sufficient NRM science and knowledge exists to be able to make informed decisions on appropriate institutional models for achieving NRM outcomes.

**Figure 6.3: A Natural Resource Governance Decision Support Tool**



The first question relates to whether government is capable of addressing the NRM problem working in isolation without undertaking any stakeholder consultation process. Governments typically do not possess all the necessary information and resources to be in a position to definitively resolve NRM problems in isolation and would generally seek to undertake some form of consultation or fact-finding process to assess how to address an NRM issue. Accordingly, it is anticipated that most policymakers would answer in the negative to this question.

Question 2 aims to elicit if options for addressing the NRM problem have already been identified. How policymakers answer this question will have implications for whether additional information needs to be collected through a desktop or broader public consultation process. This in turn will have implications for the type of governance model proposed.

Question 3 is concerned with determining whether public acceptance is critical for effective implementation of decisions to address the NRM issue. Given that decisions to address NRM problems in Australia typically depend on the voluntary support and participation of community-based stakeholders, public acceptance of decisions will likely have a strong influence on the ability to effectively achieve NRM objectives.

In Question 4, policymakers must determine whether public acceptance can be assured if the government independently proceeds to make decisions about actions to be taken to solve the NRM problem. This will determine whether or not a more devolved governance approach is recommended which offers more opportunities to engage with relevant stakeholders and the development of additional social capital – for example, improving the level of trust and cooperation with relevant community stakeholders to ensure a common understanding towards achieving desired NRM objectives. An important consideration here lies not with whether a decision made by government is the appropriate (i.e. maximising social welfare) path of action with respect to NRM, but whether stakeholders in the community also appreciate and support such a

decision<sup>84</sup>. Key in this consideration is how public acceptance may change over time as NRM knowledge in the community improves.

Question 5 seeks to determine whether relevant NRM stakeholders (e.g. government agencies and community members) are willing to engage each other in dialogue to solve the NRM problem. It is important to assess this in relation to a region's social capital and governance capital, and to acknowledge that the level of conflict present between government and community members over NRM matters may also change over time (see section 5.3).

Question 6 relates to whether a targeted public consultation process, which seeks to identify and consider local knowledge and community values in relation to NRM, improves the quality of public input and support for addressing the NRM problem. This is of particular importance if key knowledge gaps exist and further information is required in order to assess how to address the NRM problem. Under these circumstances, improving the quality of public input through a targeted consultation process can assist in brokering valuable local knowledge to address the NRM problem.

The focus of question 7 is on the potential improvement in the quality of NRM outcomes achieved if regional communities were able to provide input to NRM decisions. This is one of the key questions in the decision support tool as it concerns the quality of NRM outcomes which represents the key objective of all governance approaches. Policymakers need to consider the trade-offs between participation and buy-in on the one hand, and efficiency and lack of support on the other. Careful assessment of whether the additional costs of undertaking further consultation may outweigh any additional benefits needs to be undertaken.

Question 8 effectively represents an extension to question 7, and relates to whether specific statutory powers or a legislative basis would be required in order to address the NRM problem by a community-based NRM body.

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<sup>84</sup> This aspect reflects a key difference between a *Progressive* (see section 2.1.1) worldview of governance and one that incorporates principles of co-management (i.e. public participation, community engagement) consistent with a regional NRM approach.

### 6.6.2 Limitations of the Decision Support Tool

There are also a range of limitations and caveats that need to be acknowledged with respect to application of the decision support tool. First, policymakers need to possess a very sound understanding of the NRM region of interest, and in particular, have a clear appreciation of the history and context of the NRM problem in order to appropriately answer the guiding questions. The decision support tool only offers high-level general advice on possible governance structures and models to consider that may be appropriate for addressing NRM issues. Policymakers should not rely on the recommended options in isolation as considerations of local context and circumstance may have a significant influence on how questions are answered.

Second, a region's level of governance capital and institutional maturity<sup>85</sup> are very important considerations as more mature regions (i.e. regions with higher levels of governance capital) are better informed about the NRM problem and engaged with relevant tiers of government, are more aware of relevant NRM programs and planning activities in their region, and generally possess higher levels of capacity, skills and resources to more effectively address the NRM concern. The level of governance capital therefore influences how questions in the decision support tool are answered and this subsequently has an influence on the type of governance models that are recommended.

Third, it is important to acknowledge that an ideal *static* model of governance for addressing a particular NRM problem in a region may not necessarily exist. Just as NRM problems vary in nature and complexity, and in temporal and spatial dimensions, so too should potential governance approaches. An ideal governance approach for dealing with NRM issues will likely require benefits and functionalities from one or more of the five governance approaches presented in this study. This reflects the need for an adaptive and flexible approach to enable NRM problems to be addressed in the most appropriate manner. This is an

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<sup>85</sup> The concept of governance capital as it relates to institutional maturity was discussed in section 5.3.

important consideration as no hybrid governance option is included in the decision support tool.

In addition, the nature of the decision support tool which requires policymakers to make definitive “yes” or “no” answers to questions does not reflect the true level of complexity and uncertainty that often challenge NRM practitioners. Such dichotomies of decision making are rarely encountered in practice. This is a key limitation of the decision support tool.

Lastly, the temporal dimension of NRM needs to be carefully considered by policymakers when considering the eight guiding questions that comprise the decision support tool. It is critical to recognise that NRM is essentially a social phenomenon of behavioural change. The adoption of improved NRM practices in a region is dependent, *inter alia*, on a range of social and economic attributes, may follow different stages (e.g. Rogers 2003), and may take considerable time. This temporal aspect of what essentially is changed behaviour on the part of landholders needs to be a key consideration by policymakers especially in relation to questions 4 and 5 in the decision support tool. Transaction costs also accompany these considerations given that the level of transaction costs of developing and implementing programs and policies vary over time (e.g. McCann *et al.* 2005; Falconer *et al.* 2001). These questions primarily concern the role of public acceptance and the level of conflict between government and community over NRM issues. The level of public acceptance and conflict over NRM matters is unlikely to remain static over time as public consultation, engagement processes, and suasive pressure influences perceptions and knowledge over the adoption of changed NRM practices. Implicit in this consideration is how potential behavioural change may have implications for how these questions in the decision support tool can be answered:

- Can NRM knowledge be improved over time?
- What implications can new knowledge have in the short or long term in relation to NRM decisions and transaction costs?
- How would the variability of public acceptance affect decisions?

- Would policymakers wait to achieve greater levels of public acceptance or push ahead with decisions over NRM?

Considerations of public acceptance need to be carefully managed. Policymakers must determine how to address scenarios where some members of the community are in agreement with decisions to address an NRM problem, while other sectors are not. An assessment of whether the level of public acceptance is sufficient to implement decisions needs to be made with careful consideration to the risk of potentially irreversible damage to the environment as a consequence of decision delays<sup>86</sup>. Policymakers must also be mindful of the level of governance capital and institutional maturity of different NRM regions and in particular, note that the decision support tool can recommend different governance approaches for a region at different points in time<sup>87</sup>.

## 6.7 SUMMARY

In this chapter, a range of governance models for addressing NRM concerns were introduced. The costs and benefits of the different models were explored with a key focus on the regional NRM model of interest in this study. Frameworks for comparative transaction cost analysis and cost effective institutional choice analysis were presented based on the work of Birner and Wittmer (2004), and Challen (2000) and Marshall (2005), respectively. These prescribed theoretical bases from which a transaction cost analysis of the regional NRM arrangements for natural resource governance could be undertaken. Finally, a decision support tool representing a significant and useful contribution to NRM policymakers was presented which offered preliminary guidance on the possible choices of governance structures for addressing NRM and environmental matters. The Fitzroy Basin Association regional NRM group, which is the case study focus for the economic analysis in this study, is the focus of chapter 7.

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<sup>86</sup> The consequences of decision delays was highlighted in section 6.4 as *decision failure costs* under the transaction cost analysis framework developed by Birner and Wittmer (2004).

<sup>87</sup> Different levels of NRM knowledge reflect a region's location along different points on an institutional maturity continuum. Under such a categorisation, more *mature* regions possess more governance capital and NRM knowledge, and would yield recommended models of governance with similar attributes when applying the decision support tool.

## **7. The Fitzroy Basin Association – A Case Study of Regional NRM in Queensland**

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### **7.1 INTRODUCTION**

The investigation of regional NRM governance arrangements in this study is based on a situation analysis drawn from case study data. In this thesis, regional NRM relates to the institutional arrangements that encompass the devolution of natural resource governance functions to regional NRM groups. In the context of this study, devolution of natural resource governance functions can be observed in the work led by the Fitzroy Basin Association (FBA) regional NRM group in Central Queensland.

As elaborated in chapters 2 and 3, the regional NRM arrangements have built on the experiences of earlier NRM policies and programs, representing a more systemic and strategic approach to natural resource and environmental management in Australia. These governance arrangements have emerged as a result of the need for:

- greater community involvement in NRM;
- more efficient planning systems with better connected plans;
- more targeted regional funding to implement plans;
- triple bottom line accounting – environment, economy and community;
- strategic investment in community capacity to implement natural resource management plans;
- stopping and reversing the decline in natural resource quality;
- achieving sustainable use of natural resources; and
- taking a ‘whole of government’ view on natural resource governance issues.

Governments make decisions across a range of policy arenas that affect the way in which natural resources and the environment are managed. Hence, it is important that policy decisions are informed by research that provides evidence on the outcomes attributable to specific regional NRM processes and programs. However, in the complex arena of NRM, this outcome is far more difficult to



benchmark and measure in practice, with few studies undertaken to empirically investigate the social and economic linkages associated with the regional NRM arrangements necessary for achieving desired outcomes.

In this chapter, a case study is presented and evidence is reported to shed light on the outcomes of an NRM incentives program implemented by the FBA regional NRM group. More importantly, an analysis of the overall regional NRM devolved governance arrangements is outlined. The study addresses a research gap by contributing to a stock of case studies in relation to understanding the costs and benefits of implementing devolved governance arrangement and implications for achieving NRM outcomes.

The selection of the FBA as a case study allowed the transaction cost analysis frameworks to be tested. It is widely acknowledged that the FBA is a successful example of a regional NRM group and has a good track record in terms of engagement with landholders, relationship with relevant government agencies, appreciation of NRM planning and governance processes, and leadership in promoting on-ground initiatives for improved land management practices (Bradby 2007a, *pers. comm.*). Their success in implementing regional NRM plans and programs in the Central Queensland region resulted in the FBA being used as a model for guiding other regional NRM groups in Queensland.

As part of the case study analysis of natural resource governance processes in Central Queensland, a transaction cost analysis was conducted on the FBA regional governance approach. In particular, a situation analysis was conducted on a NRM incentive program coordinated by the FBA. An analysis of the costs and benefits associated with landholder participation in the program was conducted to assess the cost effectiveness of delivering NRM outcomes using this approach. This program was selected because it represented a typical mechanism by which regional NRM groups offered financial incentives to encourage landholders to adopt improved NRM practices (Windle, Yee, and Rolfe 2006).

This chapter commences with an overview of the regional NRM planning process associated with the delivery of the NHT2 and NAP as part of the regional NRM governance arrangements in Queensland. Discussion then investigates the background and activities of the FBA in the implementation of regional NRM policies and programs in the Central Queensland region with a particular focus on the FBA devolved grants program.

## **7.2 BACKGROUND TO REGIONAL NRM IN QUEENSLAND**

The community-based regional NRM arrangements in Queensland were initiated as a result of the announcements in November 2000 and May 2001 of the NAP and the NHT2 funding programs, respectively. These programs emphasised regional delivery and implementing regional-scale NRM initiatives. Since 2003, investment in Australian NRM has focused on developing accredited regional NRM plans and implementing associated regional investment strategies (RISs) which have been developed in accordance to Australian and State government criteria and guidelines (Commonwealth of Australia 2002).

The implementation of the NHT2 and NAP programs is overseen by a Joint Steering Committee comprising key representatives from Australian Government agencies, and representatives of key stakeholder groups, including regional community-based committees or boards. In Queensland, state-level NRM agencies have formed Regional Coordination Groups (RCGs) that provides whole-of-government support for regional NRM groups to implement programs. RCG members provide regional NRM groups with access to information and technical skills and act as a means for information transfer and support between NRM regions and the Australian Government (Paton *et al.* 2004). Figure 7.1 provides an outline of the structure of regional NRM arrangements in Queensland.

The fourteen Queensland NRM regions were given greater flexibility in their organisational and governance arrangements resulting in differing arrangements developing over varying timeframes (Bradby 2007). Each of the NRM regions in Queensland has a designated non-statutory regional NRM group responsible for

planning and investment activity under the NHT2 and NAP. A number of these NRM groups have evolved from earlier regional coordination groups established under the first round of the NHT in the late 1990s (Taylor *et al.* 2006).

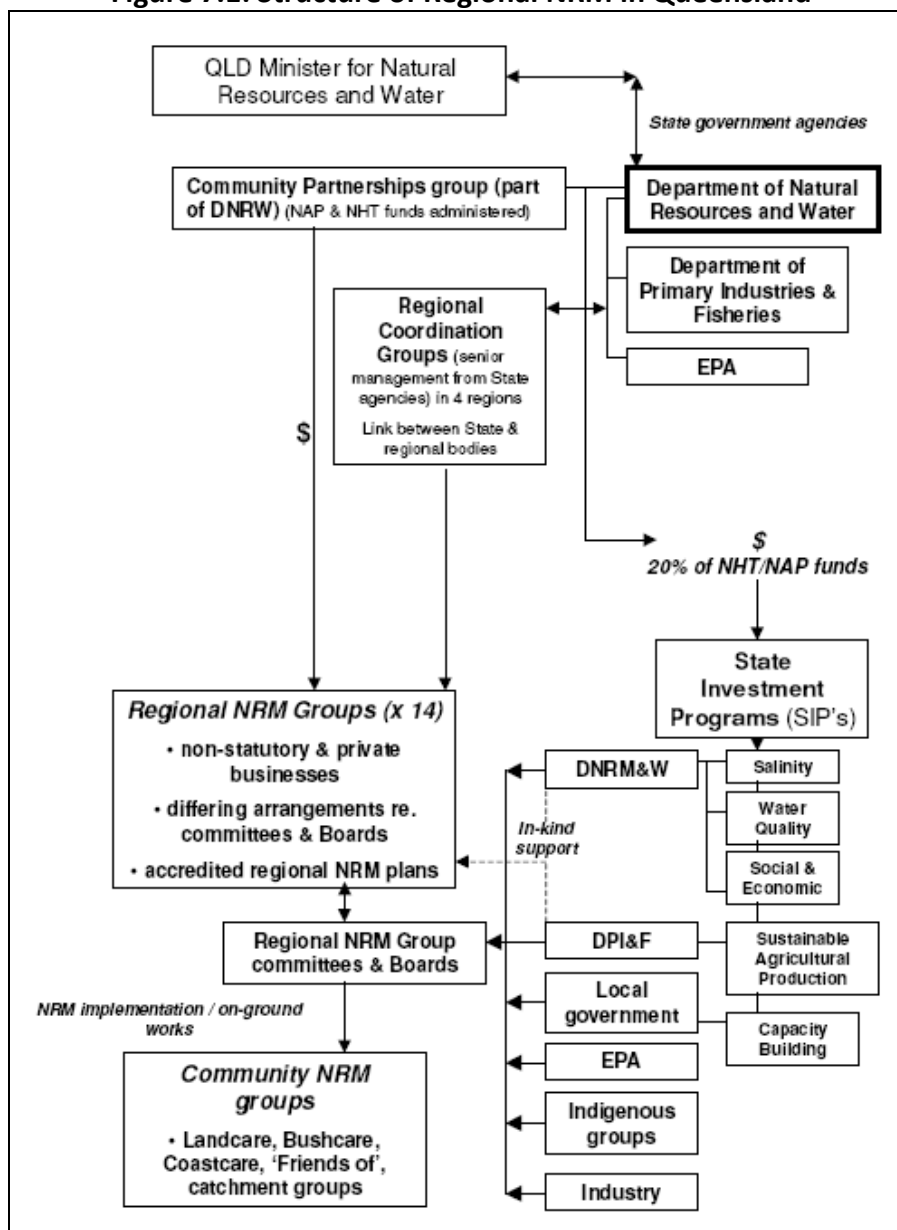
The governance arrangements for the fourteen regional NRM groups in Queensland vary from being either incorporated associations or private companies limited by guarantee<sup>88</sup> (WalterTurnbull 2005). Each regional NRM group has a majority of community membership selected on merit whilst balancing stakeholder interests, including indigenous and local government interests (Taylor *et al.* 2006). Some groups comprise a large number of members and support from advisory bodies and coordinators, while others operate on a smaller scale with fewer personnel and less resources (Taylor *et al.* 2006). DNRW is the lead state agency providing support and advice to Queensland's regional NRM groups.

Specific NRM regions, namely Burdekin, Fitzroy, Queensland Murray Darling, Condamine, Burnett-Mary and SEQ Catchments, received additional funding as targeted priority investment regions under the NAP. A significant level of funding variation exists between NRM regions funded under both programs and those funded solely under the NHT2 (Taylor *et al.* 2006). An indicative allocation of about \$146 million was allocated to regions in Queensland for investment in NRM over the period 2004/5 to 2006/7 (Queensland and Commonwealth Government 2005).

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<sup>88</sup> Queensland's regional NRM groups are community-based, non-statutory bodies and are either an Incorporated Association under the *Associations Incorporations Act 1981* or a Limited Company under the *Corporations Act 2001*.

**Figure 7.1: Structure of Regional NRM in Queensland**



(Source: Pannell *et al.* 2007, p.14)

An important point for consideration is that unlike states such as NSW and Victoria, no legislative or statutory basis exists for regional NRM groups in Queensland. Hence, non-statutory regional NRM groups in Queensland do not have the authority to legislate or pass laws to regulate resource use or raise revenue. Such governance functions can only occur through the relevant state government or statutory organisation that holds this authority. Where regulations are not enforceable, for example on freehold land, the voluntary support of the community is the only alternative (Robinson *et al.* 1999). As a result,

implementation of strategies for NRM by Queensland regional NRM groups require the voluntary cooperation of the community and land managers, together with support from local government and relevant state government agencies.

### **7.2.1 The Role of Regional NRM Groups**

Regional NRM groups play a central role under the collaborative regional NRM model. The key roles of regional NRM groups are to:

- Coordinate and implement NRM policies and programs;
- Leverage additional contributions from both government and landholders; and
- Build governance capital.

Regional NRM groups are the key delivery mechanism and act as on-ground agents responsible for implementing accredited regional NRM plans. This involves regional coordination activities including engaging with the local community and landholders and broader industry groups.

The FBA's approach to natural resource governance reflects the principles of ICM and provides a means for communities to work collaboratively to achieve NRM outcomes reflected in the region's NRM Plan. Some projects such as weed control can fail if neighbours take a different approach or do not participate. In the same respect, projects implemented at a regional or State level can lose touch with the local community who often have a role in implementing NRM programs. The regional NRM model under which the FBA operates bridges the gap between NRM policy and on-ground implementation, coordinating on-ground actions by working at the community level and building up to a broader, catchment-wide scale.

A key driver of the regional NRM approach is to protect and further develop social capital and governance capital. The benefits of increasing social capital flow from the trust, information and cooperation associated with social networks, making it a key component to building and maintaining any collaborative approach to NRM. The strength of a region's social capital can be threatened by incompatible or inappropriate government policy and regulation, unrealistic community

expectations, removal of rural services and lack of coordination and integration. The regional NRM approach offers an opportunity to address many of these concerns.

Regional NRM groups have been successful in leveraging additional program contributions from landholders, adding significantly to government funding (e.g. Taylor *et al.* 2006). Young *et al.* (1996) notes that community-based initiatives provide considerable leverage in comparison with central government directives in cost-benefit terms. Community-based initiatives such as the regional NRM arrangements involve considerable additional co-contribution in the form of voluntary labour and privately financed investment while at the same time developing land-user awareness, motivation and capacity to manage on-ground NRM programs and change initiatives. In a review of community NRM projects in Victoria, Huthwaite (1995) concluded that for every dollar given to the community, an additional eight dollars of contribution was generated either in cash or kind<sup>89</sup>. In Queensland, some regional NRM groups have successfully leveraged six to eight dollars for every dollar of government funds dedicated towards achieving NRM outcomes (Bradby 2007a, *pers. comm.*). Rolfe *et al.* (2004a) report that the FBA approved a total of about 200 projects through on-ground incentive programs involving a dollar value of about \$1.5 million from the NHT2 and about \$3 million from landholders' contributions.

The significant investments made in establishing the institutional and governance arrangements surrounding regional NRM has helped to position regional NRM groups as on-ground change agents to act as the delivery mechanism for implementing NRM programs at the regional level. In this respect, regional NRM groups can be likened 'nodes of adoption' (Yee 2003) for improved NRM practices in a catchment region. In effect, regional NRM groups may assume a role in facilitating the development of social and governance capital through rural

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<sup>89</sup> Landholders typically provide an in-kind contribution through a combination of their own time, labour, or additional monetary input.

extension and training of landholders and promoting adoption of improved land management practices for achieving NRM outcomes in a region.

Although it may be too early<sup>90</sup> to assess improvements to natural resource condition and environmental assets, there is some evidence identified in this study to support the argument that the regional NRM governance model contributes to deepening soft institutions and providing indirect benefits by fostering social capital and governance capital within the catchment community.

The following section introduces the FBA as the regional NRM group for the Central Queensland region.

### **7.3 BACKGROUND OF THE FITZROY BASIN ASSOCIATION**

The FBA is one of fourteen<sup>91</sup> regional NRM groups (see Figure 7.2) recognised by the Australian and Queensland governments for the purposes of undertake planning and implementation of NRM policies and programs across the state of Queensland funded under the NHT extension and NAP programs. Under the Bilateral Agreement<sup>92</sup>, regional NRM groups such as the FBA are responsible for preparing an NRM Plan and regional investment strategy to guide investments in NRM activities across their relevant regions.

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<sup>90</sup> Improvements in natural resource and environmental baseline condition and trend as a result of NRM programs require sufficient time to be effectively realised (e.g. Commonwealth of Australia 2000a; Marshall 2001; Ribot 2003). This is also compounded by the complex and uncertain nature of a range of qualitative factors impacting on NRM processes and outcomes, making the establishment of a causal relationship between NRM programs and amelioration of NRM problems difficult to establish (Oliver 2004).

<sup>91</sup> Until 2005, Queensland had 15 regional NRM groups. In early 2006, South East Queensland NRM and South East Queensland Western Catchments Group merged to form 'SEQ Catchments' to administer both NHT and NAP funds (Taylor *et al.* 2006).

<sup>92</sup> Under the Regional NRM Bilateral Agreements between State and the Australian governments, investment funds are devolved through regional NRM groups for actions to improve management of natural resources and environment assets. The funds are invested according to a Regional NRM Plan and implemented through a Regional Investment Strategy (RIS).

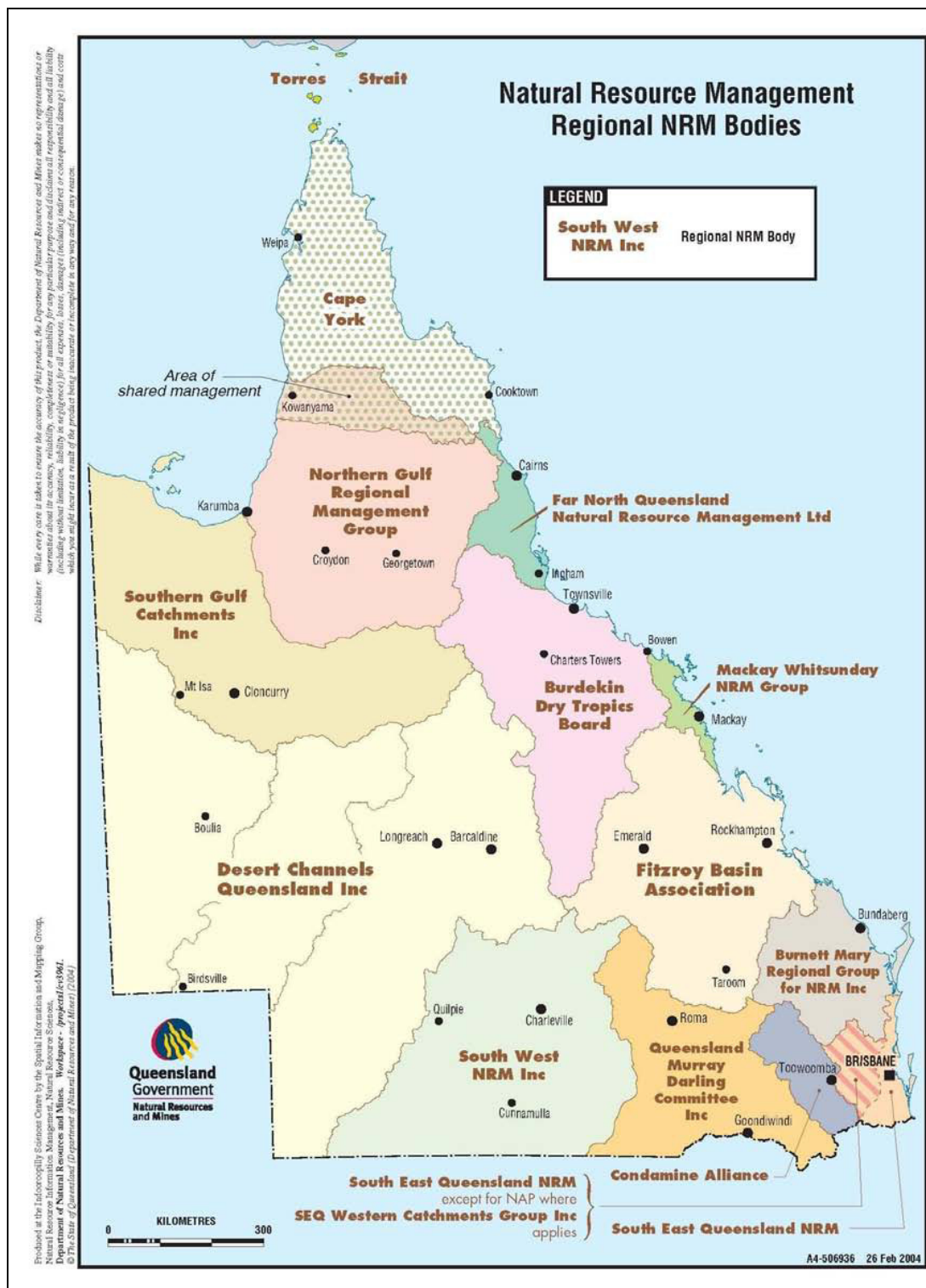
The FBA has developed into the peak community-based group involved with NRM planning in the Fitzroy Basin region in Central Queensland. It is a community-based organisation that promotes sustainable development and engages with the region's major NRM stakeholders who have an interest in the use and management of the natural resources of the Central Queensland region. The FBA is involved in a range of NRM activities that include land and water resource management projects for the improvement, and monitoring and evaluation of catchment health, and the promotion of improved research extension and adoption strategies. The main role of the organisation is to coordinate projects that contribute to the on-ground implementation of a regional NRM Plan for the Fitzroy catchment NRM region.

The FBA evolved from sub-regional Landcare and Integrated Catchment Management groups in the 1990s. In particular, the origins of the FBA can be traced back to the 1992 Fitzroy River Symposium which brought together a range of groups to address the declining water quality of Queensland's largest river system. This gathering led to the formation of the Fitzroy Catchment Coordinating Group in 1994, and emerging as the FBA in 1997 (Webster 2008, p.198). It is a not-for-profit, incorporated organisation that involves the region's major NRM stakeholders (FBA 2004a). The FBA was recognised in 2001 as a regional NRM group for the purposes of implementing the NAP and NHT2.

Governance of the organisation is guided by a Board, comprising technical skills-based and community representatives responsible for developing a regional NRM Plan addressing not only salinity and water quality issues, but also the wider range of NRM issues impacting on the natural resources and environmental assets in the region.



**Figure 7.2: Natural Resource Management Regions in Queensland**



(Source: Department of Natural Resources and Mines 2004)

Board members possess a range of natural resource, community engagement, academic, financial, and business management skills. Members from specific

sectors are also appointed to ensure adequate representation of local government, indigenous and wider conservation knowledge (FBA 2004a).

Major environmental issues facing the region are related to land degradation and sediment runoff impacting on the water quality in the region's river systems and on the Great Barrier Reef (GBR) marine park. As rangeland grazing is the major land use in the basin (see Box 7.1), it is the land use which has the most impact on the environment, and offers the most opportunity for providing mitigating actions. It is also a key focus of many NRM programs and investments undertaken by the FBA to address land degradation and water quality issues.

**Box 7.1: The Fitzroy Basin Region**

The Fitzroy Basin region is a large and diverse area with a wide array of land types and distinctive rural and urban communities. The region has a population of approximately 200,000 people and covers more than 156,000 km<sup>2</sup> of land area in Central Queensland, including catchments of the Fitzroy River, adjacent coastal waterways, and the Boyne and Calliope rivers (FBA 2004a). It has a subtropical semi-arid climate with high rainfall variability. Frequent heavy downpours, often after dry periods, provide particular challenges to land managers to maintain sufficient ground cover to prevent soil erosion leading to sedimentation in rivers and transport of sediment and nutrients to the GBR lagoon (NLWRA 2002). It surrounds the Tropic of Capricorn in Central Queensland and is a significant catchment of the GBR lagoon. The Fitzroy Basin drains an area of approximately 142,645 km<sup>2</sup> (approximately 10% of Queensland's land area) into the southern end of the GBR lagoon and is the largest river basin draining to the GBR lagoon (Rolfe *et al.* 2004a). The Fitzroy Basin is recognised as one of the richest areas in the State for its land, mineral and water resources, with the key industry sectors being grazing, agriculture, mining, forestry and fishing (Rolfe *et al.* 2004a).

The region supports a range of agricultural production including beef cattle, cereal grains, a range of horticultural crops, and some cotton. Rangeland grazing is the main land use in the region and accounting for about 88% of the basin area (Jones *et al.* 2000) and 94% of the area for agriculture (Furnas 2003). As it occupies such a large area in the basin, grazing (beef cattle production) is the land use which has the most impact on the environment (through impacts on water quality) (Rolfe *et al.* 2004a). The Productivity Commission (2003) notes accordingly that "...diffuse sources, particularly cattle grazing and crop production, are the most significant contribution to pollutant discharges into the GBR lagoon". Due to its size and biophysical conditions, there are high levels of sediment and nutrient export in the region; the majority of which stem from diffuse sources, and many NRM programs have targeted land management actions to address this issue.

Apart from the major urban centre of Rockhampton, the region has low population densities. Other important urban centres in the basin include Emerald, Biloela and Blackwater. Gladstone and the Capricorn Coast (Yeppoon and Emu Park) are population centres adjacent to the Fitzroy catchment which are often included in analysis and planning processes because of their proximity (Rolfe *et al.* 2004a).

The major activities of the FBA involve running awareness-raising and incentive programs aimed at promoting the importance of environmental issues at the property level and encouraging landholder adoption of improved land management practices in the region to achieve NRM outcomes. Such improvements include fencing of waterways and the establishment of riparian buffer strips, and establishing off-stream stock watering points to improve water quality and address soil erosion and land degradation along riparian areas. Although there has been improved awareness of environmental issues resulting from previous NRM programs such as Landcare, relatively low participation in programs have been observed across the region despite the significant level of investment funds that have been channelled to the FBA under the regional NRM arrangements.

The FBA has established itself as a key NRM stakeholder in the region and has achieved a level of credibility<sup>93</sup> and acceptance through its regional planning work. The setting of agreed targets by the community is a positive step in this regard. The history of an ICM presence as forerunner to the regional NRM arrangements has been important in building broad stakeholder and community engagement. The building of corporate knowledge through the retention of staff has also been an important contribution. Developing governance capital through fostering professional networks with state government departments and their involvement in identifying NRM priorities (e.g. biodiversity) has been very important. Also, there has been high value derived from integrating with state held information sets (e.g. Geographical Information Systems to assist NRM planning).

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<sup>93</sup> For example, as part of the preparation of the Central Queensland Regional Water Supply Strategy, the Queensland Department of Natural Resources and Water sought the assistance of the FBA to act as an independent mediator to coordinate and manage issues of conflict between the government and landholders over water allocation planning processes. This recognises the important role of the organisation (i.e. respected by community and perceived as separate from government) with respect to broader NRM planning in the region.

## 7.4 CENTRAL QUEENSLAND STRATEGY FOR SUSTAINABILITY

Under the NAP, the FBA was responsible for coordinating the development and implementation of an integrated regional NRM Plan for guiding NRM investment in the Central Queensland region: The *Central Queensland Strategy for Sustainability* (CQSS).

In 2002 the FBA was imbued with the responsibilities of a regional NRM group under the NAP, and released a second edition of the plan (CQSS2) which was updated to include targets for improved natural resource condition to support planning and investment of the NAP, NHT extension (NHT2), and other funds directed toward improving NRM in Central Queensland. The updated plan identified targets (short, medium, long term) to manage regional water quality, salinity and biodiversity. The CQSS2 was accredited in May 2004, and provided a framework to address critical pressures on the region's natural resources.

Significant resources and time have been invested in the development of the CQSS2. Extensive consultation and engagement was conducted to ensure that the plan captured the views of the catchment community in terms of what people thought should occur in relation to NRM and regional environmental assets. The CQSS2 also has links with the broader regional growth management and development planning framework prepared for the Central Queensland region<sup>94</sup>.

The CQSS2 was developed over a five-year period with significant investment of community, industry, state government, and funding through the NHT2. It was developed as a partnership between the FBA Board and government agencies including the Coastal Cooperative Research Centre, the Environmental Protection Agency, Department of Primary Industries, Department of Natural Resources and Water, and Central Queensland University. The process included technical information gathering, community workshops, and feedback processes such as the

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<sup>94</sup> 'Central Queensland: A New Millennium' (CQANM) is the regional growth management framework developed for the central Queensland region. The CQSS2 prepared by the FBA represents a key element of the CQANM framework concerning regional NRM and environmental management targets.

Sustainable Futures Symposium. The outcome was an agreed plan for the management of the resources and environments of the river catchments of the Central Queensland region.

The plan identified social, economic, and environmental sustainability issues and aimed to provide a framework for achieving sustainable NRM through encouraging the active participation of all relevant stakeholders in guiding strategic NRM investment in Central Queensland. In particular, it identified priority actions to address the causes of land and water degradation such as unsustainable grazing practices, inappropriate land clearing or irrigation practices, gully, sheet and riverbank erosion, as well as changes to river flows due to impoundment, release or abstraction.

Through an extensive stakeholder consultation process, the CQSS2 (FBA 2004a; 2004b) developed specific outcome categories for the region, which are outlined below:

*On the ground:*

- healthy, stable and productive soil resources; clean and adequate water resources; and a diversity of vegetation resources (both natural and introduced)
- a strong natural resource base which is well managed and maintained now and in the future and which is able to support a range of uses, including primary production, secondary and extractive industries, fisheries, recreational activities, and natural ecosystems
- environmentally and economically productive and balanced ecosystems
- conservation of natural areas and regional biodiversity

*People outcomes:*

- improved ability of the regional community to shape its own future and make well-informed resource management decisions
- greater efficiency, effectiveness, and coordination of resource and environmental management and planning
- reduced potential for resource use conflicts between stakeholders

- greater targeting of activities towards priority problems

*Financial outcomes:*

- enhanced ability to fund management projects through the attraction of investments of external and internal funding
- increased ability to share the costs of achieving sustainable natural resource and environmental management across all stakeholders in the regional community
- continued wealth generation through the sustainable use of the region's natural resources

The CQSS2 focuses on regionally significant assets and pressures. The information brought together for the Fitzroy catchment in the plan is divided into land use and management; terrestrial biodiversity; inland aquatic ecosystems; estuarine and marine aquatic ecosystems; water quality; and the region's social and economic profile. Priority NRM issues identified in the plan include:

- sediment management, and potential impact on the Great Barrier Reef;
- vegetation management, with high rates of clearing having occurred in many parts of the region, as well as loss of regional biodiversity from the impact of clearing on deep drainage, and potential salinity; and
- conservation and biodiversity protection.

The CQSS2 also identifies a framework for reporting the condition of the basin:

- Resource condition targets – to monitor change in resource condition, impacts on resource condition at the catchment and landscape scale, particularly nationally agreed NRM outcomes.
- Management action targets – to demonstrate achievement of management actions that lead to improved resource conditions; for example, the adoption of sustainable resource management practices or adoption of codes of practice that improve health of the catchment.
- Financial activity – reporting on investment in achieving significant targets, regional plan development and implementation.

The mechanism for implementing the CQSS2 is the FBA's Regional Investment Strategy (RIS), which provides a framework for coordinating eight programs of investment (see Table 7.1) (FBA 2004a). Under the regional NRM arrangements, all NRM regions are required to prepare a RIS detailing the specific suites of activities designed to address regional, State and national NRM priorities identified in regional NRM plans. The RISs also specify the cost of these activities and assess their anticipated impact on underlying natural resource conditions. In January 2005, delivery of the FBA's RIS commenced using the FBA's Neighbourhood Catchments<sup>95</sup> (NC) approach. The NC approach is unique to the FBA, and involves the FBA acting as an umbrella organisation to five sub-regional groups<sup>96</sup> (see Figure 7.3). Each sub-regional group has a management board and is responsible for delivering extension, education, and incentive programs to achieve both sub-regional and regional objectives.

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<sup>95</sup> A Neighbourhood Catchment (NC) consists of a group of properties that reside in a common catchment (typically about 300 km<sup>2</sup>) (Millar *et al.* 2001). The term 'Neighbourhood' refers to the relationship between people, while the sub-catchment scale is sufficient to promote localised ownership in the catchment's land and water issues to all landholders (Millar *et al.* 2001). The intent is to underscore the benefits of improved land management practices beyond the farm gate. The NC approach involves identifying and engaging with all landholders in a NC to develop and implement NC Management Plans that integrate land, water, and vegetation across adjoining properties in a targeted sub-region.

<sup>96</sup> The FBA's five sub-regional groups are: Central Highlands Regional Resources Use Planning Cooperative (CHRRUP), Dawson Catchment Coordinating Association (DCCA), Fitzroy River Coastal Catchment (FRCC), Boyne Calliope, and Isaac/Connors and Mackenzie (see Figure 7.3).

Figure 7.3: Sub-regions of the Fitzroy Basin Catchment



(Source: Fitzroy Basin Association 2005)



**Table 7.1 – FBA Regional Investment Strategy Program Portfolios**

1	<p><b><i>Sustainable Landscapes</i></b></p> <p>The focus of this program is on addressing land use and management practices influencing ground cover as the primary pressure affecting soil condition, water quality and biodiversity. The program will achieve improvements in soil retention in the region, and a subsequent decrease in delivery of sediments to the Great Barrier Reef Lagoon. The program incorporates the neighbourhood catchments approach – the primary delivery mechanism for implementation of the CQSS2, through integrated, holistic and strategic delivery on targets at the landscape scale.</p>
2	<p><b><i>Salinity</i></b></p> <p>The focus of the salinity program is to reduce the amount of land in the region at risk from future salinity impacts, and to address current salinity outbreaks. It provides a strategic and prioritised approach to managing current known outbreaks and rising groundwater, while developing the knowledge base to determine where investment in prevention will have the greatest return.</p>
3	<p><b><i>Healthy Waterways, Rivers, &amp; Wetlands</i></b></p> <p>The focus of this program is on the development of the knowledge base in order to set regionally relevant water quality targets, protection of valuable riparian zones and wetlands, improving condition in strategic areas, and improving the movement of aquatic species through artificial barriers.</p>
4	<p><b><i>Water Allocation and Management</i></b></p> <p>The focus of this program is on providing supportive actions to achieve a reliable and secure water supply for primary production, industrial development, and urban usage while allowing sufficient environmental flow for the region's ecosystems. This program adds value to the government's responsibilities with regard to sustainable use of water by addressing elements outside the scope of legislation including the integration of monitoring, increased water use efficiency, addressing conflict and pressures arising from limited water, and strengthening partnerships between community, industry and government in managing water.</p>
5	<p><b><i>Biodiversity and Vegetation</i></b></p> <p>This program is focussed on off-reserve protection of representative regional ecosystems, and addresses fragmentation and loss of biodiversity. The program assists in sharing costs of protecting biodiversity across the whole community and cooperates with Queensland Government's vegetation regulations to achieve plan targets.</p>
6	<p><b><i>Coral &amp; Coasts</i></b></p> <p>The focus of the program target pressures on the environmental, social, and economic value of the region's coastal assets. The program relies heavily on community and local government participation, particularly in on-ground activities.</p>
7	<p><b><i>Protecting Our Heritage</i></b></p> <p>This program improves understanding of cultural values and indigenous capacity and enhances intergenerational and cross cultural transfer of traditional ecological knowledge. The program also invests in protection of cultural heritage sites.</p>
8	<p><b><i>Healthy Region</i></b></p> <p>This program supports core elements of a healthy planning system to increase the region's capacity to plan for and manage natural resources sustainably, including partnership building, and governance arrangements for sub-regional implementation.</p>

(Source: Fitzroy Basin Association 2009)

The NC approach ensures that NRM programs are locally relevant but also achieve broader NRM goals for the region (Love 2007). It is based on the premise that local sub-catchments are the appropriate size to engage individual landholders to address NRM issues. By working with all landholders in a catchment, change at a number of properties equates to change at a sub-catchment scale (Millar *et al.* 2001). Subsequently, NCs can act as building blocks to scale up and achieve sustainability over the larger catchment region.

While the CQSS2 identifies broad regional priorities and actions, sub-regional and catchment planning is a critical link between regional scale priorities and the property scale at which NRM change can occur. The CQSS2 provides an ‘umbrella’ for sub-regional scale planning mobilised, for example, through the *Dawson River Catchment Strategy*, *Central Highlands NRM Plan*, *Fitzroy River and Coastal NRM Plan*, *Isaac-Connors Plan*, and *Port Curtis NRM Strategy*. In turn, the RIS identifies the investment needs of sub-regional and local implementation, and draws from them the priorities for the whole region. Under the FBA regional governance model, sub-regional groups represent a key element for implementation of the CQSS2.

The RIS outlined a range of mechanisms for delivering the outcomes under the CQSS2. This provides some flexibility for the FBA to direct funding more strategically. The FBA’s RIS (FBA 2004a, p.21) outlined the following three mechanisms for implementing programs for achieving NRM outcomes identified in the CQSS2:

- **Contract type arrangements:** FBA would develop terms of reference for specific pieces of work it may require. Tenders would be sought. This type of approach may best suit some research work, specific short term projects, and more technically based projects. Some sector groups and community groups may also prefer this approach.
- **Devolved grants:** Expressions of interest would be advertised for, and projects assessed by, a regional panel against program objectives. This type of approach

has been demonstrated to be effective<sup>97</sup> in supporting landholders to implement better practices, and undertake on-ground works (FBA 2004a).

- **Sub-regional / implementation body contracts:** The CQSS2 and further iterations of an integrated NRM plan will be based on sub-regional planning and action. Each sub-region may enter into agreements with FBA for components of the investment plan specific to their area. It is envisaged that smaller devolved grant or contract approaches may be used by sub-regions to support on-ground action and local group activity (e.g. Landcare).

The RIS was also designed to target funding from three key government NRM funding programs<sup>98</sup>: The NAP, NHT2, and National Landcare Program. The process for delivering the objectives of the CQSS2 plan through the RIS is illustrated in Figure 7.4.

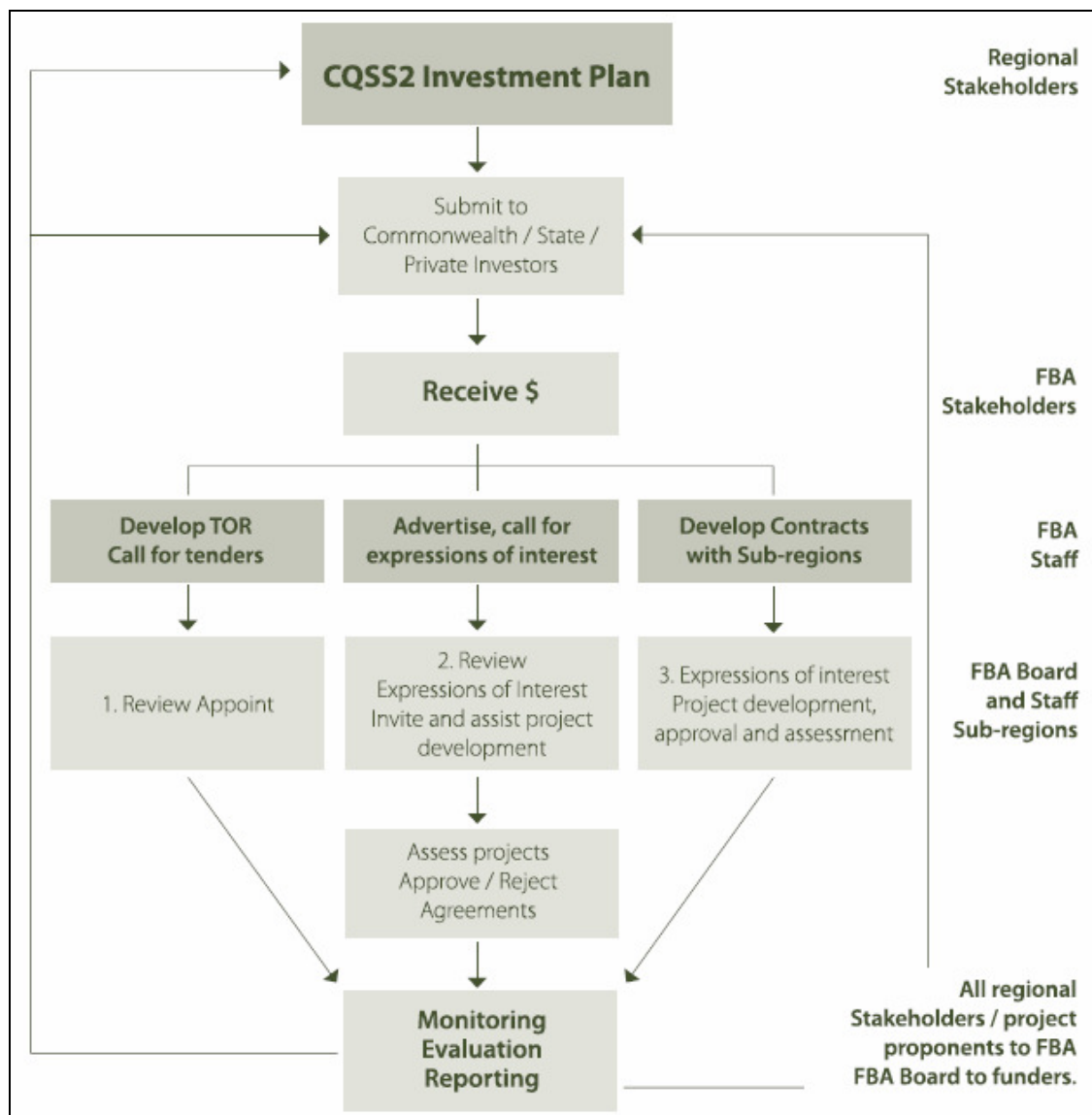
A particular interest of this study is the FBA's *Neighbourhood Catchments Incentive Scheme*, which is the umbrella program that directs investment into funding programs such as the devolved grants program. The case study reported in this thesis specifically concerns the FBA's Sustainable Landscapes program portfolio, which oversaw the management and implementation of the FBA devolved grants program which is reported in chapter 8.

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<sup>97</sup> In recent years, regional NRM groups have been trialling new incentive schemes known as MBIs. Recent evaluations of MBIs such as the use of competitive tenders have been shown to be more cost effective than devolved grants (e.g. Windle and Rolfe 2008).

<sup>98</sup> While it is acknowledged that a new Australian Government NRM funding program, *Caring for our Country*, has been announced by the new Rudd Labor Government in early 2008 to replace the NAP and NHT2, and accompanied by significant changes in the process of funding for regional NRM groups, the case study in this thesis focuses on the period prior to the introduction of the new arrangements on 1 July 2008.

**Figure 7.4: Delivery Mechanism for the FBA Regional Investment Strategy**



(Source: Fitzroy Basin Association 2004a, p.22)

## 7.5 TRANSACTION COSTS OF GOVERNANCE

A cost effective governance model seeks to minimise transaction costs in achieving governance outcomes. As outlined in chapter 6, these costs specifically include static and dynamic transaction and transformation costs. These costs include, *inter alia*, the range of costs involved in design, decision making, and implementing new institutional arrangements (i.e. delivering programs). They also include the cost of labour and administration (e.g. financial, legal and specialist advisory services) associated with implementing agreements and ongoing operation and maintenance costs. Ultimately, the aim is not to have low transaction costs for their own sake but

to have maximum value for the money invested. A program that incurs higher costs to run but has excellent environmental outcomes may be better value for money than one that incurs lower costs and provides poorer environmental outcomes. The key issue is whether the regional NRM model represents the appropriate governance model for facilitating such a process in comparison with alternative models.

In section 6.3 it was noted that the cost of delivering NRM through a regional governance model would likely be higher than a centralised government approach due to the additional transaction costs and other direct costs of establishing institutional and governance arrangements and processes associated with regional NRM groups. Moreover, a regional NRM model also incurs added costs associated with direct engagement and collaboration with relevant community and other NRM stakeholders in the delivery of NRM objectives. However, it was also argued that these costs may increase a region's social capital and governance capital (see chapter 5), which may reduce costs of implementation and those associated with non-compliance (e.g. Birner and Wittmer 2004).

An analysis of the regional NRM model based on the FBA case study was carried out, mindful of the principles outlined in the comparative transaction cost frameworks by Birner and Wittmer (2004), and Challen (2000) and Marshall (2005), to compare the cost effectiveness of a regional governance approach with alternative arrangements, namely a more centralised governance approach. In particular, the transaction costs of establishing the regional NRM arrangements was estimated using a range of government and FBA documents and information elicited through interviews and personal communications with DNRW and FBA officials. The transaction costs of participation in the FBA devolved grants program was estimated based on data collected in a survey of landholders participating in the scheme. The proportion of transaction costs to the total amount of average grant funding was also estimated to provide a basis for comparing cost-sharing arrangements of similar programs.

In the following section, a transaction cost analysis of the regional NRM model is presented in relation to different levels of a regional governance hierarchy. The first level relates to the higher-level transaction costs of establishing the regional NRM

arrangements in Queensland. The second level relates to the transaction costs of administering and operating the FBA as a regional NRM group. The third level relates to program-level transaction costs associated with the administering and running of FBA program portfolios to achieve NRM objectives as outlined in the CQSS2 plan. This also includes identifying transaction costs of landholder participation in NRM incentive programs. The latter is the focus of a survey of landholders involved in the FBA devolved grants program reported in chapter 8.

### **7.5.1 High-level Regional Governance and FBA Costs**

The discussion in sections 4.7 and 6.5 identified that static and dynamic transaction costs and transformation costs need to be considered in an evaluation of policy choices between alternative institutional options (e.g. Challen 2000; Marshall 2003; McCann *et al.* 2005). Given that the primary focus of this analysis is on the cost effectiveness of the regional NRM governance model, an analysis of the total expenditure on environment conservation and NRM programs in Queensland can provide a basis for comparison with the costs of establishing and operating regional NRM groups such as the FBA. In particular, the analysis undertaken here specifically focuses on the regional governance arrangements for the Central Queensland region (section 7.5.2).

Total net NRM and environment conservation expenditure in Queensland for 2002-03, based on estimates from the Australian Bureau of Statistics (ABS 2004) and DNRM (Binney 2005, *pers. comm.*), which include funding contributions to the NAP and NHT2 programs, was approximately \$850 million<sup>99</sup>.

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<sup>99</sup> Total *gross* environmental expenditure in Queensland for 2002-03 is estimated at approximately \$1.9 billion. This figure includes Local Government current and capital expenditure, but excludes local government revenue, which principally consists of wastewater and solid waste revenue. The total *net* environmental expenditure in Queensland includes local government revenue principally consisting of wastewater and solid waste revenue. Local Government environmental protection expenditure consists of wastewater, solid waste, biodiversity and conservation, soil resources, and cultural heritage. Local Government NRM expenditure consists of water and land management.

Also included in these environmental expenditure figures is the Australian Government expenditure on the Great Barrier Reef Marine Park Authority (GBRMPA), NHT and NAP programs, and environmental expenditure for the Queensland Environmental Protection Agency and Department of Natural Resources and Mines.

A derived estimate of transaction costs of institutional change associated with establishing regional NRM governance arrangements in Queensland can be undertaken on the basis of the level of funding provided to Queensland regional NRM groups. Table 7.2 outlines the funding to regional NRM groups in Queensland based on total indicative allocations and RIS review reporting of NHT2 and NAP funding for 2004-08.

**Table 7.2: Total Regional NRM Group Investment in Queensland 2004-2008**

Region	2004-05	2005-06	2006-07	2007-08	Four year Average
Burdekin Dry Tropics	\$5,300,000	\$7,700,000	\$7,200,000	\$2,967,000	\$5,791,750
<b>Fitzroy Basin Assoc.</b>	<b>\$6,000,000</b>	<b>\$8,300,000</b>	<b>\$7,800,000</b>	<b>\$4,461,000</b>	<b>\$6,640,250</b>
Burnett Mary	\$4,900,000	\$6,600,000	\$6,200,000	\$2,551,000	\$5,062,750
South West NRM	\$2,100,000	\$2,800,000	\$2,700,000	\$1,620,000	\$2,305,000
QMDC	\$5,000,000	\$7,300,000	\$6,800,000	\$4,072,000	\$5,793,000
SEQ Catchments	\$4,400,000	\$5,459,827	\$5,200,000	\$3,431,000	\$4,622,707
Desert Channels QLD	\$1,746,533	\$1,894,013	\$2,100,000	\$2,247,000	\$1,996,887
Mackay Whitsunday	\$1,438,000	\$1,493,800	\$1,800,000	\$1,896,000	\$1,656,950
Northern Gulf	\$1,448,030	\$1,615,278	\$1,800,000	\$1,510,000	\$1,593,327
Southern Gulf	\$1,366,763	\$1,600,850	\$1,800,000	\$1,471,000	\$1,559,653
Cape York	\$2,866,666	\$2,966,666	\$3,100,000	\$1,640,000	\$2,643,333
Far North Queensland	\$1,981,151	\$2,200,000	\$2,400,000	\$1,912,000	\$2,123,288
Torres Strait	\$700,000	\$700,000	\$900,000	\$747,000	\$761,750
Condamine Alliance	\$2,900,000	\$4,000,000	\$3,800,000	\$4,115,000	\$3,703,750
<b>Total</b>	<b>\$42,147,143</b>	<b>\$54,630,434</b>	<b>\$53,600,000</b>	<b>\$34,640,000</b>	<b>\$46,254,394</b>

(Source: Department of Natural Resources and Water 2008)

On this basis, the average expenditure on regional governance (i.e. using regional NRM groups to deliver NRM objectives) in Queensland is estimated at approximately \$46.2 million per year<sup>100</sup>, which represents about 5% of the total environment and

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These estimates have been derived from available DNRM internal unpublished estimates and Ministerial Statements and available published ABS data on Local Government expenditure. Complete data on other years was not available at the time of writing.

<sup>100</sup> It is important to emphasise that these costs only represent a conservative estimate of transaction costs associated with shifting governance to the regional level in Queensland based on available data from the ABS and DNRM, and for this reason it is recognised that this analysis may not be a true reflection of the actual cost magnitudes. It is acknowledged that there will also be additional costs associated with administering the regional governance arrangements (e.g. negotiation of Bilateral Agreements, administering of funding through relevant Joint Steering Committees, and funding delays) with relevant State and Australian Government agencies. Indeed, Paton *et al.* (2005) specifically recognised the high transaction costs of decision delays (or “decision failure costs” as outlined in section 6.4) associated with financial reporting obligations, and getting agreements (e.g. NHT2 and NAP Bilateral Agreements) between state and federal governments to commit resources, in getting effective regional NRM groups in states where there had been limited experience with

NRM expenditure in Queensland based on above estimates. In particular, average annual operational costs of the FBA are approximately \$6.6 million, which represents about 14% of the cost of regional governance in Queensland and less than 1% of Queensland's total net environment and NRM expenditure. Of this cost, FBA fixed operating costs for 2006-07<sup>101</sup> are estimated at \$2.6 million<sup>102</sup>, which represents about 33% of total FBA costs for this year.

Another important aspect of the FBA governance model that needs to be recognised is the cost of operating the FBA's five sub-regional groups which implement on-ground NC programs for achieving NRM outcomes in accordance with the CQSS2. These costs are included in the estimates of FBA operational costs outlined above. The operational costs of the five sub-regional groups for 2006-08 total approximately \$3.6 million, which represent about 30% of total FBA operational costs for this period (see Appendix C).

Total costs of establishment of the FBA and costs of implementation of its eight program portfolios over the four years from 2004-08 was approximately \$26.5 million<sup>103</sup> (FBA 2009). This figure, which includes the full costs incurred across all FBA program portfolios, represents the total *static transaction costs* of the FBA (which effectively represents the part of the total static transaction costs of the regional NRM model focused on the Fitzroy Basin region). Figures available for total costs

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regional NRM, and in developing processes to accredit regional NRM plans. The transaction costs and transformation costs associated with shifting to a regional model of governance across Queensland and Australia would of course, also require estimates from across all states and territories, and is beyond the scope of this study.

<sup>101</sup> Complete data for other years were not available. Estimates for 2006-08 are outlined as part of the Healthy Region program funding (see Figure 7.7)

<sup>102</sup> This provides a more accurate estimate of transaction costs associated with operation of the FBA as estimates of total funding also include direct payments for environmental improvements, and therefore overestimate transaction costs.

<sup>103</sup> Note that figures outlined in Table 7.1 represented *indicative allocations* of NAP and NHT2 funds. This differed slightly from actual funding regional NRM groups received in each year due to financial reporting systems and procedures established between Australian and State Governments through relevant Bilateral Agreements. Regional NRM groups were guaranteed 100% of funding in the first [transitional] year of the regional NRM arrangements, 80% in the second year, and 50% of the third year in a typical three year RIS. Remaining funds were provided when regional NRM groups demonstrated that measures were in place to ensure relevant resource targets were being met.



associated with the FBA's eight program portfolios and share of total costs for 2006-08 are outlined in Figure 7.5.

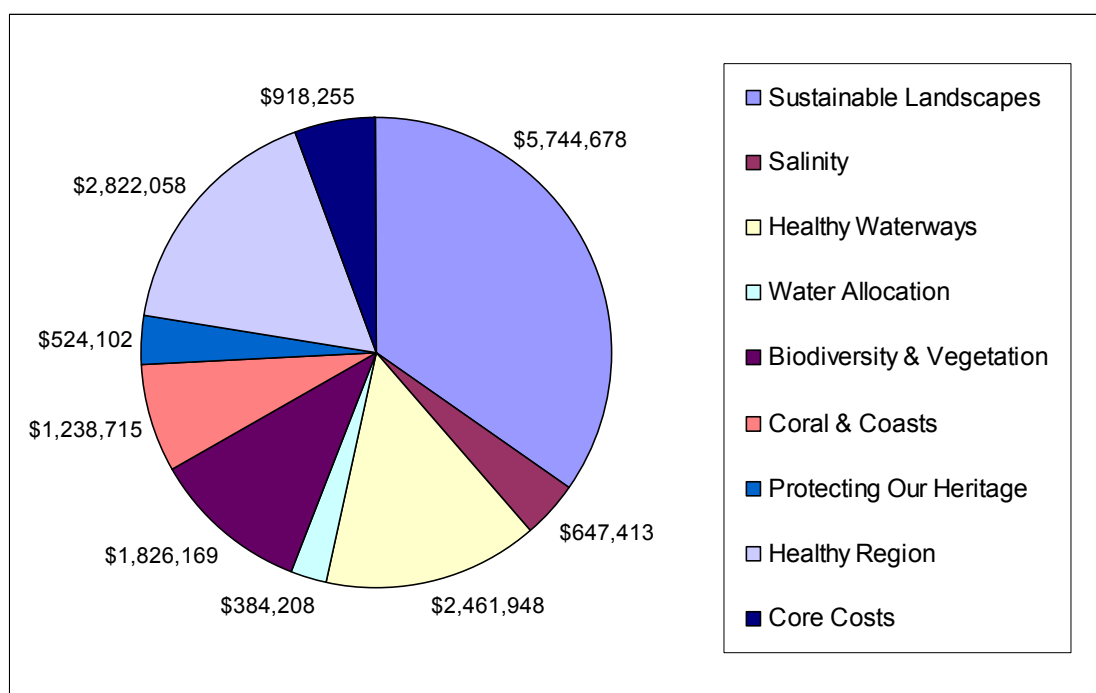
## 7.5.2 FBA Program-level Costs

This program-level analysis of transaction costs focuses on two FBA program portfolios:

- Sustainable Landscapes; and
- Healthy Region.

These programs represent the FBA's core functions critical to the role of a regional NRM group under a devolved governance framework which include, *inter alia*, fostering stakeholder and community engagement mechanisms through which the FBA conducts on-ground planning, collaboration, and regional capacity building activities vital in achieving NRM objectives (Bent 2006, *pers. comm.*).

**Figure 7.5: FBA Program Portfolio Costs 2006-08**



(Source: FBA 2009)

The *Sustainable Landscapes* program is of particular interest as it represents the program portfolio that directs on-ground investment through the devolved grants program case study which is the focus of the survey of landholders reported in chapter 8. The *Healthy Region* program has a principal focus on investing in key

elements to support healthy regional governance arrangements, which include the building of partnerships for improving governance systems at the sub-regional level critical for implementing on-ground NRM actions. In other words, this program is important for developing and maintaining social capital and governance capital-enabling processes critical to achieving NRM outcomes under the regional NRM governance model. Therefore, the cost of implementing the Healthy Region program effectively represents the core operating costs of the FBA. These two programs comprise a very high proportion of planning, capacity building, and on-ground activities that are the core foundation of a robust regional governance framework for NRM. Accordingly, these programs together represent the two highest costs as a proportion of total FBA program portfolio costs. When considered together with FBA *core costs*<sup>104</sup>, the total cost represent about 57% of the total FBA costs based on available figures for 2006-08 (Figure 7.5).

The costs associated with the Sustainable Landscapes program for 2006-08 is outlined in Figure 7.6. The majority of funding in this program is allocated to planning work (59%). This reflects the focus of the program which involves the main technical support and on-ground engagement activities that are characterised by high transaction costs.

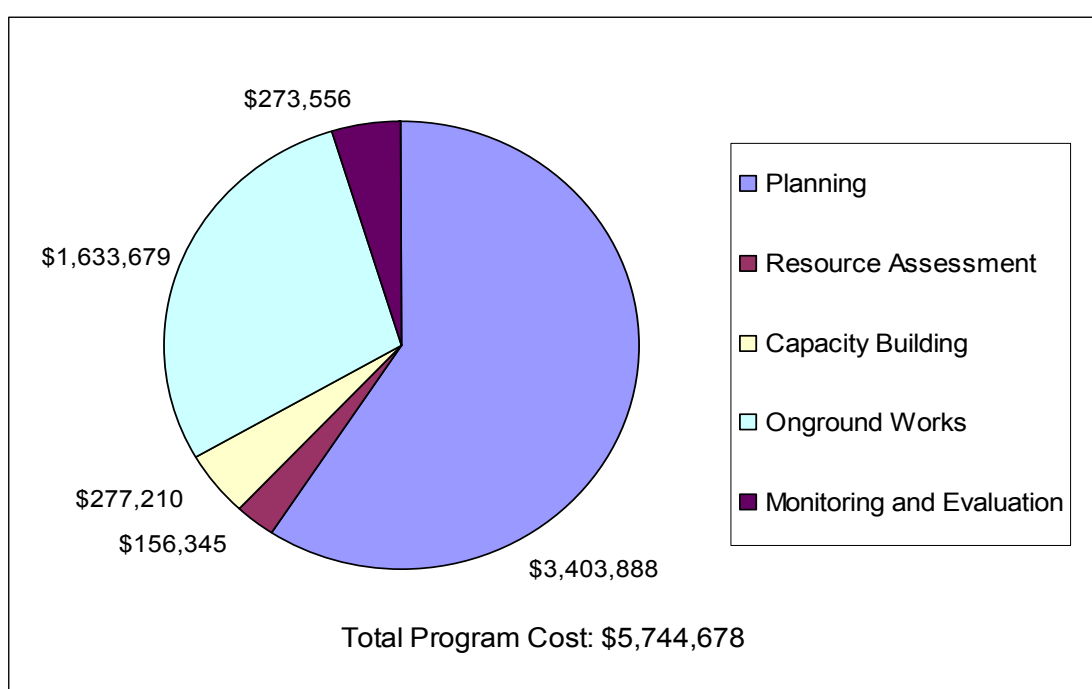
The main outputs for this program are Property Management Plans<sup>105</sup>, which accounts for the disproportionately large planning category expenditure. The other significant cost category relates to on-ground works (28%), which funds Neighbourhood Catchments incentives scheme projects such as devolved grants programs. Specific analysis of transaction costs associated with landholder involvement in the devolved grants program is investigated in chapter 8.

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<sup>104</sup> Core costs comprise the overhead and operating costs associated with running the FBA. These include costs associated with funding the FBA Board, Stakeholder Council, Chief Executive Officer, management staff and administration, and operating costs of delivering the regional NRM plan. The FBA's RIS identifies a best practice target of 15% to cover core costs (FBA 2004a, p.19). For 2006-08, FBA core costs totalled \$918,255 (FBA 2009), which represented about 6% of total RIS funding for this period.

<sup>105</sup> Property Management Plans outline a suite of property-level NRM actions tailored to individual properties in accordance with relevant regional NRM plans. Technical staff from regional NRM groups work with landholders to undertake a comprehensive resource assessment and prescribe a plan of action for achieving regional NRM priorities.

**Figure 7.6: Sustainable Landscapes Funding vs. Project Categories 2006-08**

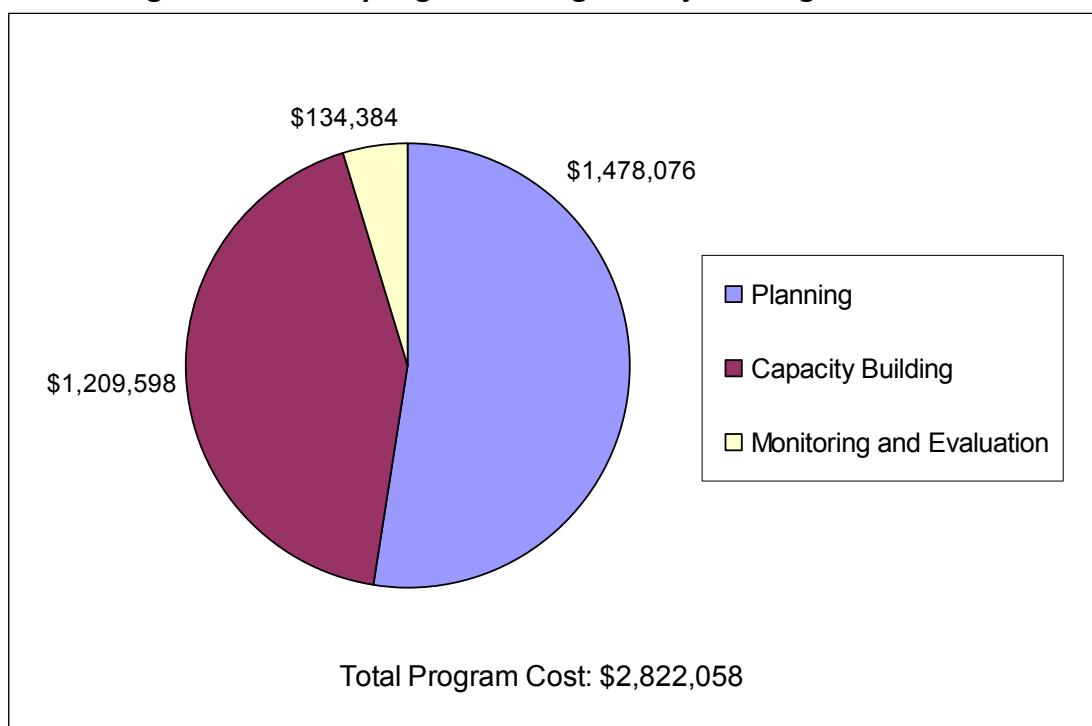


(Source: FBA 2009)

The costs associated with the Healthy Region program for 2006-08 is presented in Figure 7.7. The majority of funding in this program is also allocated to planning activities (52%). In addition to planning work, this program has a significant focus on regional capacity building (43%). This reflects a key emphasis of this program on developing and improving sub-regional governance relationships and developing social capital with local-level stakeholders across the sub-regions in the Fitzroy Basin region.

Important activities include investment in training programs and initiatives to strengthen links with the FBA's five sub-regional groups to facilitate the translation of broad NRM planning targets outlined in the CQSS2 to effective on-ground implementation. In effect, the total cost (\$2.8 million) associated with the Healthy Region program can be considered as broadly representing the transaction costs of the FBA regional governance model. This is broadly consistent with the level of fixed costs of the FBA for 2006-07 reported in section 7.5.1 (\$2.6 million).

**Figure 7.7: Healthy Region Funding vs. Project Categories 2006-08**



(Source: FBA 2009)

### **7.5.3 Devolved Grants**

The CQSS2 and RIS provide a framework that articulates the long term NRM goals and visions for the Fitzroy Basin region, and the mechanisms through which this would be achieved by the FBA. A key mechanism for implementing the CQSS2 is financial incentive schemes such as devolved grants to encourage adoption of improved land management practices across the region. Devolved grants are one method of investing NRM funding for on-ground activities. A devolved grant involves a funding organisation, such as the Australian Government, allocating funds to regional NRM groups such as the FBA to run their own environmental grants scheme. Devolved grants generally aim to implement an existing regional strategy (i.e. CQSS2) and typically involve a large number of landholders.

The organisation managing the project is responsible for selecting and assessing eligible sites for on-ground work and then allocating the funds needed. Interested landholders apply directly to the organisation managing the scheme. Funding is provided for undertaking a range of on-ground projects using recommended

‘abatement technologies’<sup>106</sup>, including fencing of riparian areas, revegetation, provision of off-stream watering, and management of pests and weeds in accordance with the relevant regional NRM plan. Public benefits targeted include biodiversity conservation, habitat enhancement, soil conservation, weed control, water quality protection, coordination of natural resource service providers, a more sustainable farming and grazing industry, and increased adoption and awareness of Best Management Practices (BMPs).

As established in section 4.2.1, private landholders have little incentive to invest in NRM practices for society’s well being if the private returns from the investment fall short of the costs (e.g. NLWRA 2002). A key challenge facing policymakers is to generate high levels of adoption of preferred management practices. There are typical long time lags associated with the take-up of new technologies that improve agricultural productivity, and the adoption of BMPs associated with improved NRM outcomes may follow similar patterns (Rolfe 2006). Incentive schemes such as devolved grants encourage landholders to adopt improved NRM practices that also yield public benefits. Devolved grants have been the main incentive mechanism applied by regional NRM groups to negotiate improved NRM outcomes on private land (Windle, Yee and Rolfe 2006, p.1). However, the voluntary nature of such incentive schemes means that there is often no guarantee of participation (and adoption), given that there may be trade-offs between espoused NRM practices and production (e.g. removing land from production). Low levels of participation by landholders can therefore translate to reduced environmental benefits. Lockie and Rockloff (2004) identify that the factors influencing landholder adoption of BMPs are complex, and require the careful consideration of both ‘program factors’ and ‘landholder factors’. Rolfe (2006) remarks that programs with high levels of

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<sup>106</sup> In the context of institutional change considerations (i.e. shifting to regional NRM governance arrangements), it is important to acknowledge that the specific NRM practices (e.g. BMPs) promoted under such devolved grants incentive schemes will influence the static and dynamic transformation costs as prescribed by the framework outlined by Challen (2000) and Marshall (2005) in section 6.5. It follows, therefore, that the regional NRM arrangements (through devolved grants incentive programs or MBIs) influence the costs (i.e. technological transition costs) of adopting particular choice of ‘abatement technologies’, and in turn, influence technological lock-in costs. Due to time and resource constraints in this research, detailed cost analysis and influence of specific recommended abatement actions were not investigated.

transaction costs, increase risk and uncertainty, impact on perceived rights or have complicated design characteristics are likely to have lower levels of adoption. Landholders are more likely to support programs that “enhance production outcomes, have positive program features, are communicated well and are consistent with current attitudes and management practices” (Rolfe *et al.* 2006, p.12).

While devolved grants schemes may be viewed as a positive contribution on the part of landholders towards achieving NRM outcomes, there also limitations in their use. Rolfe *et al.* (2004b, p.17) note that that some devolved grants tend to be focused on dealing with capital cost components of opportunity costs (e.g. fencing and water improvements), and are not tailored to addressing recurrent opportunity costs (e.g. production losses and management effort). It is also difficult to assess the cost effectiveness of many devolved grants, especially in cases where there is low participation rates, where standard rates are used for many capital items, and where no set procedures are in place to assess biodiversity or other NRM outcomes for each project (Rolfe *et al.* 2004b). Key issues of concern are that proposals are not selected on cost effectiveness grounds and there is not enough focus on the outputs achieved and the associated costs (e.g. Pannell 2008).

Since 2003, the FBA has been providing landholders in their Neighbourhood Catchments incentive scheme with the opportunity to participate in a devolved grant program (Windle, Yee and Rolfe 2006). The program has been designed to provide landholders with assistance to improve property management and infrastructure in order to achieve better NRM outcomes in the region. To evaluate the success of the devolved grant program, a questionnaire survey of all participants was undertaken as part of this research, the findings of which are reported in chapter 8.

One of the objectives of evaluating the FBA devolved grants program was to compare the attitudes of landholders between those schemes and a range of relatively new incentive schemes for the management of natural resources and the environment known as market-based instruments (MBIs). Increased interest in applying MBIs in Australia has been influenced through the National MBI Pilot Program established in 2003 under the NAP (NMBIWG 2005). MBIs are considered more targeted

mechanisms because they can provide land users with more tailored incentives to minimise abatement costs (Rolfe 2006), and provide ongoing incentives to reduce the cost of achieving NRM targets (Whitten *et al.* 2004). Hence, MBIs have been investigated as schemes that provide landholders with incentives to undertake improved NRM actions, but are also associated with more cost effective outcomes (Windle, Yee and Rolfe 2006). There has been growing interest and experimentation in the use of MBIs by regional NRM groups, and state and local governments (Rolfe *et al.* 2006).

## **7.6 THE DECISION SUPPORT TOOL REVISITED**

In section 6.6.1, a decision support tool was introduced that outlined a broad decision framework offering preliminary guidance to policymakers for assessing suitable institutional and governance arrangements. The framework provides a basis for investigating potential governance models best suited to achieve desired NRM objectives for a region. This is achieved by guiding policymakers through a series of eight questions which lead to 10 potential scenarios for consideration. In this section, the decision support tool is applied to the FBA case study of interest in this study. The outcome of this assessment offers additional advice in determining whether the regional NRM model is a suitable governance arrangement given the case study findings and NRM objectives of the Central Queensland region. More importantly, it also offers a useful test of the utility of the decision support tool to an existing case study on regional NRM and validates the tool as a significant and useful contribution to knowledge in the area of natural resource governance and environmental management.

### **7.6.1 Applying the FBA Case Study**

In order to properly apply the decision support tool proposed in chapter 6 to the FBA case study, a specific NRM issue is needed to provide a basis for answering the eight guiding questions. The decision support tool will be applied in the context of the FBA's Sustainable Landscapes program, which aims to implement projects to improve catchment water quality and biodiversity. In particular, projects included:

- fencing riparian areas;

- revegetating riparian or corridor areas; and
- establishing alternate stock watering points when excluding riparian areas.

This section applies the eight questions of the decision support tool to the FBA case study to identify the most appropriate governance model for achieving regional NRM outcomes.

*Question 1: Does government have all the necessary resources and information to effectively solve the NRM problem working alone?*

As previously discussed, NRM has been gradually shifting to more participatory and devolved processes where community stakeholders are becoming more involved in NRM both at the policy level and at implementation. Implicit in this shift is recognition that *Progressive Era* policies were not appropriate for matters concerning NRM. Governments, as agents of the public (the principal), are responsible for implementing policies and programs to optimise social welfare. One of the key problems relates to asymmetric information, where governments may possess information on what the public wants in terms of improved NRM and environmental outcomes, but do not possess information on landholder costs of improved management practices. Coupled with this are large constraints on scientific and biophysical knowledge. Accordingly, this question can be answered in the negative, that is, governments are unlikely to have all the necessary information to address the NRM issues in isolation.

*Question 2: Have the potential options for addressing the NRM problem been broadly identified and defined?*

The answer to this question in relation to the FBA case study is contingent on the following considerations: (i) Before the finalisation of the CQSS2<sup>107</sup>; or (ii) After the finalisation of the CQSS2. In the case of the former, this question attracts a negative response. In theory, the case of the latter attracts an affirmative response as the preparation of regional NRM plans should involve the clear articulation of options for

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<sup>107</sup> As outlined in section 7.4, the CQSS2 is the comprehensive NRM Plan prepared by the FBA for the Fitzroy Basin NRM region in accordance with the regional NRM arrangements funded under the NHT2 and NAP national NRM funding programs in Australia.



addressing the NRM problem that is founded on robust scientific knowledge and prioritised on the basis of cost-benefit considerations. However, in practice, as discussed in section 6.3.2, regional plan development and implementation under the NHT2 and NAP framework was generally inconsistent across regions and prioritisation of options failed to make good use of available social, economic and scientific information. As the preparation of the CQSS2 involved extensive consultation and engagement processes with relevant catchment communities to determine NRM goals and targets, this represents an important consideration on whether potential options for addressing the NRM issue have been identified. Implicit in this consideration is the assumption that the goals and targets identified in the CQSS2 are broadly linked to particular courses of action. Depending on how this question is answered on the basis of the above considerations, two potential decision paths are offered in the decision support tool (see Figure 7.8).

*Question 3: Is public acceptance critical for effective implementation of any decisions made to address the NRM problem?*

As many NRM problems require the voluntary participation and action by private landholders, it is critical that public acceptance be broadly achieved to ensure effective implementation of any policy and program decisions to address the NRM issue. In the case of the FBA, substantial resources have been invested in devolving governance arrangements to the sub-regional level to ensure that FBA programs are developed and implemented by FBA branches (i.e. sub-regional groups) that have a sound appreciation of the important NRM issues facing landholders at the sub-catchment scale. Hence, this question can be answered in the affirmative.

*Question 4: Is public acceptance reasonably assured if the government proceeds to act alone in making decisions about actions to be taken to address the NRM problem?*

Government authorities risk a negative public reaction if they proceed to act alone to implement actions for addressing NRM problems facing the Fitzroy Basin in Central Queensland. This is especially pronounced if the policy decision is not consistent with the opinion and accepted practices of the local community. The FBA has been working closely with government agencies in the region as part of state and national

regional NRM funding requirements for more than a decade. If government authorities decided to ignore established engagement and consultation processes (accompanied by development of social and governance capital) in the Central Queensland region to independently undertake a course of action over NRM matters, it is highly likely that this would not be met with immediate public acceptance on the basis of previous government interventions<sup>108</sup>. Although there may be public support for governments to act alone on some aspects of NRM decisions such as the protection of endangered species, other more complicated issues which involve larger trade-offs with economic and social impacts may not be met with public support. Accordingly, this question is answered in the negative, but should be recognised that under certain circumstances this may not always be a given.

*Question 5: Are relevant stakeholders (government and community) willing to engage each other in dialogue in order to solve the NRM problem?*

A long and established practice of stakeholder engagement and collaboration has existed in the Fitzroy Basin region stemming from earlier NRM initiatives such as Landcare and integrated catchment management. These initiatives highlighted awareness of NRM problems within the catchment community and established social capital among local Landcare groups in promoting transfer of farmer skills and knowledge for addressing NRM issues. As a result of such programs, relevant NRM stakeholders are cognisant of the important role that they can play in the management of environmental assets in their region and are generally willing to collaborate and engage with relevant parties in addressing NRM concerns. However, it is also important to recognise the temporal dimension associated with relevant

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<sup>108</sup> The Queensland Government introduced the Vegetation Management Act 1999 (Qld), and Vegetation Management and Other Legislation Amendment Act 2004, 2005 (Qld) which provided a framework for phasing out broad scale clearing of remnant vegetation. At the time, the introduction of this legislation was met with significant landholder opposition.

In October 2008, the Queensland Government announced plans to regulate farming and land management activities in catchments adjacent to the Great Barrier Reef to address widespread concerns over the threats to Reef health due to agricultural water pollution. Landholders in affected catchments voiced strong opposition to the regulations and expressed anger that they had been identified as the key reason behind the degradation of water quality and impacts on reef health. The Government was accused of giving in to the green lobby, given the impending state election in 2009.

stakeholders' willingness to engage in dialogue to address NRM concerns. The Landcare-based experiences characterising Australian programs of NRM have ingrained a strong engagement and collaboration ethic, but this has occurred over a long period of time and may not always have been the case prior to the implementation of such initiatives. Although relevant parties are not always willing to engage in dialogue, it is essential to note that it is possible to improve the dialogue. This question, therefore, can be answered in either the affirmative or negative<sup>109</sup>.

*Question 6: Would targeting public consultation and incorporating local knowledge and values improve quality of public input and support for solving the NRM problem?*

While the previous question established whether relevant stakeholders would be willing to engage in dialogue to address the NRM problem, this question concerns whether the quality of public input would be improved if a public consultation process was specifically targeted at sub-regions and local communities directly impacted on NRM policy decisions. In the case of the FBA NRM region, five specific sub-regional groups have been established that are able to effectively target action to address local NRM problems in specific areas within the Fitzroy Basin. Consultation through such a network provides the mechanism through which local knowledge and values can be incorporated which can improve the quality of NRM policy decisions. Subsequently, this further improves support at regional and sub-regional levels. Hence, this question is answered in the affirmative.

*Question 7: Are there net benefits in transferring or devolving NRM decision making responsibilities to community-based regional NRM groups?*

The focus of this question is on identifying whether there are net benefits involved in devolving decision making to the regional level. This is a critical question as it directly relates to the cost effectiveness of achieving NRM outcomes which all governance models would be seeking to optimise. A key task is determining whether the benefits of devolution outweigh any additional costs. It is also important to note that both

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<sup>109</sup> It is important to note that whether this question needs to be answered is contingent on the response to questions 2, 3 and 4 (i.e. question 5 is only relevant if the response to question 2 was "no", the response to question 3 was "yes", and the response to question 4 was "no"). Question 5 does not apply if the response to question 4 was "yes".

benefits and costs involve several types of impacts that are difficult to measure. As region-specific knowledge is likely to offer the opportunity to tailor policy decisions to local NRM concerns, it is also likely that potential exists for NRM outcomes to be improved by such processes. Critical to the success of these processes is the design of NRM programs, which need to consider sub-regional NRM issues to be more effective. This is where new incentive programs such as MBIs may offer improvements as they allow landholders the flexibility to propose the nature and cost of property-level actions for achieving desired NRM outcomes.

As catchment communities are able to provide direct input into NRM decisions and the design of NRM programs through engagement with community-based NRM groups, they would also have a higher likelihood for acceptance and ownership of decisions; reducing costs of implementation and compliance (see section 6.4). In the context of these considerations, and taking into account the evidence from the FBA case study that the institutional structure generates social capital (see chapter 8), this question can be answered in the affirmative.

*Question 8: Would specific statutory roles or powers be needed to solve the NRM problem in the region (e.g. formal legitimacy, revenue raising power)?*

The governance arrangements for NRM in Queensland specifically established regional NRM groups with a non-statutory basis. This was consistent with principles that promoted open and inclusive stakeholder consultation processes and the belief that such a devolved arrangement for NRM would imbue the process with bottom-up grassroots support necessary for effective implementation. This arrangement is in contrast to the NRM governance structures which exist in other states such as NSW and Victoria where equivalent CMAs have a statutory and legislative underpinning. When the Australian Government circulated a green paper in early 2005 canvassing the opinions of various regional NRM groups on four options for a planning framework in future years, the FBA rejected the option to become a statutory body. Webster (2008, p.172) explains:

...[statutory] arrangements would place FBA under the control of a single government minister. In the Central Queensland community, there already existed a high 'suspicion of

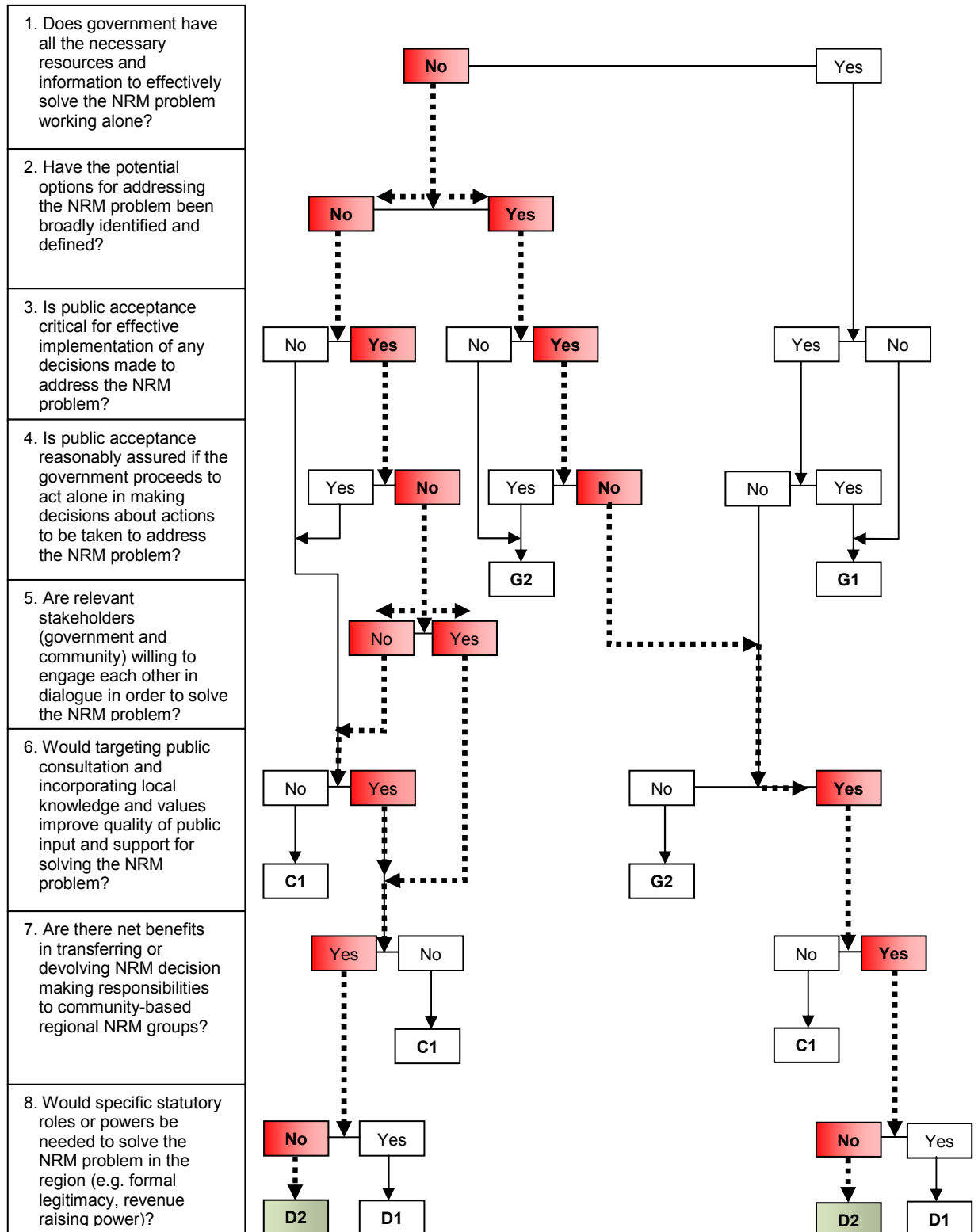
direct government intervention in community process' based on landholders' past experiences, and statutory powers raised the likelihood of legislating the existing, or future, NRM plan...statutory authority status would be counter productive to the culture of independence and self reliance in the community and industry. People have a great appreciation of their stewardship responsibilities. We cannot legislate this appreciation. Grudging compliance could replace willing participation, with a resulting lack of innovation, initiative and involvement.

Non-statutory status allowed groups such as the FBA to foster deep community networks and be perceived as a member of the community and part of the region. Regional NRM groups risk being perceived as an agency of government if imbued with statutory powers under legislation, effectively eroding social and governance capital established over a long process of ongoing engagement with their respective sub-regional grassroots communities. A statutory basis for regional NRM groups could also potentially restrict adaptiveness and flexibility on the part of government authorities. However, it is important to recognise that coercive power may still be warranted in some cases (e.g. banning the use of some chemicals), but for consistency such regulations should be applied at a state level rather than at a regional level. In light of the above factors, this question is answered in the negative.

The outcome of answering these eight questions of the decision support tool in relation to the FBA case study is the recommendation of governance model *D2*, the non-statutory devolved regional NRM model. Based on the evidence from the FBA case study, the decision support tool suggests that the regional NRM arrangements in place represent an appropriate model of governance in relation to achieving NRM outcomes in the Fitzroy Basin NRM region.

Figure 7.8 outlines the decision path based on the above discussion. Note the two potential branches that result from the response to question 2 and the sub-branch from the response to question 5. Each branch recommends the same governance model.

**Figure 7.8: Applying the FBA Case Study to the Decision Support Tool**



**G1: Government Autonomous Model**  
**G2: Government Consultative Model**  
**C1: Consultative Approach Model**  
**D1: Devolved Statutory Body Model**  
**D2: Devolved Regional NRM Model**

## **7.7 SUMMARY**

In this chapter, an overview of the regional NRM planning process was provided in relation to the FBA case study as part of the delivery of the NAP and NHT2 under the regional NRM devolved governance arrangements in Queensland. An analysis of transaction costs associated with adjusting governance to the regional level in Queensland was presented, and specific organisational and program-level costs of establishing the FBA was also investigated. The FBA case study was applied to the natural resource governance decision support tool that was introduced in chapter 6. The results suggested that:

- The regional NRM model is likely to be the most appropriate governance framework;
- The natural resource governance decision support tool was validated based on FBA case study findings examined in this study.

In light of these findings, there is a need to test if the benefits achieved will justify the costs. This is the focus of chapter 8, which investigates the benefits of the regional NRM model from the perspective of landholders involved in the FBA devolved grants program.

## **8. Landholder Survey**

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### **8.1 INTRODUCTION**

Since 2003, the FBA has been providing landholders with the opportunity to participate in a devolved grant program through their Neighbourhood Catchments incentive scheme. This scheme has been designed to provide landholders with financial assistance to improve property-level management and planning for achieving improved NRM outcomes in the region.

Devolved grants have been the main incentive mechanism applied by regional NRM groups to negotiate improved NRM outcomes on private land (Windle, Yee and Rolfe 2006). However, there has been growing interest in the use of a range of new incentive schemes, known as MBIs, that offer landholders incentives to undertake improved management actions for achieving NRM objectives, but are associated with more cost effective outcomes. One of the objectives of evaluating the devolved grant program was to provide case study evidence to allow for future comparisons with the attitudes of landholders involved in different types of incentive schemes such as MBIs.

Landholder participation in NRM incentive programs can be influenced by a range of factors, including personal attitudes and characteristics, property or farm characteristics, and the nature of the incentives offered by the program. Required land management actions prescribed by the program can also influence participation levels (Vanslebrouck *et al.* 2002, p.490). Perceived benefits such as the utility to be gained from additional financial assistance, ease of the application process, and assistance provided by FBA staff are other potential factors.

Awareness of the FBA devolved grants program is also an important influence on participation. Typically, NRM incentive programs in Queensland (and Australia) have been poorly communicated to potential participants, with Lockie and Rockloff (2004) revealing that many landholders in coastal catchments had not heard of major



incentive programs. They found that 90% of respondents in their study were not aware of the Envirofund grants program offered by the Australian Government.

In this chapter, findings from a survey of landholders involved in the FBA's devolved grants program are reported. Landholder experiences and perceptions of the regional NRM model as reflected in the FBA case study are outlined. Understanding these perceptions is important as it can offer insight on the development of social capital and governance capital which are advanced as one of the key benefits of the regional NRM approach. In particular, understanding how participation in FBA incentive programs can translate to adoption of improved NRM actions is a critical aspect and purported strength of the regional NRM model.

The survey explored landholder attitudes towards the FBA (including factors linked to the deepening of soft institutions such as the development of social capital and governance capital), factors influencing landholder participation in the FBA devolved grants program (including transaction costs of involvement), and benefits of undertaking prescribed actions. The survey provides empirical evidence of the comparative advantage of a regional NRM governance model consistent with the transaction cost framework outlined by Birner and Wittmer (2004). In particular, a focus of the survey was to investigate the ability of regional NRM groups such as the FBA to foster the development of social capital enhancing processes which may reduce transaction costs associated with implementation of programs to achieve regional NRM objectives.

## **8.2 METHODOLOGY**

The review of the FBA devolved grants program involved both a desktop analysis and the collection of data from landholders involved in the program.

For the desktop analysis, the program details and a database of program participants were made available to the researcher by the FBA. For the data collection with landholders, a telephone survey of participants in the program was conducted in June 2006. A sample of 91 contact names, addresses and telephone numbers of participants was extracted from the database for this survey. These represented the

number of participants of the FBA devolved grants program who indicated they were willing to be involved in the study. The survey was conducted by the Population Research Laboratory (PRL) at Central Queensland University using computer assisted telephone interviewing (CATI) technology. Prior to telephone data collection each participant was sent a single page letter which informed them of the study, offered information about the project, gave them prior knowledge of the times which PRL staff would be calling and gave them the opportunity to contact the PRL if they wished to make an appointment.

The survey<sup>110</sup> questionnaire was organised in four parts comprising a total of 37 questions:

- Part 1 collected background information on the size and tenure of the property, number of people employed, and length of time in the district and on current property;
- Part 2 sought to collect information on involvement in the FBA devolved grants program. More specifically, the questions related to the type of on-ground activity associated with the grant, including what factors influenced their decision to participate in the program, and any additional contribution they made to the grant activity. Respondents were also asked to comment whether they observed any changes in environmental condition resulting from land management changes and whether involvement in the program had influenced how they would manage their property in the future;
- In Part 3, questions were asked to elicit information specifically related to landholder perceptions and attitudes towards the FBA. Respondents were asked whether their attitudes towards the FBA had changed as a result of participation in the program. The constructs measured included: change in levels of conflict, trust and cooperation in programs, levels of adoption of changed practices, flexibility compared to government programs, and tailoring to local knowledge in achieving natural resource management goals. These are related to the development and promotion of social capital; and

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<sup>110</sup> The survey instrument and design of the survey is outlined in Appendix A and Appendix B, respectively.

- Part 4 asked a series of demographic questions relating to age, gender, income, profitability, education, and membership in local Landcare or catchment groups.

The survey was conducted in June 2006 and targeted landholders who had received a devolved grant from the FBA between 2003 and 2005. The objective of the survey was to evaluate the attitudes and opinions of landholders who had participated in the scheme and to assess the impact of the program. Landholders were contacted and invited to participate in the evaluation survey which was delivered in a telephone interview.

The data was tabulated and cleaned using SPSS<sup>111</sup> software. The final sample contained 67 completed interviews. In sum there were four numbers for which no contact (no answer, answering machine, disconnected, etc.) was made, four numbers which were not eligible, as they informed that they had not participated in the devolved grants program and three refusals. There were also three duplicate records. A total of 399 telephone calls were made during the study period. The average length of completed interviews was about 31 minutes and the response rate was 86%<sup>112</sup>. This was a high participation rate for survey involvement, and provides indirect evidence of interest and support for the FBA program. The SPSS program was used to generate descriptive statistics and for the conduct of statistical tests to assess relationships between answers to different survey questions. These are reported in the following sections.

### **8.3 PROGRAM CHARACTERISTICS**

The desktop analysis reveals that the FBA had invested more than \$740,000 in the Sustainable Landscapes devolved grants program which involved more than 70 landholders in the following project areas:

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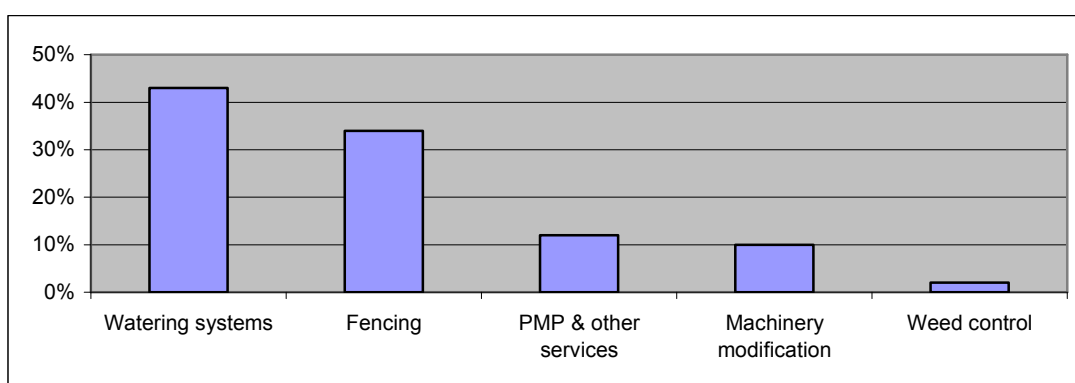
<sup>111</sup> SPSS (Statistical Package for the Social Sciences) Statistics 17.0 is a product of SPSS Inc., Chicago, Illinois.

<sup>112</sup> The maximum response rate was calculated by dividing the total number of completed interviews by the sum of the total number of completed interviews, together with refusals, non-eligible contacts, and non-contacts.

- Property Management Planning (PMP) and other services and products;
- Fencing;
- Watering systems;
- Machinery modification; and
- Weed control

Funding had mainly been targeted at providing landholders on grazing properties (which cover over 80% of the Fitzroy Basin area) with financial assistance to improve the infrastructure on their properties (Figure 8.1). Forty-three per cent of funding was directed at improving property watering systems, and a further 34% assisted landholders to improve their fencing. Resources for PMP and other services comprised 12%; and another 12% included machinery modification (10%) and weed eradication (2%).

**Figure 8.1: Main Focus of Devolved Grants as a Percentage of Total Funding**



Devolved grants are a cost sharing arrangement and landholders were required to contribute towards the scheme in order to receive funding. The desktop analysis revealed a range in the value of landholders' private contributions both within and between project types. The average contribution from landholders ranged from approximately \$2,500 for PMP projects to over \$20,000 for machinery modification projects. The average grant payments for the same project types ranged from about \$2,000 to over \$10,000 respectively (Table 8.1). The landholders' contributions ranged from 50% of the total funding for PMP projects to 80% of total funding for weed control projects. Fencing, water and machinery projects followed an approximate 70/30 cost share arrangement. Details are presented in Table 8.1 and are illustrated in Figure 8.2. Overall, the total grant payment ranged from 26% of the

total private contribution in weed control projects to 85% in PMP projects. The average grant payment across the different project types was about \$6,200, representing about 51% of landholders' average private contributions.

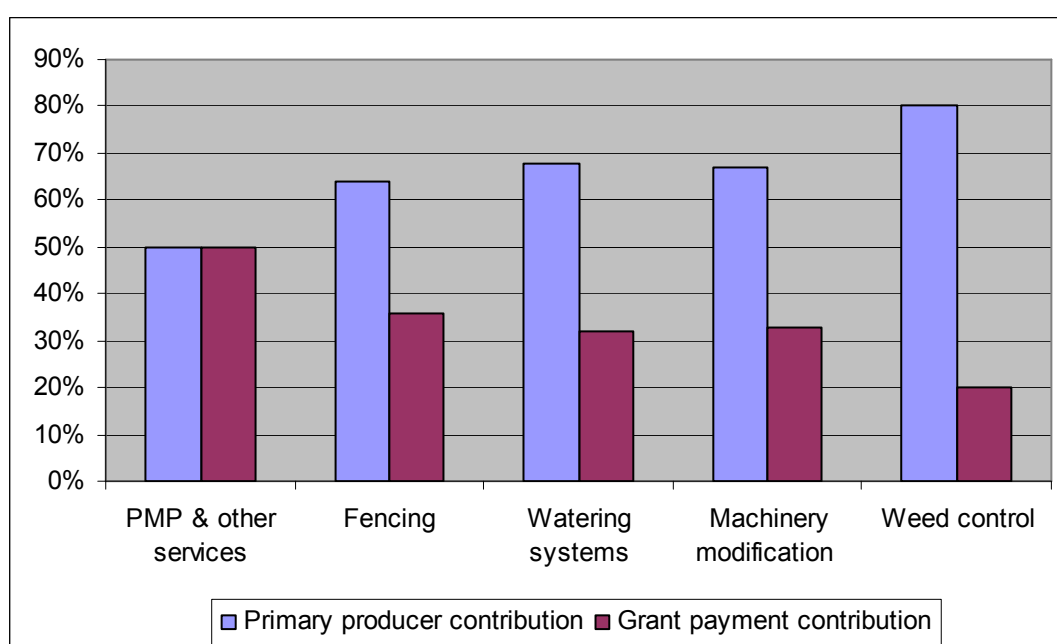
The survey results revealed that there was a considerable range in the extent of the contribution made by respondents, with only nine respondents indicating that they had not made any contributions.

Forty-eight respondents (83%) made some contribution in terms of time involved in construction work associated with the grant activity. The average was 498 hours, ranging from 1 to 10,000 hours, with a median of 200 hours.

**Table 8.1: Average Cost Sharing Agreements for Different Projects**

	Average Contribution		Approx. Percentage Contribution		Grant payment as % of private contribution
	Primary Producer	Grant payment	Primary Producer	Grant payment	
PMP Resources, Other Products & Services	\$2,494	\$2,110	50%	50%	85%
Fencing	\$9,159	\$5,366	64%	36%	59%
Watering System	\$15,185	\$7,262	68%	32%	48%
Machinery Modification	\$20,627	\$10,362	67%	33%	50%
Weed Control	\$11,683	\$3,000	80%	20%	26%

**Figure 8.2: Relative Contributions of Landholders and Grant Payments**



Twenty-six respondents reported details of the time they had spent on subsequent management or maintenance activities. This ranged from 1 to 800 hours, with a mean of 40 hours.

Fifty-five respondents (95%) accounted for the time they had spent on applying for the grant. This ranged from one to 80 hours with a mean of 15 hours and a median of 10 hours.

Overall, 58 respondents (87%) made some contribution in terms of time, which ranged from one to 10,000 hours with a mean of 156 hours and a median of 12 hours. On average, about 88% of the time contribution was spent on construction; 9% on maintenance and 3% on the grant application process. Given that most of the grants were focused on providing infrastructure, the high cost of time in construction is not surprising. The proportion of time invested in the grant application process was influenced by the type of project. For example, if there was a lot of time spent on construction, 20 hours spent on the application process might be a relatively low percentage. However, if there was no time spent on other activities, 20 hours spent on the application would account for 100% of total time. Six respondents (10%) indicated that the only time contribution came from the application process.

Although some landholders made a very considerable contribution to the project in terms of time, only four respondents (6%) indicated that in hindsight they would not have accepted the project if they knew how much work was involved.

Fifty-one respondents (88%) reported that they had incurred expenditure on materials and labour associated with the grant activity. This ranged from \$1,200 to \$100,000 with a mean and median value of \$26,443 and \$15,000, respectively.

The survey also revealed that 79% of properties were under Freehold tenure with another 10% under a combination of Freehold and Leasehold. The average size of participants' properties was approximately 9000ha, ranging from 60ha to 52,000ha. Fourteen respondents (24%) had taken out areas on their property from production

as part of the grant activity. This ranged from 5ha to 3,500ha with a mean value of 98ha. Overall, 5,700ha had been retired from production activities.

An analysis of the transaction costs associated with landholder involvement in the program is outlined in section 8.8.

### **8.3.1 Landholder Characteristics**

Results of the survey suggest the majority of landholders involved in the FBA devolved grant program had a strong link with their property.

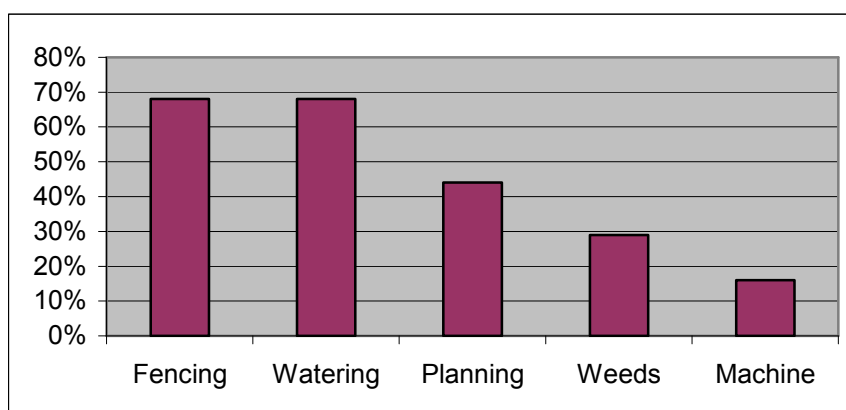
- More than half the respondents (58%) had resided on their property for over 15 years.
- More than half the respondents (55%) expected to reside on their property for the rest of their lives.
- Only 18% of respondents were uncertain about how long they will continue to live on the property and this was not related to age.
- 76% of respondents thought they would pass on their property to a family member or the next generation, and only 13% were unsure about this.
- Just over half the respondents (51%) had no income from off-farm sources.

### **8.3.2 Involvement in the Program**

Respondents were provided with a list of activities and asked to nominate the ones that they had been involved in. The results are presented in Table 8.2. Overall, over 60% of respondents had been involved in fencing and watering projects; 46% in planning projects; 28% in weed control and 16% in machinery modification (Figure 8.3).

**Table 8.2: Participation in Different Devolved Grant Activities**

Activity	Respondents	
	No.	%
Fencing watercourse	43	65
Fencing land type	22	33
Fencing remnant vegetation	18	27
Fencing saline or degraded land	9	13
Off-stream stock water system	41	61
Alternate stock water system (for changing grazing practice)	27	40
Strategic weed control	19	28
Irrigation water use efficiency	3	5
Machinery modification for zero till/CTF	11	16
Property management planning	31	46

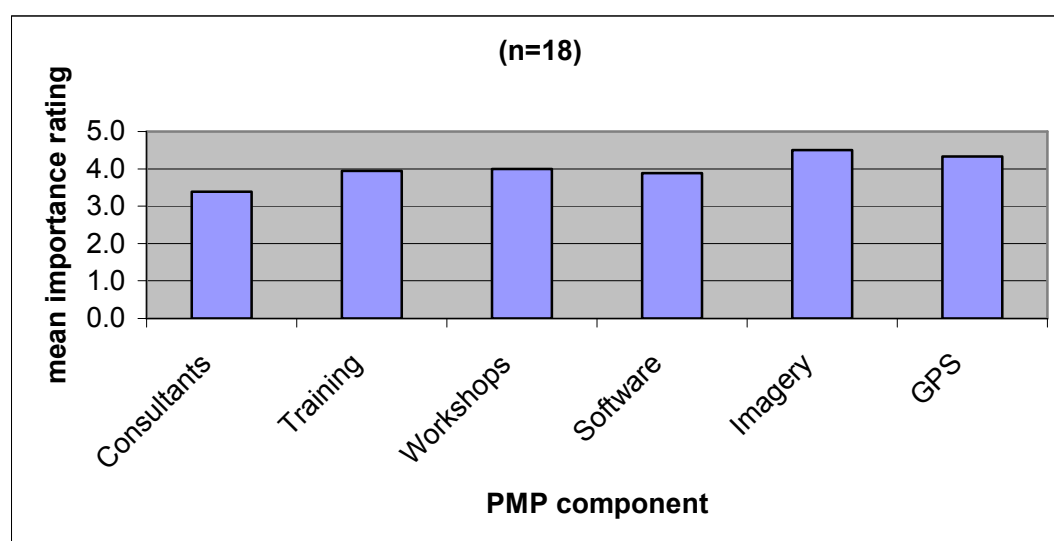
**Figure 8.3: Participant Involvement in the Grant Programs**

The majority of respondents (66%) were involved in projects that covered more than one program area, and only 21 respondents were involved in only one main project area.

Eighteen respondents indicated that they had been involved in PMP as part of their grant. They were asked to rate the importance of different components from 1=“very unimportant” to 5=“very important” (high scores indicated a higher importance rating) with results outlined in Figure 8.4.



**Figure 8.4: Average Importance Rating of Different PMP Components**



On average, all components were considered relatively important with a median score of four or higher. Imagery and GPS components were rated the most highly with mean scores of 4.5 and 4.3 respectively.

Fourteen respondents commented that they were still using components of their PMP. Six were still using all of it and eight were still using the GPS or mapping component. Only one respondent stated they were not using it. This was due to the drought which meant that most of their time was spent feeding cattle. However, eight respondents stated that they had, or were having, technical problems:

- Four respondents reported problems with their software;
- Three respondents reported problems with the maps, and
- One respondent did not possess adequate computer skills.

This would suggest that while training is also provided as part of the PMP package, further, readily accessible, technical support would have been beneficial for some landholders. Box 8.1 outlines respondents' comments in relation to aspects of property management planning.

#### **Box 8.1: Comments on Property Management Planning**

“Still using GPS, no one has got a package that is user friendly or able to interface with other products. Imaging is a big issue, how it is brought into software, not enough people around that sell it, or know how to manage it to offer advice (FBA)”

“Still using all aspects of PMP, issues getting good maps - took a couple of years to get up to date ones.”

“Still using all aspects of PMP, problems that we had were that the image we could get was a split image, wouldn't quite align properly, haven't quite resolved it.”

“Mapping program - having a bit of problem with. Important to have ongoing support because you need to have someone to talk to if it doesn't come together as it should.”

“Still using all aspects of PMP, encountered no issues.”

“We use the maps from time to time.”

Eleven respondents agreed to undertake some monitoring activity as part of their grant program, with about half of these (5 people) reporting that they had completed the activity. All but one person thought the monitoring process had worked as a tool to highlight changes that had occurred as a result of the project. The results indicate that the monitoring was acceptable to landholders and was viewed as being practical and useful.

Some participants had used photographs (5 people) or grass checks (2 people), with another person also using grazing charts for monitoring activities. One respondent described actions as follows:

“looking, seed collecting, using plastic metre square to count the amount of weeds.”

One landholder had not completed their monitoring activity because the cooperation required from others had not eventuated:

“Monitoring didn't occur due to lack of participation from neighbours, but would have shown definite improvements.”

This highlights the critical importance of cooperation between landholders, especially those from adjoining properties, in the management of aspects of NRM activities such as weed management.

In relation to identifying drivers influencing landholders to be involved in the FBA devolved grants program, respondents were presented with a list of reasons that may

have influenced their decision to participate and asked to rate them from 1=“not very important” to 5=“extremely important”. Table 8.3 presents the results of the rating exercise.

**Table 8.3: The Importance of Reasons for Participating in the Program**

	Mean score	Not important	Important
		% of respondents	
1) Availability of financial support (e.g. grant)	4.2	6	78
2) Availability of technical support/information	3.1	34	39
3) Environmental benefits	4.3	2	84
4) Ease of application	3.5	15	51
5) Improvement in long-term productivity	4.3	2	84
6) Wanted to support FBA	3.5	19	51
7) Wanted to fix particular issue on the property	4.5	0	94
8) Interested in trialling some environmental action	3.5	18	55
9) Support from friends and neighbours	2.6	48	30

In general, all the factors with the exception of Item No.9 (Support from friends and neighbours) had a positive influence on the decision to be involved in the program (i.e. mean score greater than 3). The majority of participants (94%) appeared to have a particular issue that they wanted to fix on their property (No.7). This would imply that the grant funding was specifically targeted to provide a particular outcome, rather than being used for a more general purpose. The use of funding to achieve both environmental and production outcomes (Nos. 3 and 5) were both very important, and more than half (55%) of respondents were keen to trial specific environmental actions (No.8). Obviously the actual funding was an important factor, but opinions were very mixed about the importance of technical support or information (No.2). However, this is likely to be related to the focus of the grant, with some programs requiring a high level of technical support such as the provision of GPS and mapping as part of the PMP program, and other programs such as infrastructure funds for fencing and water requiring little technical support. Ease of application to obtain the grant was also important to more than half of respondents (No.4).

Other possible influences on participation may be attributable to the future plans for the property – if landholders had plans to not use parts of their land for production

then the opportunity cost of removing parts of the property from production would be less than landholders who did not have such plans.

Although most people did not think that support from friends and neighbours (No.9) was important, it was still considered important by nearly a third of respondents. More than half the respondents wanted to support the FBA (No. 6). This was consistent with findings from other studies identifying that a key factor explaining participation by landholders in NRM incentive programs was their experience with Landcare programs (e.g. Grafton 2005). Almost 80% of all respondents indicated that they were or had been a member of a local Landcare or catchment management group.

#### **8.4 OBSERVED IMPACTS OF THE GRANT ACTIVITY**

Respondents were asked about the changes in environmental condition they had observed as a result of the grant activity. They were provided with a list of conditions and asked to assess them from 1=“significant decline” to 5=“significant improvement”, so that higher scores represented more improvement. The results are outlined in Table 8.4.

Most respondents reported improvement in the overall condition of their property, with 78% of respondents indicating some improvement resulting from the grant activities. The most improvement reported for a specific activity was for that of ground cover, where almost 75% of respondents had observed an improvement in ground cover levels. Further probing indicated that 34 participants (56% of those measuring ground cover) thought that ground cover had improved by more than 10% in target areas.

Almost 60% and 70% of respondents reported an improvement in the occurrence of cattle pads and incidence of soil erosion, respectively. On the problem of weeds, 45% reported an improvement, with 12% reporting a decline. This may be a result of keeping cattle out of certain areas and/or changed tillage practices but there was no statistical correlation between the activity respondents were involved in (apart from those doing weed control) and the condition of weeds on their property.

**Table 8.4: Changes in Environmental Condition Resulting from Grant Activities**

	No. of responses	Mean score	% rating improvement	% rating decline	% rating no change
1) Cattle pads	56	3.6	59%	18%	23%
2) Native vegetation	59	3.5	39%	5%	56%
3) Ground cover	61	4.1	74%	2%	25%
4) Water quality	60	3.7	50%	3%	47%
5) Weeds	60	3.4	45%	12%	43%
6) Erosion	61	3.9	69%	5%	26%
7) Wildlife	57	3.3	33%	5%	61%
8) Water use efficiency	53	3.6	55%	8%	38%
9) Overall condition of the property	63	4.0	78%	6%	16%

The main areas where there had been no reported change in environmental condition were in native vegetation and wildlife (56% and 61% of responses, respectively). However, the grant programs have only recently been implemented in relation to the timing of the survey, and it was too soon to expect any significant changes in vegetation and wildlife. Changes in water quality were also difficult to detect and are not always apparent from simple observation. In addition, water quality is affected by a number of factors that are outside the control of an individual landholder, such as upstream activity and drought conditions that have reduced land condition throughout the region.

#### **8.4.1 Changes in Environmental Condition**

Forty-five respondents (67%) provided a comment about the changes in environmental condition that they had observed as a result of undertaking the grant activity. Most people had reported, or expected to see some improvement, and these were more likely to be associated with changes in grazing management rather than changes in cropping management.

- Nineteen respondents reported some level of improvement;
- Nine respondents expected some improvement and three indicated it was too early to observe changes; and

- Six respondents commented that the drought had impeded progress.

Box 8.2 outlines comments made by respondents in relation to observed changes in environmental condition resulting from the grant activity.

**Box 8.2: Comments on Observed Changes in Environmental Condition**

“It is very good all over, it's looking really great; vegetation is coming back.”

“Find the grass lands are coming back to good order, the undesirable are dying.”

“Cattle drink from troughs instead of churning up the river walking down to it to drink.”

“One big thing is that where the fence is on the river side the weeds are less of a problem - can now lock it up and give it a spell, river banks are better grassed.”

“Dramatic changes, everyone comments on it - was all Parthenium, now Buffel Grass.”

“Better ground cover, better water quality and improvement in wildlife.”

“Nitrogen levels in the soil in plant areas will go down. Want to see difference in plowed and planted areas.”

#### 8.4.2 Changes in Property Management

Respondents were also asked about the management changes they had made as a result of the grant activity. They were presented with a list of activities and asked to rate them from 1=“no change” to 5=“very significant change”. The results are outlined in Table 8.5.

**Table 8.5: Property Management Changes Resulting from the Grant Activity**

	No. of responses	Mean score	% indicating no change	% rating significant change (score 4 and 5)
1) Pasture management	62	3.5	16	60
2) Stock management	62	3.7	11	68
3) Infrastructure maintenance	60	2.6	27	25
4) Weed management	62	2.5	36	26
5) Cropping practices	34	2.2	53	26
6) Irrigation practices	20	1.5	80	10
7) Property planning	62	3.1	13	45
8) Monitoring	63	3.0	19	38

The most significant changes were observed in the areas of pasture and stock management, which was the focus of most of the grants. Less change was reported in the areas of weed management and cropping practices. The least change was reported in irrigation practices, which reflected the low proportion of landholders involved in these projects (see Table 8.2).

The mean score ratings were generally quite low with all of the listed changes having a rating of less than 4 (“some significant change”) indicating that while some management changes had occurred, they were not necessarily considered as significant changes. However, when participants were asked to make their own comments responses were very positive.

Thirty six respondents (58%) provided some comment about the management changes that had occurred on their property as a result of the grant activity.

- Over half of all respondents (20 people) made a specific comment about the benefits of the management changes;
  - Of these, seven reported that the changes had made their management *easier* in some way; and
  - Five commented that increased monitoring activities made them more *aware* of different issues and interactions on their property.
- Five respondents indicated there had been no change due to the drought;
- Three respondents indicated they were already doing the activity and the grant just helped, although one of these said that the grant had enabled them to fast track the change; and
- Only one respondent reported any negative change which related to the increased regularity of checking water points.

In general, most respondents (27 respondents or 40% of responses) indicated that it was too early to observe if there had been any change in their enterprise productivity, but only one respondent reported a decrease. Twenty-one respondents indicated an increase in productivity; 16 of whom indicated an increase by more than 10%, and 5 indicated an increase by more than 5%.

Box 8.3 presents respondents' comments on management changes that had occurred on their properties as a result of the grant activity.

**Box 8.3: Comments on Observed Management Changes**

"Biggest thing is the satellite imagery, able to work out where fence lines are, determine accurately acres in each paddock, worked out stocking rates more effectively - very exciting, Determine where fencelines can be altered."

"Quite significant in respect to cattle management."

"Being able to spell paddocks more easily, availability of better quality water, more even grazing."

"Stock are much easier to handle, cattle are not congregating in one spot, not overgrazing single areas."

"More aware of how land is being utilised and how we can more effectively stop erosion - really stood out."

"Because we have done this we are a lot more aware and it has given us direction."

"It's been very very good relative to spreading grazing pressures and reducing distances cattle walk, restricted areas over which cattle walk – degraded."

"Biggest factor is the grazing practices of management, because of monitoring processes being put in place. Gives people more of an idea what quantity of grass and water in dams, etc."

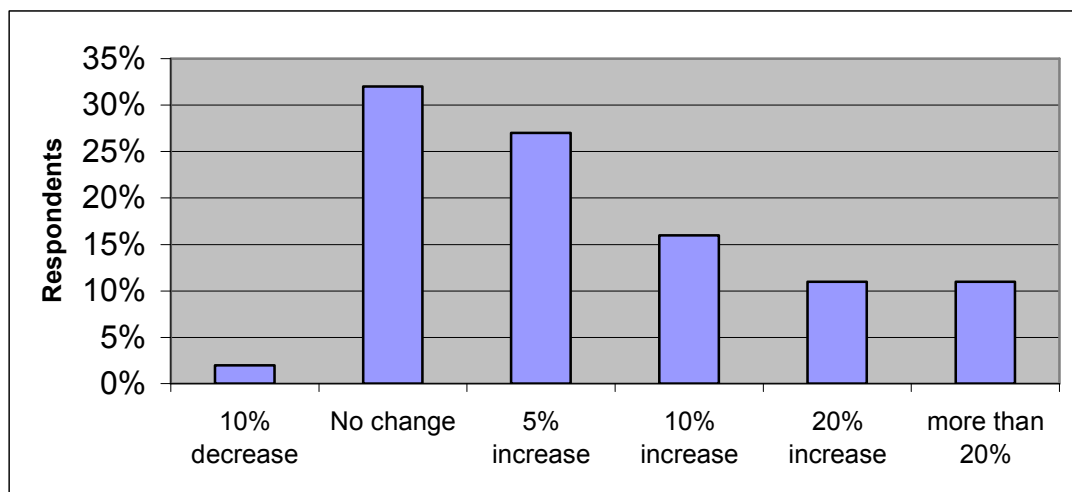
"Learned to look at pastures a lot closer and land management in relation to reducing soil degradation and ground cover."



Although it was too soon to determine the net outcome of many grant projects, only two (3%) respondents commented that they were *financially* worse-off as a result of the grant activity. Twenty-one respondents indicated there had been no change in their financial situation while 44 respondents (66%) believed they were financially better-off (Figure 8.5).

In many cases, the grant program was able to act as a catalyst to seed changes in management practices. Although a high proportion of respondents (44 respondents or 66%) indicated that they would have undertaken the project anyway even if they had not received a grant, 14 thought it would have taken them more than 1-2 years and 17 indicated that it would have taken more than 2 years to complete. A further 11 respondents were unsure if they would have completed the activities without assistance from the grant. However, all respondents reported that the grant had enabled them to undertake the project sooner and more quickly.

**Figure 8.5: Financial Implication of Involvement in the Grant Activity**



Thirty-one respondents (50%) indicated that the project had changed the way they managed other parts of their property. Eleven respondents specifically indicated that they had extended the practice of rotational grazing, fencing and/or reduced stocking rates to other parts of their property; and nine respondents reported overall property management changes as a result of undertaking the activity associated with the grant program. Box 8.4 outlines respondents' comments consistent with these findings.

**Box 8.4: Comments on Changes in Property Management from Involvement in the Grant Activity**

"We will be able to make more profit that allows us to send it on the other properties for weed control."

"Made me fence off different land types and different grazing pressures on them."

"An awareness of the changes that can happen when you do fence off riparian areas such as not having to worry about erosion. We would try to use preventative measures now on other areas of the property."

"More fencing, can manage stock better over whole property."

"Trying to implement the same practices across the property, increasing watering points, reducing erosion, less weeds."

"Water project affected all of property - been a godsend in dry weather."

"Way in which project is set up will be replicated across the property as funds become available to do it."

"Roads for access around the property had to be changed."

"By taking more notice of our pastures, converting other large paddocks - rotational grazing, spelling pastures."

## **8.5 ATTITUDES TOWARDS THE PROGRAM**

The assessment of the indirect benefits generated under the regional NRM model was undertaken by examining attitudes of landholders involved in the program. To achieve this, the survey asked respondents how they viewed the administration and implementation of the program under the regional NRM model. The findings revealed that the majority of involved landholders thought that the FBA program had:

- led to *reduced* conflict between landholders and the government;
- led to *improved* levels of adoption and take-up for environmental programs;
- was *more flexible* than government programs;
- *allowed* NRM actions to be tailored to local knowledge;
- *improved* the likelihood of achieving NRM and environmental outcomes; and
- helped farmers to *improve* their production.

There was strongest agreement from landholders on the view that the program would improve the likelihood of achieving environmental outcomes and that the program allowed actions to be tailored to local knowledge. Table 8.6 and Figure 8.6 provide a summary of these findings.

Another impact of the grants program concerned whether it had increased the level of cooperation with their neighbours. A large proportion (37%) indicated that the grant program increased cooperation with their neighbours, which would be expected as the participants were part of a Neighbourhood Catchment program. However, 63% did not feel that the involvement in the program had any effect, which may indicate that they were already cooperating with neighbours as part of NRM actions. Alternatively, this result could also indicate that for 63% of respondents, cooperation was not needed to implement the NRM activities on their properties.

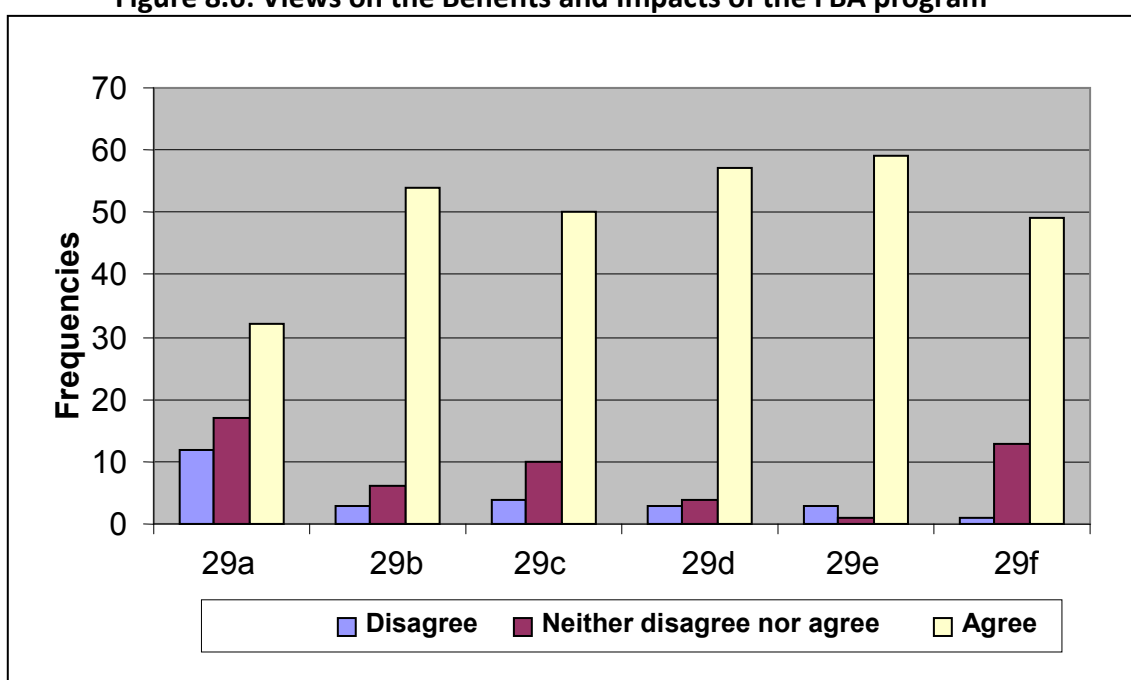
Twenty-two respondents provided examples of why they thought the level of cooperation or communication with their neighbours had increased as a result of undertaking the program. Of these:

- Seven commented that they talked more with their neighbours;
- Five indicated that their neighbours were interested and influenced by their projects and/or would also follow the program;
- Three commented on the impact of attending field days; and
- Two reported more cooperation with their neighbours and another two were working on common projects.

**Table 8.6: Views on the Benefits and Impacts of the FBA Program**

Question	These types of programs ...	# of responses	Mean	Std. Dev.
29a	...has led to reduced levels of conflict between landholders and the government.	64	3.53*	1.13
29b	...has led to improved levels of adoption and take-up for environmental programs.	64	4.08*	0.76
29c	...have more flexibility than government programs in dealing with environmental conservation issues.	64	4.02*	0.95
29d	...has allowed Natural Resource Management actions and programs to be tailored to local knowledge.	64	4.19*	0.81
29e	...has improved the likelihood of achieving environmental outcomes.	64	4.25*	0.74
29f	...will help landholders improve production.	64	4.09*	0.79

\* (Scale: 1 = Strongly disagree to 5 = strongly agree)

**Figure 8.6: Views on the Benefits and Impacts of the FBA program**

Box 8.5 outlines some of the comments made by respondents in support of increased cooperation or communication with their neighbours.

**Box 8.5: Comments on Increased Cooperation and Communication with Neighbours**

“We got to talk more about the environment.”

“Because I am on a river system - neighbours above and below are integrating their systems into mine - wildlife corridors.”

“Gave us something to talk about, showing interest in what I was doing, asked for their ideas.”

“Telling the neighbours about the benefits of project, availability of money, how helpful FBA were”.

“Mixing with neighbours on an environmental basis and work with them a little bit more closely.”

“Neighbours come and have a look to see what was happening, intrigued.”

“Neighbours have applied for similar grants since seeing what has been done and talking to them about it”.

“Interest in improvements in our control traffic system.”

It is apparent from these findings that landholders generally held positive attitudes towards the program. Results suggest that regional NRM groups such as the FBA play an important role in developing social capital critical to gaining private landholder support in achieving NRM outcomes. This lends support for resulting benefits of the regional NRM model including the deepening of soft institutions necessary for the model’s success.

Given the growing interest in the use of new and different types of market-based instruments (MBIs), respondents were asked a few questions to explore their attitudes to some of the underlying concepts behind some of these incentive schemes. Provided with a list of statements, respondents were asked to rate them from 1=“strongly disagree to 5=“strongly agree”, with higher scores indicating higher levels of agreement. Table 8.7 presents the results of this inquiry.

One of the main issues that all respondents agreed with was that landholders should be able to suggest the actions suitable for their property (No.1). In other comments

made by landholders there was further indication that more flexibility in the programs would be welcomed.

Another issue that received strong agreement was support for the idea that programs should involve most farmers rather than targeting those that can offer environmental improvements at least cost (No.5). These attitudes do not support the underlying philosophy of a competitive process that provides the best environmental outcomes for a given level of public funds. However, the majority of respondents (74%) considered that good land managers should be rewarded for their efforts.

The majority (64%) of respondents were supportive of introducing some competition between landholders for access to funding (No.2), but they felt that priority support should go to landholders with damaged areas (No.4). The only issue where opinions were more divided was on whether priority support should be given to land managers on properties in good condition (No.3). These findings are presented in Table 8.7.

**Table 8.7: Opinions on the Structure of Incentive Schemes**

	<b>No of responses</b>	<b>Mean score</b>	<b>% disagreeing</b>	<b>% agreeing</b>
1) Landholders should be able to suggest the actions suitable for their property.	64	4.5	0	98%
2) It's okay for there to be competition between landholders for access to funding.	64	3.4	27%	64%
3) Priority support should be given to land managers on properties in good condition.	64	3.1	33%	42%
4) Priority support should be given to land managers on properties with damaged areas.	64	3.6	11%	60%
5) Funding programs should try to involve most farmers rather than just focus on the ones that can give cheapest environmental improvements.	63	4.0	8%	83%

Respondents' attitudes to rural land management and conservation were very similar with landholders in strong agreement with all statements (see Table 8.8). The only exception related to opinions on the impact of agriculture on water quality.

Respondents did not consider that there was any conflict between achieving production and conservation outcomes. Only one respondent did not agree that investing in conservation practices was important in ensuring future profitability

(No.5), and almost all (86%) landholders interviewed indicated that they had many options to implement practices that were both good for the environment and good for production outcomes (No.3).

**Table 8.8: Attitudes to Rural Land Management and Conservation**

	No of responses	Mean score	% disagreeing	% agreeing
1) People who practice good land management and environmental conservation should be given recognition and provided with subsidies to promote management actions	66	3.9	9%	74%
2) Agricultural activities in this region have relatively little negative impact on water quality in the river systems.	63	2.8	56%	37%
3) Farmers have many options to implement practices that are good for the environment and good for production.	66	4.0	8%	86%
4) Agricultural activities in this region have relatively little negative impact on marine water quality.	63	3.2	32%	46%
5) Investment by landholders in conservation practices is important to ensure future profitability.	67	4.4	2%	96%
6) Penalties should be imposed on people who cause environmental damage.	64	3.7	11%	64%

The issue where respondents were more divided in their opinions was on the impact of agricultural activities on water quality in the river systems and further downstream on marine water quality (Nos. 2 and 4). Nearly half of the respondents (46%) agreed that agricultural activities have little negative impact on water quality in marine waters, while 37% agreed that agricultural activities have little negative impact on water quality in the river systems.

### 8.5.1 Follow-up grants

Thirty-six respondents (65%) had not applied for a follow-up grant and they were asked to provide a reason for their decision (see Box 8.6). Fourteen respondents reported they did not have a new project. Thirteen stated that they were unaware of any other grants on offer. This may be due to poor follow-up communication by FBA officers about grant opportunities, or that other grants were not available at the time of the survey. Eight respondents commented that no programs were being run in their area, and five reported that their project was not eligible for assistance.

Comments by landholders supported these reasons, with a lack of time and having other priorities being additional factors.

**Box 8.6: Reasons for Not Applying for Follow-up Grants**

“Have done what I need to do and haven't got more to do.”

“Just been flat out - no time to think about it...”

“[No] time and energy to do it.”

“Just haven't gotten around to it - would like to find out what is happening with future grants as plans for quite a bit more similar work”

“Don't like living on grants - you can sometimes feel too dependent.”

“Like to do it on our own – feel funny about getting grants, don't want to become reliant on funding.”

“No programs that addressed any problems that we might have.”

“Lack of communication, not informed of what's going on.”

A few landholders made the comment that they had achieved what they wanted and had no further need for financial assistance. Some respondents made comments that they did not like to rely on grants or that others should be provided assistance. This indicates that for some landholders the program served a very specific purpose and that financial assistance was not always relied upon to support management change.

## **8.6 ATTITUDES TOWARDS THE FBA**

To assess landholder attitudes towards the FBA, the survey asked respondents to rate whether their perceptions or attitudes towards the FBA changed as a result of involvement in the grant program (see Table 8.9). The findings indicated that involvement in the FBA grant program has generally increased positive perceptions across all the categories (i.e. mean greater than 3). The only issue where respondents were more divided was on their attitudes towards the FBA in relation to level of conflict with government over environmental issues, where equal number of respondents both indicated an increase and decrease in levels of conflict.



The highest levels of positive attitude change towards the FBA were over level of interest in FBA programs, and willingness to adopt environmental actions promoted by the FBA. Of those respondents indicating an increase in interest in FBA programs, 42% reported a very high level of increase. Of the respondents indicating increased willingness to adopt actions promoted by the FBA, 35% reported a very high level of willingness.

**Table 8.9: Changes in Attitudes towards the FBA**

Question		# of responses	Mean	Std. Dev.
25a	...level of effort in involvement with FBA programs.	26	3.54*	1.03
25b	...level of trust of the FBA in promoting specific environmental actions.	26	3.77*	0.95
25c	...level of knowledge about management actions promoted by the FBA	26	3.65*	0.98
25d	... level of interest in FBA programs.	26	3.88*	1.07
25e	...level of conflict with government over environmental issues on your property.	25	3.08*	0.95
25f	...level of cooperation with the FBA over environmental issues.	25	3.56*	0.82
25g	...willingness to take up or adopt specific environmental actions promoted by the FBA	25	3.84*	0.94

**\* (Scale: 1 = Decreased a lot to 5 = Increased a lot)**

These findings provide evidence to indicate that the FBA has been successful in changing landholder attitudes towards NRM actions through the generation of social capital-enhancing processes. The fostering of key attributes of trust and cooperation by the FBA leads to reciprocal actions by landholders that yield net benefits through achieving cost effective NRM outcomes as discussed in section 5.3.

Respondents were also asked in an open ended question to comment on the positive and negative aspects of the program they participated in. The findings from this inquiry are outlined in sections 8.7 to 8.9 below.

## **8.7 COMMENTS ON POSITIVE ASPECTS OF THE PROGRAM**

All the survey respondents provided open-ended comments about positive aspects of the program, with the high response rate notable in a questionnaire survey of this nature. The comments offered valuable insight for program designers and implementers on the success and effectiveness of the program from the view of participants. The responses highlighted that there were genuine benefits to landholders. Comments can be grouped into four main categories, which are reported, in turn, below:

- Management and land condition;
- Catalyst and/or accelerator of change;
- Communication; and
- Grant availability and administration.

### ***Management and land condition***

Nineteen people commented about how the grant had improved some aspect of their property management. For some landholders, this had resulted in productivity gains and environmental improvements. Comments made by respondents in support of this are outlined below:

“Teaching me about managing the property, more options all round for my farm practices and hope everybody would be part of it.”

“Made management easier.”

“Made it better place to run and the creek is a lot healthier”

“The things we achieved, highlighted to others in the area that you can achieve things environmentally, good data on water quality and relate back to management, actually have evidence of what is occurring.”

“Better productivity as a result of the program.”

“Makes me aware of our country more readily, makes me analyse what we see more, whole new take on things, keen to implement more.”

“Stop the cattle walking into the creek and causing erosion, good to see creeks grassed up.”

“Getting the cattle out the creek we have not lost any cattle since doing this.”

“The ability to improve farming methods when times were tough.”

### ***Catalyst and/or accelerator of change***

Fourteen people made some comment about the grants either being a catalyst for change or an accelerator of change, outlined in the following quotes:

“Gives us an opportunity to correct things that aren't right.”

“Able to do the work now rather than years down the track and create better work practices.”

“Done quicker and got the system up and running quicker”

“Fitted in with what I was already doing and helped me achieve it a lot sooner.”

“Allowed you to do something immediately which otherwise would have taken several years.”

“Allowed me to really do something I wanted to do, that I could not do on my own.”

“Was an incentive to get going and do things we knew we would eventually have to do, in lots of cases people wouldn't have done it without the grant.”

“It encourages people to adopt some environmental planning into their property where they may not have been able to afford it or chose not to spend the money on their own.”

These comments provide direct evidence that the grant had assisted landholders with internalising the private costs of implementing improved NRM practices on their property as discussed in section 4.2.1. In many cases, the grant assisted landholders to implement projects more quickly than would be the case without the grant.

### ***Communication***

Twelve respondents made a comment about the advantages of communication whether it was with other landholders, the FBA, or in terms of general advice and support. The interaction and support from FBA staff was clearly beneficial and well received. It is evident that the devolved governance framework operationalised by the FBA through their Neighbourhood Catchments approach has been successful in developing social capital-enhancing processes. The following comments on the benefits from working with the FBA are illustrative of this:

“Communication with everyone else and hearing different ideas and opinions.”

“Social contact where you can share new ideas and access information ...”

“Communication with outside people, knowledge that I learnt at workshops.”

“Consult was good, advice was good, results have been very good.”

“There was quite a lot of knowledge out there with the guys that were running it and this can open your eyes up to things you haven't thought of before.”

“Educational, informative and enlightening.”

“Being involved with my neighbours, people who were there from the FBA was prepared to work with the group closely, really impressed by the FBA people who worked with the group.”

“The FBA person to help implement the program, financial contribution is great.”

“What I learnt from it, support and information.”

“Creating communication between landholders and FBA”

“Combination of planning with people who are trying to do something positive with the environment, getting family members involved, assistance that came from FBA, the outcomes will be a huge positive.”

### ***Grant availability and administration***

Twelve respondents commented on the benefit offered by the FBA grant; either in terms of the availability of financial assistance aspect, or the grant application process. These are outlined in the following comments:

“Relieved the financial burden of improvement costs ...”

“Funding was good, easier on the pocket”

“That it was available”

“Very easy to get the grant, more incentive, and we have put in more than we expected.”

“The easy process of applying for the grant.”

“They were very helpful and great in helping with paper work.”

“We were able to work it out ourselves and do the application ourselves and then talk to the FBA about it and quickly get into the work. The FBA were here within a couple of days of completion and the money came very soon after.”

“Able to design your own program/plan, at times would be good to have a consultant to look at it as well.”

## **8.8 COMMENTS ON NEGATIVE ASPECTS OF THE PROGRAM**

Only half the respondents made negative comments on the FBA grant program. Most of the comments related to the difficulty in the grant administrative process (which contrasted with comments reported in section 8.7); the need for additional funding;

the difficulty in terms of time commitments and lack of follow-up communication; and the lack of flexibility in the programs. The following comments on the negative aspects of the program provide evidence to support this:

“The amount of the paper work.”

“The time spent trying to organise it - the administration of it.”

“Filling out forms and getting a handle on it all, understanding the process.”

“The application process requires expertise that a lot of farmers don't have.”

“Only negative thing is they need a few more staff, to help out with monitoring, can be quite a big ongoing burden.”

“Time limits on it, in terms of getting the work done.”

“After the first twelve months I never really got a lot of communication back, otherwise we may have become involved in other schemes like fencing.”

FBA's falling contribution to costs of programs. Grants have stayed the same but costs have risen sharply.”

“Not a high enough level of funding.”

“Rigidity of the programs - co-contributions were sometimes difficult to cope with, also paperwork was extensive. More flexibility needed for projects that don't quite fit the mould - want all outcomes to fit in.”

“Limited to certain things”

“Projects outside of the square not favourably considered.”

“Sometimes the distribution of the money (grants) does not seem to be targeting the more beneficial outcomes, but is simply being spent because it has to be.”

## **8.9 OTHER COMMENTS ON THE PROGRAM**

The final comments respondents made about the devolved grants program mainly comprised of supportive statements about the FBA and their staff. There were some comments relating to the need for FBA to invest more in their staff and reduce high turnover rates. There were also some comments made about the need to advertise the grants and other incentive programs more widely to increase awareness and participation. Some of these comments are provided below:

“Where does one learn about what is happening with the FBA?”

“Great thing but should be advertised more. More funding for larger projects ...Better staff retention.”

“Very non-threatening organisation, community on-board and very accepting of organisation, could do with some more money.”

“Received good help and support from field personnel. Positive experience.

“We have found the FBA easy to get along with and happy to answer questions.”

“I'd have to give them 10 out of 10, they really are working with producers, very good program.”

“More support for their field staff from head office. Big job but field staff don't get a lot of support. There is too high a staff turnover. A few different things, like contour banks, should be eligible for grants.”

“Found them really good to talk to, really good people. Excellent knowledge level.”

“Great amount of respect for FBA, very helpful and hope to work with them for a long time to come - outcomes great for FBA and great for community.”

“Marvelous thing for the bush and has got the potential to turn around the soil degradation and outcomes on the reef - been associated with this right from the beginning.”

“The program - this money was granted under the rules that it go to individual farmers, however if the money was combined it could go into a joint research project to benefit the whole industry, i.e., modifying grade harvesters for controlled traffic farming.”

“This was money that was made available for machinery modifications and is one of the only grants for this - more of these wouldn't hurt.”

“This was the first project where money has actually gone to help with improvements in the grain industry; most of the others are cattle and grazing.”

“More lateral approach for high conservation areas.”

## **8.10 TRANSACTION AND TRANSFORMATION COSTS OF PARTICIPATION**

This section reports transaction and transformation costs incurred by landholders participating in the FBA devolved grants program. This provides valuable information that can be used to improve the design of future incentive schemes to enhance landholder participation. The analysis also reveals some of the indirect costs of landholder involvement in such programs.

In assessing the transaction and transformation costs of landholder involvement in the program, respondents were asked to estimate both the total time and costs incurred from the grant activity associated with participating in the FBA program. Landholders were also asked to estimate what area of their property was taken out of production, and whether they experienced a change to their net farm income as a

result of their involvement in the program. Table 8.10 summarises the total costs associated with landholder involvement in the program.

The average cost of individual landholder involvement in the program amounted to \$33,349. This was calculated by summing the total direct costs associated with the purchasing materials and labour for the program, together with the total number of hours invested as reported by landholders in various aspects of the program (e.g. construction, maintenance, and grant application process). The number of hours invested was converted to a dollar value by multiplying this with an appropriate average wage rate which was based on the average annual wage and salary income in Queensland for 2003-04 (\$17.27 per hour). This total also takes into account the change in net farm income of \$2,643 which already takes into account the monetary costs for purchase of materials/labour for the program.

**Table 8.10: Cost of Participation in Devolved Grants Program**

Question	Units	No. of responses	Mean	Total Cost
Was time involved in construction?	Hours	58	498	\$8,599*
Was time involved in subsequent management and/or maintenance?	Hours	58	40	\$691*
Was time involved in applying for, or organising the incentive grant with the FBA?	Hours	58	15	\$259*
In dollars only, approximately how much money was used to purchase materials/labour?	\$	58	\$26,443	\$26,443
What was the area of land taken out of production?	Hectares	58	98	
In dollars only, what was the change in net farm income?	\$	56	\$2,643	
Total costs per landholder				\$33,349

\* Calculation based on Queensland average annual wage and salary income of \$35,917 for 2003-04 (ABS 2003)

Fourteen per cent of respondents indicated an increase in net farm income of \$2,643 attributable to the program, which provides direct evidence for production benefits being generated. Of these respondents, 50% indicated that the grant activity was associated with removing some land from production. Overall, the grant activity

resulted in 24% of landholders removing a total of 5,700ha of land from production, equivalent to about 98ha of land per landholder.

While the costs presented in Table 8.10 can be classified as costs to landholders, it can also be viewed as the value of additional investment that has been generated as a result of engagement processes under the regional NRM model of governance. Given the average grant payment in the program across the different project types was about \$6,200, the grant was able to lever more than a five-fold equivalent of additional contributions. This is based on the assumption that the wider adoption would not have occurred in the absence of the grant program.

### **8.11 PREDICTING REASONS, COSTS AND LIKELIHOOD OF LANDHOLDER PARTICIPATION**

This section reports significant relationships identified between variables in the survey of landholders involved in the FBA devolved grants program. Statistical tests were performed using crosstab and chi square analysis outlined in section 8.11.1 and 8.11.2. Section 8.11.3 presents a regression analysis that outlines two significant statistical models identified from the survey results. Where appropriate, the significance of tests in this section is shown with the following notation:

\*\* = Significant at the 1% level; and \* = Significant at the 5% level.

#### **8.11.1 Reasons for Participation**

##### ***Social factors and landholder characteristics.***

The survey findings suggested the age of landholders had an influence on the reasons for participating in the program, particularly in relation to environmental benefits from the grant activity. The tests indicated that the relatively younger landholders attached more importance to achieving environmental benefits than older landholders\*. About 83% of the 25-34 age group, and almost 60% of the 35-44 age group identified environmental benefits as being an “extremely important” factor in their decision to participate in the grant program. Support decreased with age to 25% support for the 65+ age group. This was consistent with Jones and Dunlap (1992), who found that younger and better educated people consistently were more supportive of environmental protection than other respondents. However, the



literature reporting the nature of this relationship generally described mixed evidence (Cary *et al.* 2002).

Landholders who resided on their properties for more than 16 years in the 45-54 age group felt that availability of financial support (e.g. grant) was an “extremely important” factor in deciding to take up the program than landholders of other age groups\*. This accounted for 70% of landholders in this category. Landholders who indicated they planned to reside on their property for the rest of their lives felt that fixing a particular issue on their property was an important reason for participating in the program\*\*.

Tests also indicated that level of education attained may influence participation. For landholders who held a trade or technical certificate, trialling particular environmental actions was more important in their decision to take up the grant than for landholders with other levels of education\*\*. Although this aspect was supported by some researchers (e.g. Luzar and Diagne 1999), the literature reporting links between education level and participation in environmental and conservation programs or actions is generally inconclusive (e.g. Cary *et al.* 2002; Drake *et al.* 1999).

More landholders in the \$20,000-\$50,000 income category than any other income category felt that improving long term productivity was an important reason for participation\*. These landholders also felt that the FBA has led to improved adoption and take up for environmental programs\*. This outcome could be due to the fact that landholders in this lower income category are in the early phases of building up their farming operations and view participation in the FBA program as a means of improving NRM practices and farm productivity (e.g. improving farm income).

### ***Relationship to the grant activity***

According to the tests, the reasons for participation and factors that influenced this decision also varied within the activities landholders were involved in. The following tests confirmed this hypothesis:

- Landholders involved in fencing saline or degraded land cared more about a program which would offer technical support or information than landholders

involved in other activities\*, and felt that agricultural activities in the region have relatively little negative impact on marine water quality\*;

- Landholders who indicated that availability of financial support was an important reason for participation and those who were involved in irrigation water use efficiency activities both agreed with the statement: “Farmers have many options to implement practices that are good for the environment and good for production”\*\*.

Tests also showed that attitudes towards land management also varied with the grant activities. The following tests support this hypothesis.

- Landholders involved in fencing watercourses\* and strategic weed control\* activities agreed that priority support should be given to land managers on properties with damaged areas.
- Landholders involved in alternate stock water systems\*\* and strategic weed control\* activities agreed that penalties should be imposed on people who cause environmental damage.
- Landholders with current or previous membership of a local Landcare or catchment group who felt that improving long term productivity was an important reason for participating in the program, tended to agree to undertake some monitoring as part of their project\*\*.

### ***Financial factors***

Several tests showed that some landholders were mainly interested in participating in the grant program to access financial support. Landholders who indicated the following reasons for participation all placed high importance on the financial assistance offered by the grant: (i) to support FBA\*\*; (ii) to achieve environmental benefits\*\*; and (iii) to trial a particular environmental action\*\*.

Landholders of the view that investing in conservation practices was important to ensure future profitability felt that the availability of financial support was an “extremely important” reason for participating in the program\*\*. The same landholders also considered themselves not financially worse off after completing the project\*\*. These findings support other research concluding that profitability is an

important factor influencing landholders' decision to participate and adopt changed practices (e.g. Cary and Wilkinson 1997).

The majority of landholders in the 45-54 age group who indicated that they were not financially better off after completing the project, also felt that availability of financial support (e.g. grant) was a "very important" factor in deciding to take up the program\*.

Landholders indicating that 1-9% of their farm income was sourced from off-farm sources and who thought investment in conservation practices was important for ensuring future profitability, felt that availability of financial support was an "extremely important" factor in deciding to take up the grant\*.

Tests also demonstrated a significant relationship between landholders who felt that investment in conservation practices was important in ensuring future profitability and the following views<sup>113</sup>.

- Not financially worse off after doing the project\*\*;
- Increased level of effort in involvement in FBA programs\*\*;
- Increased level of trust of the FBA in promoting specific environmental actions\*\*;
- Increased level of knowledge about management actions promoted by the FBA\*\*;
- Increased level of interest in FBA programs\*\*;
- Increased level of cooperation with the FBA over environmental issues\*\*; and
- Increased willingness to take up or adopt specific environmental actions promoted by the FBA\*\*;

### **8.11.2 Views and Attitudes of the Program**

#### ***General Attitudes***

Tests showed that involvement in the program had changed landholder attitudes towards the FBA. The following significant tests confirm this hypothesis:

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<sup>113</sup> These tests showed strong relationships, but the sample size was relatively small.

- Landholders who felt confident about the long term financial viability of their farm over the next 10-15 years agreed that FBA programs would help farmers improve their production\*. These landholders also felt that the FBA has improved the likelihood of achieving environmental outcomes\*.
- Landholders who indicated that their level of effort in involvement with FBA programs had increased after participating in the program agreed that the FBA had led to reduced levels of conflict between landholder and government over NRM matters\*.

Tests also confirmed significant relationships between landholders who felt that FBA programs were more flexible than government programs in dealing with environmental and conservation issues, and the following views:

- Landholders were not financially worse off after doing the project\*; and
- Willing to adopt specific NRM actions promoted by FBA\*.

Landholders who indicated that supporting the FBA was an important reason for participating in the program agreed with the following statements:

- “Priority support should be given to land managers on properties with damaged areas”\*\*\*;
- “Penalties should be imposed on people who cause environmental damage”\*\*

The majority of landholders who were currently or had been a member of a local Landcare or catchment group and indicated that they trusted the FBA more in promoting specific environmental actions, agreed with the following:

- FBA led to improved levels of adoption and take up for environmental programs\*\*;
- FBA programs were more flexible than government programs in dealing with NRM issues\*;
- FBA has allowed NRM actions and programs to be tailored to local knowledge\*;
- FBA has improved the likelihood of achieving environmental outcomes\*\*; and
- FBA programs will help farmers improve their production\*\*.

The majority of landholders who were currently or had been a member of a local Landcare or catchment group and indicated that their level of knowledge about management actions promoted by the FBA increased, agreed with the following:

- FBA has led to improved levels of adoption and take up for environmental programs\*;
- FBA has allowed NRM actions and programs to be tailored to local knowledge\*\*;
- FBA has improved the likelihood of achieving environmental outcomes\*\*; and
- FBA programs will help farmers improve their production\*.

### **8.11.3 Regression Models**

This section outlines two regression models identified from the analysis of survey results. The purpose of the regression analysis is to allow better prediction about the factors that are important in predicting participation levels and necessary financial incentives. By using multiple regression techniques, the relative importance of the different factors can be identified. Model 1 outlines the relationship between total costs of participation in the FBA grants program against different factors elicited in the landholder survey. Model 2 predicts the likelihood of landholders taking up further grants.

#### *Model 1*

The aim of this regression analysis is to identify the important factors that affect the costs of landholder participation in the FBA devolved grants program. This model uses multiple regression to compare the *Log* of costs against other factors identified in the landholder survey presented in this thesis. Costs were estimated using the landholder survey, where respondents were asked to estimate both the total time (e.g. total number of hours invested in the grant application process) and costs (e.g. direct costs associated with purchasing materials and labour, construction, and maintenance) incurred from participation in the grant activity. Multiple regression is an appropriate analytical technique because the key dependent and independent variables are metric. The results of the regression analysis are outlined in Table 8.11. The coefficient of determination value is high (R-square = 0.872), which suggests that

about 87% of the variance is explained by the parameters. An analysis of variance test also confirmed that the model was significant.

**Table 8.11: Model 1 Results<sup>a,b</sup>**

Variable	Unstandardised Coefficients		Standardised Coefficients	T	Sig.
	B	S.E	B		
FenRemVeg	1.439	.691	.133	2.081	.043
Ease App	-2.043	.633	-.236	-3.226	.002
ImprvAdopt	1.762	.683	.849	2.582	.013
Localknow	-1.458	.673	-.718	-2.167	.035
Age	.041	.024	.347	1.742	.088
ImprvProd	1.116	.651	.529	1.715	.093
<b>R-square</b>	<b>0.872</b>				

a. Dependent Variable: LNTotalC

b. Linear Regression through the Origin

The results from this regression analysis demonstrate that total landholder costs of participation tend to be higher (*Beta* is positive) for those involved in fencing remnant vegetation, and higher for those who did not rate the application process as easy (*Beta* is negative). As expected, costs were lower for those who thought that the FBA was flexible and also lower for younger respondents. Surprisingly, the model also identified that costs were higher for those respondents who thought the FBA had led to increased take-up, and for those who thought participation would lead to increased production. A possible explanation for this outcome is that respondents feel that the higher costs of participation in the program are justified as improved NRM practices will lead to increased production.

#### *Model 2*

The purpose of this regression analysis is to identify the important factors that may explain future involvement in the FBA program. This model summarises a logistic regression analysis explaining if landholders had or had not taken up further NRM grant opportunities. The application of the logistic regression model was justified because the dependent variable (future involvement) was defined as a dichotomous variable. The model was calculated using logistic regression functions, comparing future involvement with NRM grant programs (survey response Q27+Q28) against other variables. The model predicts the likelihood that respondents will not

participate in future NRM grant programs. The results of the regression analysis are outlined in Table 8.12.

**Table 8.12: Model 2 Results**

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Income	.000	.000	2.311	1	.128	1.000
OffInc	1.260	.516	5.961	1	.015	3.525
FutYrsProp	1.482	.790	3.514	1	.061	4.401
Constant	-9.645	3.855	6.258	1	.012	.000
<b>R-square</b>	<b>0.322</b>					

The results of the regression analysis indicate that there is some significance in the model. The model summary demonstrates significance (R-square = 0.322) but the income variable is only significant at the 12% level. The results, as shown by the positive values of the *Beta* coefficients, indicate that older respondents, respondents with higher levels of income, respondents with higher levels of off-farm income, and respondents who plan to have the property for longer in the future are less likely to take up or participate in additional NRM grant programs or projects.

## 8.12 KEY IMPLICATIONS OF THE SURVEY RESULTS

The findings from the landholder survey conducted in this research presented in the preceding sections have provided a range of support for the benefits of the regional NRM model of governance. The key implications from these results are summarised below:

- ***The devolved grants program has been successful in involving a number of landholders not previously engaged.***

The majority (97%) of the respondents had never been involved in any FBA program from of this type. Their positive views on the program and the fact that they will be likely to participate in future FBA programs, if one becomes available, suggests that some barriers to engagement have been removed.

- ***A key reason for participation was that landholders were focused on their farm future by addressing a particular issue on their property for achieving environmental benefits.***

The majority of landholders indicated this was a primary reason for participation. It may also have been linked to the high proportion (76%) who indicated that they planned to pass their farm to future generations, and may have taken a longer-term view about maintaining their natural assets. However, results also indicated that respondents with higher incomes, with higher proportions of off-farm income, and who planned to hold on to their properties for longer into the future were less likely to participate in additional grant programs.

- ***Financial support was an important but not overwhelming reason for involvement. Looking after the farm and the environment are also important factors influencing participation.***

There are many factors that can have an influence on participation and adoption behaviour, including both characteristics of the specific program, and characteristics of individual landholders. Evidence from the survey demonstrated that not all landholders act in the same way. While financial support provided a strong incentive for participation for many landholders, non-financial factors also was a key influence.

- ***Sixty-six per cent of landholders indicated that they would have undertaken the project anyway, even if they did not receive a grant.***

On face value, the answers to this question suggest that much of the FBA devolved grant funding may have been poorly allocated since management changes would have likely occurred even without the program. However the responses do not explain why management changes have not already taken place if that was the landholder intentions. One possible interpretation of the response is that the program has brought accelerated intentions to change management practices. Another is that attitudes to management changes have already changed, or that landholders wanted to describe themselves as being more progressive. In this case, the responses offered may not have matched the attitudes of landholders prior to the program. This suggests that



the program may have had more value in triggering management and attitude changes than what the question responses might indicate.

- ***Changes were not simply isolated to the area of the property outlined in the grant.***

Half of the respondents committed to the management changes across other parts of their property. This finding indicates that the program demonstrated the benefits of the improved NRM actions increasing adoption to other sections. These results suggest that investment through the program can catalyse changes in management. These results may also indicate that the trade-offs involved in undertaking the management changes, particularly ongoing costs or production losses, may not have been very significant. This is confirmed by the fact that only 3% of landholders indicated that the program had left them financially worse-off through decreased production on their farm. If actions had enhanced environmental protection at the expense of production losses, ongoing commitment may be expected to be smaller.

- ***Many landholders incurred additional costs in their involvement with the program.***

The majority of landholders incurred some costs, both in terms of financial costs and time commitment, to implement the grant projects. Twenty-four per cent of respondents indicated that they had taken land (an average of 98ha) out of production, but only 3% indicated that actual production decreased. This suggested that only areas that were not appropriate for production were removed. Results also showed that costs of involvement were higher for older landholders, those involved in fencing remnant vegetation, and those who thought participation would lead to increased production.

- ***Landholders are satisfied with the support from the FBA.***

Overall, landholders felt that they had received sufficient communication from the FBA. Only 2 (3%) respondents indicated that they had not received adequate follow-up communication and support from the FBA.

- ***Farmers believe that the program will generate environmental improvements***

The majority of landholders believed that the grant activities will result in environmental benefits. These results provide some confirmation that the program design has been effective, and that the landholders will maintain motivation to continue with the actions.

- ***The program has generated positive changes in attitudes***

The program appears to have generated some positive changes in attitudes towards these types of programs, with the majority of landholders indicating increased support for these types of programs. There was general consensus that the program had generated social capital through increased levels of interest, trust, and cooperation with the FBA. There was also willingness to adopt environmental actions promoted by the FBA and general agreement that FBA programs improved likelihood of achieving environmental outcomes. There was also support for landholders being able to suggest potential actions and competing between each other for funds. However, there was also support for funding to involve most landholders rather than just concentrating on the ones who can offer most cost effective actions.

### **8.13 SUMMARY**

The results outlined in this chapter have key implications for the research questions in this study. In particular the results offer:

- Evidence that the FBA governance model generates social capital;
- Estimates of transaction costs and transformation costs associated with landholder participation in the program; and
- Validation of the decision support framework applied against the FBA in chapter 7.

These are summarised in turn below.

#### ***Generation of social capital***

The survey findings clearly indicated that the FBA program has generated overall positive changes in attitudes. Landholders' level of trust and cooperation with the FBA, and willingness to adopt promoted actions and participate in FBA programs,

increased as a result of involvement in the FBA program. Some evidence also indicated that levels of conflict between landholders and the government over NRM matters have declined. These results offer evidence from the FBA case study that the institutional structure generates social capital.

### ***Costs of participation***

Although most landholders incurred costs from participating in the FBA program as outlined in section 8.10, from a cost-share perspective this can also be viewed as the value of additional investment that the program has generated. Results show that the FBA program was able to lever more than a five-fold equivalent of additional contributions, which is based on the assumption that the wider adoption would not have occurred in the absence of the grant program. This was consistent with the achievements of other regional NRM groups as outlined in section 7.2.1. This is not only a key aspect for assessing the benefits of the FBA program, but also important in evaluating the net benefits of the broader regional NRM governance framework. The latter is achieved to some extent by comparing the transaction costs of the FBA outlined in chapter 7 (section 7.5.1-2) with the value of landholder investment outlined in section 8.10. Assuming FBA transaction costs to be approximately \$2.8 million per year<sup>114</sup>, the total value of benefits comprised of landholder contribution (direct cost and in kind) and social capital generated needs to be at least equal to this value for the regional NRM model to be worthwhile. The survey results estimated average individual landholder investment in the FBA program to be about \$33,349. On this basis, the FBA needs to engage with around 84 landholders in a similar NRM program to offset this level of transaction costs<sup>115</sup>.

One point of critical note in relation to the higher level transaction costs estimated for the regional NRM governance arrangements is the need to acknowledge that all of the derived transaction costs are likely to *underestimate* the total transaction costs across all NRM schemes (e.g. Landcare, ICM) over time. Indeed the transaction costs

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<sup>114</sup> This was based on available data on FBA transaction costs for 2006-08 (see section 7.5.2).

<sup>115</sup> This is a conservative analysis as the benefits of social capital generated under the FBA regional governance model have not been included. It was also acknowledged in section 8.10 that this conclusion is based on the assumption that in the absence of the regional NRM arrangements (i.e. 'without scenario'), a government-based program or other co-existing program would not also leverage landholder contributions.

estimated specifically for the establishment of the FBA regional NRM governance model would in fact be expected to be lower if there were pre-existing institutional structures that had already helped to establish social capital and governance capital as a result of the more localised networks of Landcare and catchment management groups, and the explicit linking of these groups in Regional Investment Strategies (thus leveraging existing social and governance capital).

It is also important to recognise that the generation of social capital yields benefits in a temporal dimension consistent with the comparative transaction cost frameworks outlined by Birner and Wittmer (2004), and Challen (2000) and Marshall (2005). The generation of social capital through elements such as increased trust and cooperation between landholders and the FBA yield reciprocal net benefits through the reduction of static and dynamic transaction costs. On one level, these may be realised in reduced costs associated with program implementation and negotiation (compliance). On another level, these may also affect institutional path dependency by adjusting institutional transition and institutional lock-in costs (Challen 2000), and dynamic transformation costs (Marshall 2005) as outlined in section 6.5.

#### ***Application of decision support tool to FBA case study***

The natural resource governance decision support tool developed in this research was applied to the FBA case study in chapter 7. The application of the decision framework involved addressing eight guiding questions which were focused on various aspects of social capital generation potential in the region. The relative level of pre-existing social capital, and the potential for social capital to be generated in a region (or sub-region), had the potential to influence the manner by which the questions could be answered which in turn, may result in the recommendation of different governance models.

The results presented in this research provide evidence to justify the responses in the decision support tool. For example, the response to question five in the decision framework is dependent on the level of social capital (i.e. influencing willingness of NRM stakeholders to engage in dialogue to solve the NRM problem) in the community of interest. Early efforts by Landcare groups in the Fitzroy Basin region engendered social capital in the members of the catchment community, which

allowed externality problems to be addressed by direct negotiation between landholders to promote transfer of farmer skills and knowledge thereby reducing transaction costs of negotiations and implementation of NRM programs. The results presented in this research, therefore, offer some evidence for validating the decision support tool's recommendation of the non-statutory regional NRM model as an appropriate governance arrangement based on the FBA case study.

In this chapter, the results and findings from the survey of landholders involved in the FBA's devolved grants program was presented. The implications of these findings with respect to the regional NRM model of governance of interest in this study were also examined. The program was clearly a success from the perspective of the landholders who had participated in the scheme. Most respondents were able to identify tangible improvements either in terms of some aspect of property management activities or environmental outcomes.

The survey findings have provided some clear evidence of indirect benefits to support adoption of the regional NRM governance model for the delivery of NRM services. Findings also provide a preliminary basis of support for the key elements underpinning this governance framework discussed in chapter 6.

The conclusion and wider implications of this research is presented in chapter 9.

## 9. Conclusion

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*Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.*

(Sir Winston Churchill, 10 November 1942)

### 9.1 INTRODUCTION

Several decades of scholarship on institutions in a range of disciplines illustrate that effecting the paradigm shift in cultural mindset necessary to modify entrenched or “locked-in” (Marshall 2001, 2005; Brunckhorst and Marshall 2007) governance systems is a formidable challenge (Armitage 2006, p.2). In Australia, the regional NRM arrangements have been in the making for several decades, slowly simmering with the essential ingredients of Landcare and ICM, and catalysing through the NHT2 and NAP funding programs. Evidence from examination of the FBA case study suggests that the regional NRM model has been successful insofar as demonstrating the importance of indirect benefits and deepening soft institutions through the development of social capital and governance capital-enhancing processes vital in influencing the adoption of improved NRM practices at the regional level.

Although the regional NRM model did not begin with Landcare, both the strengths and limitations of the Landcare approach influenced the shift to NRM regionalisation (Paton *et al.* 2004). Landcare demonstrated the potential of local action to address land and water degradation. Indeed, a key factor influencing participation in recent MBI-type NRM programs has been attributable to the “Landcare-based experience” of landholders (Grafton 2005, p.22). In particular, the Landcare movement planted the necessary seeds of awareness of NRM issues. On this basis, it is arguable that the regional NRM arrangements may not have evolved to its current form without the Landcare movement, although it is acknowledged that other influences such as the sustainable development and devolution discourses may have also been important factors. This is consistent with the concept of institutional path dependency which was explored in chapter 6 (section 6.5), manifested through positive-feedback and increasing return dynamics that can cause particular institutional decisions and associated ideologies inherited from the past to lock-in to certain institutional

development pathways (e.g. Marshall 2001, 2005; Brunckhorst and Marshall 2007). This process is invariably accompanied by static and dynamic transaction (e.g. institutional transition and lock-in costs) and transformation costs (e.g. technological transition and lock-in costs). Other examples can be observed more explicitly. For example, the experience of the first phase of the NHT program led to the changes in institutional structures witnessed in the NHT2, which resulted in the formation of regional NRM groups. Consequently, it may also be argued that the establishment of these institutional structures and governance systems also led, in an interim review of institutional options for future NRM arrangements in Queensland, to the Queensland Government recommending an option that essentially amounted to the *status quo* institutional arrangement (DNRW 2005).

This study aimed to address the following key research questions:

- What benefits and costs are generated from a regional NRM governance model?
- What are the key factors to consider in choosing NRM institutional models?
- What institutional arrangements are appropriate for NRM based on the FBA case study?

The research addressed these key questions by a combination of theoretical and empirical investigation.

First, the research involved undertaking a literature review and assessment of the theoretical economic frameworks that could offer insight in explaining how the regional NRM model could generate net benefits. Using institutional economics theory, the research provided an institutional perspective in demonstrating why the regional NRM arrangements have evolved. This was accompanied by a review of the history of key Australian NRM policies and programs.

A second part of the research addressed the research objectives by examining an Australian case study of regional NRM. More specifically, this entailed identifying and estimating the transaction costs associated with implementing the regional NRM model using the FBA case study in Central Queensland. The analysis identified high-level transaction costs associated with establishing the regional NRM arrangements in

Queensland, transaction costs associated with operating the FBA as a regional NRM group, and program level transaction costs including the costs of landholder involvement in a FBA NRM incentive program.

Third, the research expanded on the idea of social capital by developing the concept of governance capital to explain: (i) how institutions can improve operation to achieve regional collaborative advantage; and (ii) how adaption and resilience is enhanced under the regional NRM model using the FBA case study.

Fourth, key research findings provided evidence that the regional NRM institutional structure deepens soft institutions by generating social capital.

Fifth, the research developed and trialled a decision support framework that incorporated key factors identified in the literature review and case study analysis for choosing the most appropriate institutional structure for NRM. The decision support tool was applied to the FBA case study analysis and results suggested that the regional NRM model was the appropriate institutional and governance framework for achieving NRM outcomes in the Fitzroy Basin region of interest in this study. The decision support tool represents a significant and useful contribution to knowledge.

Overall, this thesis provides a valuable contribution to knowledge by addressing a key research gap in relation to the intersection between social processes facilitated by participatory and devolved governance arrangements on the one hand, and institutional economics principles through the analysis of governance transaction costs on the other. Together, these factors reveal important lessons in the context of the regional NRM case study analysis presented in this research.

The research findings contributed to the stock of case study evidence to inform the development, improvement and implementation of collaborative natural resource governance arrangements. Marshall (2005) asserts that it is important to build up evidence by ongoing case study analysis to demonstrate that the vision of collaborative environmental governance is worth pursuing. This study provided additional case study evidence towards this effort.



The case study findings reported in this research were also found to be consistent with commentary on the comparative benefits of devolved and co-governance systems (e.g. Hanna 1995; Mburu *et al.* 2003; Kuperan *et al.* 1999) including in particular, the comparative transaction cost analysis frameworks outlined by Birner and Wittmer (2004), and Challen (2000) and Marshall (2005), which was used to inform the analysis.

The key proposition in this thesis is that the regional NRM model generates social capital and governance capital by directly engaging with local networks in the regional community through devolved regional NRM groups such as the FBA. Hence, the relatively high costs of the FBA may be more than offset by its successes in gaining voluntary cooperation from lower-level actors and thus in reducing the costs of achieving desired on-ground NRM behavioural change. While such community-based governance arrangements are likely to be more effective in more cohesive and better managed communities (i.e. higher levels of social and governance capital), evidence also indicates that better networked or better educated groups within a community may be better able to organise and thus to facilitate achieving desired NRM outcomes (Mansuri and Rao 2004). Support for this is reflected in the role of the FBA in developing regional governance capital and effecting NRM change, as demonstrated in this study.

In chapter 4 it was established that different institutional arrangements were associated with different levels of governance transaction costs. The collaborative, community-driven focus of NRM planning and implementation is a key benefit of the regional NRM model but is also accompanied by significant costs. Many of the costs can be identified as transaction costs, where the costs of collaboration and engagement under a governance process can be likened to the search, negotiation, monitoring and enforcement costs familiar from market transactions. These transaction costs also include the costs of administering a separate organisation, and duplication costs associated with running parallel programs to those of government-run NRM initiatives. In a marginal analysis setting, the question is whether the costs

of devolving governance to regional NRM groups are justified when the benefits are considered.

The magnitude of transaction costs associated with establishing and implementing the regional NRM arrangements using the FBA case study in Queensland was outlined in chapter 7. This demonstrated that transaction costs associated with the FBA regional governance model, based on costs of the Sustainable Landscapes and Healthy Region program portfolios, together with FBA core costs, represented about 57% of total FBA costs. This represented about 8% of the total cost of regional NRM governance in Queensland and less than 0.5% of net NRM and environmental conservation expenditure in Queensland (see section 7.5.1).

Given that success of the regional NRM model is crucially conditioned by local cultural and social systems, programs are best undertaken with careful learning by doing and adopting an adaptive approach. Indeed, a key strength of the regional NRM model is the increased scope for experimentation from having more organisations running experiments thereby increasing levels of adaptive efficiency. While successful projects in any context provide a significant learning opportunity, any wholesale application of best practices is unlikely to be useful as the development and institutionalising of improved NRM practices needs to be recognised as an evolving, region-specific process (i.e. parallels development of social and governance capital over time). Key concepts that underpin regional NRM must therefore be adequately operationalised using context-specific variables. Case study evidence indicates that any naïve application of these notions by policymakers and implementers may lead to poor program design and outcomes. This was evident in the Landcare movement introduced in the first phase of the NHT program which was considered highly ineffectual in achieving NRM outcomes.

The regional NRM model may not deliver major improvements in environmental performance. However, it may be premature to criticise the model on the basis of an apparent lack of positive environmental outcomes as the governance arrangements have only been in place for a relatively short time and needed to overcome a range of institutional ‘teething’ problems. Moreover, environmental improvements typically

lag considerably behind program actions (e.g. Marshall 2005) and this lag could extend over generations (Commonwealth of Australia 2000a). This is an area that is lacking in detailed empirical investigation, especially in relation to establishing sound baseline data that can be used to strengthen causal links between governance processes and improved NRM outcomes. In addition, it is also important to recognise achievements and advances in understanding the relationship between aspects of social and governance capital, and governance transaction costs (e.g. Bellamy *et al.* 1999; Born *et al.* 2001). The important groundwork laid in this thesis presents an opportunity for future research endeavour in this complex, yet highly relevant area. This underscores the importance of careful monitoring and evaluation of programs to enable adaptive learning to flourish. Little is known about the longer term impact of NRM incentive programs such as devolved grants, largely because many programs lack careful evaluations. It is clear that a key deficiency with the regional NRM arrangements implemented under the NHT2 and NAP framework was the potential for poor decisions on funding allocations and lack of adequate monitoring and evaluation requirements. The Australian National Audit Office (ANAO 2008) found that since 2000 the regional NRM arrangements have gained momentum in delivering NRM programs and also concluded that significant components of the model were performing well given the long timeframe required for large-scale improvement in the condition of NRM assets. However, it also suggests that investment in NRM programs would be enhanced through development of a systematic monitoring and evaluation regime linked to all levels of investment. On this aspect, it is promising to note that in negotiations between the Queensland and Australian Governments for establishing the Caring for our Country Initiative (CfoC), the new national NRM funding program post NHT2 and NAP introduced by the Rudd Federal Labor Government, DNRW (Orth 2008, *pers. comm.*) advise that the importance of monitoring and evaluation systems has been acknowledged with the incorporation of a new national monitoring, evaluation, review and improvement (MERI) framework as a key component of the new CfoC Bilateral Agreements with the states.

There have been calls by some economists to use market-based approaches to improve the efficiency of environmental investments (Pannell 2008). In Australia, the

National MBI Pilots Program, which was funded as part of the NAP, has provided substantial impetus for research into MBIs to improve efficiency of investments in NRM. Many agencies across Australia and elsewhere have in place mechanisms such as devolved grants to provide landholders with incentives to undertake NRM actions on private land. Research into MBIs has resulted in advances in their design, development and implementation systems which are able to create markets for NRM for increasing the cost effectiveness of investments. This has resulted in Australian regional NRM groups trialling various MBIs as part of their NRM program implementation. This highlights one of the strengths of the non-statutory regional NRM model adopted in Queensland as it enables different regions to trial different innovative mechanisms such as MBIs to achieve cost effective NRM outcomes consistent with an adaptive management approach. However, the transaction cost advantages of an institutional alternative may be outweighed by other costs disadvantages (e.g. monitoring, enforcement, and abatement costs) and policymakers should be mindful of such trade-offs.

It is not clear whether undertaking community-based NRM planning and investment prioritisation at the regional level is the most cost effective approach (e.g. ITS Global 2006). While a regional approach can allocate resources well within a region, it may not be so effective in allocating between regions. Similarly, the application of uniform administrative and financial reporting requirements across all regional NRM groups, when large variation in resourcing and staffing exists, places a disproportionate burden on smaller groups (e.g. Robins 2007; Robins and Dovers 2007). In Queensland, regional NRM has been generally characterised by inconsistent funding decisions coupled with weak accreditation procedures for approval of funding, which did not require regional NRM groups to make good use of scientific information (e.g. linking proposed actions with NRM outcomes) when formulating priorities and plans. This typically resulted in approved plans that had unrealistic targets (e.g. Pannell 2008). There is, perhaps, merit in combining a centralised approach for designing and overseeing the assessment of key NRM funding and investment decisions (which requires certain levels of skills and resources), with a devolved approach that levers social and governance capital of regional NRM groups for program implementation.

## 9.2 *NEO-RENAISSANCE OR RHETORIC OF CONVENIENCE?*

The key analytical issue is whether the regional NRM model can generate increased net benefits compared to other models. This task is complicated by the difficulty in identifying and measuring all the transaction costs and related benefits, together with the complexity of attributing particular impacts “on complex governance systems as well as complex relationships in natural systems” (Bellamy *et al.* 2002, p.viii). While regional NRM groups such as the FBA will deliver a number of outcomes, these are largely driven by the allocation of government funding, and it is unclear if the allocation of the same funds through different processes would deliver inferior outcomes.

Clearly, a regional experiment is indeed taking place. Different states have embarked on different paths to address the issues associated with environmental and land degradation. While NSW, Victoria and South Australia have opted to take the path of establishing statutory NRM groups, Queensland, Tasmania and Western Australia have taken the non-statutory route. Differences in governance arrangements are also evident within each state. To date, the on-ground evidence and benefits of adopting these different governance types have been limited, but differences may yet emerge between the regional NRM groups, where different governance styles have been evident between the 14 non-statutory groups in Queensland. It is important that the policy lessons of trodden paths be heeded to facilitate adaptive improvement to future natural resource governance regimes.

Does the regional NRM model represent a *neo-renaissance* in natural resource governance, or is it merely ‘window dressing’ of the status quo to tap into funding opportunities? While the rhetoric of regional NRM is that it is a fully participatory process driven from the grassroots community level, there still remains a significant level of formal government control by way of NRM plan accreditation and the funding approval process by which regional NRM groups are bound. Regional NRM groups have only been devolved a relatively small number of functions, with most core responsibilities and funding responsibilities still held by government.

To date, few detailed economic evaluations of the regional governance arrangements have been conducted to determine whether the regional NRM arrangements are a genuine attempt to devolve NRM planning to the regional level or simply paying lip service – a ‘rhetoric of convenience’ – to secure Australian Government funding to assist with the implementation of routine NRM programs (Yee and Rolfe 2006). An indirect benefit of the regional NRM arrangements has been the strong interest generated in evaluating and examining its successes. Regional NRM groups are much more open to being analysed than are government agencies. This openness to learning represents a genuine benefit of the regional approach, even if measurement poses a new set of challenges.

The findings from the FBA devolved grants survey reported in this study provides additional insight into the level of transaction costs of landholder participation in NRM programs and in particular, offered new empirical evidence of the ‘soft’ benefits of the regional NRM approach. While the research focused on the specific circumstances of the case study area, the methodology applied and most of the key findings and decision tools developed can be adapted to governance matters in any region of Australia. The research findings also suggest there is merit in undertaking additional continued longitudinal transaction cost studies of incentive programs to further validate the temporal dimension of comparative transaction costs presented in the analysis framework. This will strengthen the causal linkages between transaction costs of different governance models and achieving NRM outcomes. Of particular interest is determining if transaction costs of governance reduce in magnitude over time resulting from social capital and governance capital influences.

The different models of governance outlined in this study represent a broad typology of possible institutional and governance arrangements that have been identified to deal with NRM issues. While they are only a small subset of the possible iterations of governance arrangements, they broadly represent alternative models considered by policymakers (e.g. DNRM 2005). Each of the models has its positive and negative attributes that make them appropriate (or inappropriate) for certain contexts and circumstances. This means that it depends largely on the case study circumstances as

to the appropriateness of different governance models. Within this general caveat, it is possible to make some more definitive comments about the appropriateness of the models, at both the theoretical and case study levels.

First, the application of governance models usually involves higher levels of opportunity costs and some types of transaction costs, but with the offsetting benefits of improved coordination and efficiency, reductions in some types of transaction costs, and contributions to social capital, particularly governance capital. Many of these different costs and benefits occur at different points of time and are not readily measurable; making the assessment of net benefits a difficult task.

Second, the ideal assessment task is to identify the net benefits of a governance model relative to a base case such as the standard centralised model that operates across many government agencies. Comparing models to a base case makes it easy to measure only the marginal changes in costs and benefits associated with adoption of different engagement models.

Third, different governance models involve costs and benefits at varying scales. While established administrative efficiency arrangements characterising a central government model can theoretically provide low to moderate levels of costs and benefits, the regional NRM model is characterised by high levels of both costs and benefits.

Fourth, case study evidence indicated strong justification for the effectiveness of the regional NRM model in Central Queensland on the basis of the ability to generate social capital and governance capital. This is particularly noteworthy as it may provide some indirect evidence to account for the relative failure of some other regional NRM groups in otherwise similar environments.

Fifth, results from the FBA case study indicated that the regional NRM model was generating a number of benefits relating to different types of social capital and governance capital as well as more tangible environmental outcomes.

Lastly, it is important to acknowledge that an ideal model of governance for addressing a particular NRM problem in a region may not necessarily exist. Just as NRM problems vary in terms of type and complexity, so too do potential governance

approaches. Cosgrove *et al.* (1994, p.5) advocate a need for an eclectic approach, calling for a variety of tools (e.g. legislation and regulation, economic incentives and disincentives, and education and awareness programs) to be used in a context-appropriate way if more sustainable NRM is to be achieved. Accordingly, the effectiveness of local and regional efforts depends heavily on the practices of higher levels of government (e.g. Geddes 2005; Lane 2006). Collaborative natural resource governance therefore needs to be viewed as a multi-level, multiple-scale, nested activity in which the enabling behaviours and responsibilities of different actors are critical.

There is scope for both a central government regulatory-type approach and a social capital-based participatory governance approach such as regional NRM to operate. The relative influence of these two approaches would depend on whether conditions favour the application of a top-down or bottom-up approach to enhancing implementation capacity (Wallis and Dollery 2001). In particular, the cost-benefit trade-offs between alternative approaches will play a key adjudicating role to determine how far the pendulum of governance swings in a given context.

In areas where policy formation, funding and service delivery could be undertaken by separate agencies operating within a vertical line of accountability, a top-down approach may strengthen accountability and reduce agency failure. However in those areas such as in NRM where multiple agencies, community groups and non-government organisations need to work together to solve common problems, the development of networks of civil engagement based on trust and reciprocity should be emphasised (Wallis and Dollery 2001).

The outcomes of this research confirm and support calls for an adaptive approach to natural resource governance espousing the application of model 'hybrids' which recognise the strengths of both a centralised government approach and a devolved regional NRM approach.



It is apparent that any future institutional choice consideration needs to properly take into account the specific context of application. It is clear that there are contexts where one model will be more useful over another. This may partly account for why certain governance models are used in some sectors and not in others. Determining the criteria to match the context with the relevant model will prove critical to achieving desired natural resource governance outcomes for a region. This may in fact require multiple models to be applied to deal with different issues within and between regions. A general framework to guide what works best where and why would assist policymakers in choosing appropriate governance approaches.

Fittingly, the natural resource governance decision support tool developed in this research represents one such attempt at achieving this goal. The decision tree offers a 'first-cut' attempt at a simple decision framework to provide preliminary advice to guide policymakers on the choice of appropriate institutional and governance arrangements for addressing NRM problems. While it can be viewed as a rudimentary tool given the complexities involved in reconciling the social and economic dimensions of NRM dilemmas, it provides a sound practical basis for further refinement and improvement as new research and case study evidence comes to light. A revised decision tree based on the cost barriers and limitations of each model could be explored including recommending 'hybrid' suites of alternatives based on other case study evidence. This is an important consideration as no hybrid governance option is included in the decision support tool developed in this thesis. The ultimate goal of the framework is to offer a simple, yet practical approach grounded in empirical evidence to enable government and regional decision makers to better understand and improve the design of future policies and programs to achieve desired NRM outcomes. The decision tree presented in this study offers a good starting point for future research into institutional choices for NRM.

### 9.3 WIDER IMPLICATIONS

In light of the literature and findings reported in this study, it is now pertinent to question whether this amounts to a paradigm shift in natural resource governance in the regional NRM arrangements. Perhaps this was the vision for natural resource governance through the regional NRM arrangements in Queensland, but it is not clear from the evidence reviewed in this study that this has occurred. The theory continues to lag behind practice. Short-term NRM funding programs, such as the NHT2 and NAP that essentially aim to address long-term outcomes, may be limiting the potential for adaptive efficiency and innovation to take place. While there have been improvements over earlier approaches, further refinement is necessary. Evidence from this research suggests that Australian regional natural resource governance policies are moving in the right direction by establishing a devolved governance framework that recognises the value of community-based approaches and develops social capital and governance capital. The latter has been reflected to some extent with the regional NRM arrangements having resulted in all levels of government and regional communities collaborating far more than they have in the past. One outcome of this collaboration is that regional NRM organisations have a more coherent and efficient access to government<sup>116</sup>. However, there is scope for further adaptive learning.

Recent developments in Australian policy discussion on the implications of climate change, notably through the Garnaut Climate Change Review<sup>117</sup> and subsequent plans to introduce an Australian Carbon Pollution Reduction Scheme<sup>118</sup> by the Australian

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<sup>116</sup> This can be described in terms of a region's 'collaborative advantage' (see section 5.3), which was identified in this research as one of the positive outcomes resulting from the development of governance capital.

<sup>117</sup> The Garnaut Climate Change Review (Garnaut 2008) was a major study commissioned by the Commonwealth and Australian State and Territory governments in April 2007 led by Professor Ross Garnaut to examine the impacts of climate change on the Australian economy, and recommended medium to long-term policies and frameworks to improve prospects for sustainable development. The final report was released in September 2008.

<sup>118</sup> In July 2008, the Commonwealth Government released a Carbon Pollution Reduction Scheme Green Paper (Commonwealth of Australia 2008), which outlined a proposed emissions trading mechanism to limit carbon pollution while minimising the impact on business and households. Two elements are proposed: the cap on carbon pollution and the ability to trade. The cap achieves the

Government in 2010, has also directed public interest and political discourse towards NRM and environmental concerns. In particular, this has centred on the likely economic impacts of climate change and the cost to the economy of environmental mitigation actions. This is an emerging application and presents an opportunity for exploring the potential role that regional NRM groups, with their established governance frameworks and capacity developed through the NHT2 and NAP era, can play in implementing NRM programs to address climate change impacts at the regional level. The extent that policymakers capitalise on further refining the regional NRM institutional structure to accommodate climate change issues will influence the role and relevance of regional NRM groups in the future.

#### **9.4 RESEARCH LIMITATIONS**

The task of comparative institutional analysis is a challenging endeavour. Despite the results presented in this research, identifying and measuring the different types of costs and benefits of alternative institutional and governance models remains challenging.

There are several limitations associated with this research. First, there is no direct evidence presented from the case study that demonstrates the existence of governance capital. Instead, indirect evidence of the ability of the regional NRM model to develop regional collaborative advantage and enhance adaption and resilience was demonstrated through a review of the literature and desktop analysis. Second, the full comparison between costs and benefits of alternative governance models is not available. This was due to the difficulty in accurately identifying and estimating comparative costs and benefits. As a result, definitive conclusions on the cost effectiveness of the regional NRM model over a central government approach for achieving specific NRM outcomes was not possible. The assessment of the comparative advantage of the regional NRM model was therefore dependent to some extent on conceptual frameworks which outlined theoretical comparisons between institutional options. Third, an estimation for all the transaction cost categories

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environmental outcome of reducing carbon pollution and the ability to trade ensures carbon pollution is reduced at the lowest possible cost.

outlined in the institutional analysis framework of Challen (2000) and Marshall (2005) was not provided, which prevented an analysis of the effects of adopting the regional NRM model in terms of each of the cost components to be conducted.

## **9.5 CONCLUDING REMARKS**

So what of this regional NRM approach, this professed natural resource governance panacea? No doubt the architects of regional NRM would have conceived a governance structure that would strike the appropriate balance between a participatory approach and more centralised decision making. They would have debated the merits of whether stakeholder consultation in a regional NRM model would be too lengthy or fractured, or whether state interests were too entrenched or narrow to be genuinely open to community input in NRM considerations. This trade-off between a model that favoured participation and buy-in to decisions, and one that offered more administrative efficiency is a difficult proposition. A *neo-renaissance* in natural resource governance the regional NRM model is perhaps not, but it does go some way towards attaining such a goal. Perhaps as Marshall (2005, p.9) so eloquently reminds us, it is but a collaborative “vision” that we are pursuing and case study evidence in this research suggests that this is no “hallucination” as the stock of case studies continue to add weight to the merits of such a governance system founded, *inter alia*, on transaction costs considerations, and principles of social capital and governance capital which were explored in this study. What is becoming evident is that no single governance model alone can solve the breadth and scope of problems that face NRM policymakers.

The outcomes of this research confirm and support calls for an adaptive approach to governance, especially in relation to NRM. Accordingly, the research findings suggest that a hybrid model of governance should be adopted to cater for the range and level of importance of different NRM problems. Insofar as such an ideal is sought, the regional NRM model of governance represents a credible option. This study confirmed that there is a role for a polycentric governance approach, including the regional NRM model, wherein responsibilities are devolved to the lowest possible governance level consistent with the principle of subsidiarity as noted by Marshall

(2008). While some level of authority has been devolved to regional NRM groups under the regional NRM model, other NRM powers and responsibilities still reside with central government agencies (e.g. through plan and investment strategy accreditation). Perhaps there are situations outside the 'norm' when governments are required to take swift action to prevent potential environmental catastrophes – times in which consultation is not sought. It is under these circumstances where governments may need a governance structure which permits flexibility and an adaptive approach to addressing NRM problems. Perhaps the non-statutory regional NRM model adopted in Queensland represents the first genuine attempt at such an approach.

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## **Appendix A: FBA Devolved Grant Survey**

## **A survey about the Fitzroy Basin Association's (FBA) Neighbourhood Catchments Devolved Grant Program**

### **What is this survey about?**

We want to know your views on your involvement in the FBA Devolved Grants Program. We are interested in your experiences as a participant of the program so we can help to better design future funding rounds.

This survey is being undertaken by Central Queensland University and the Fitzroy Basin Association.

### **How were you chosen?**

You were chosen from a list of participants from the FBA Devolved Grants Program.

### **What we ask you to do**

Any adult member of your household can complete this survey. It should only take about 20 – 30 minutes. There are no right or wrong answers. We are simply trying to assess your views.

### **Confidentiality**

Your answers will be treated as strictly confidential. Anonymity will be ensured by analysing and reporting on grouped responses rather than individual responses. No information will be linked directly to a particular individual and names are not recorded on questionnaires.

THESE QUESTIONS ARE DESIGNED TO HELP US LEARN ABOUT THE LANDHOLDERS THAT PARTICIPATED IN THE PROGRAM, AND HOW WE COULD IMPROVE ANY FUTURE PROGRAM.

1. How long have you lived on your property / in the area?

\_\_\_\_\_ years

2. How long do you think you will continue to live on your property?

rest of my life \_\_\_\_\_ 1  
another 10 – 20 years \_\_\_\_\_ 2  
another 5 – 10 years \_\_\_\_\_ 3  
another 2 – 4 years \_\_\_\_\_ 4  
less than 2 years \_\_\_\_\_ 5  
uncertain \_\_\_\_\_ 6

3. Do you plan to pass on your property to a family member/next generation?

Yes  
No  
Not sure

4. How large is your property (owned or managed)?

\_\_\_\_\_ acres or \_\_\_\_\_ hectares

5. How many people are working on the property / properties full time and part time?

*How*

many are family members (including yourself)?

Total: Full time \_\_\_\_\_ Part time \_\_\_\_\_ Persons

Family: Full time \_\_\_\_\_ Part time \_\_\_\_\_ Persons

6. What tenure is the property under?

1. Freehold  
2. Leasehold  
3. Combination  
4. Other (please specify) \_\_\_\_\_

NOW WE WANT TO FOCUS ON THE GRANT YOU RECEIVED:

7. What has been your involvement with the FBA Devolved Grant?

FBA Devolved Grant activity	Yes	No
Fencing watercourse		
Fencing land type		
Fencing remnant vegetation		
Fencing saline or degraded land		
Off-stream stock water system		
Alternate stock water system (for changing grazing practice)		
Strategic weed control		
Irrigation water use efficiency		
Machinery modification for zero till/CTF		
Property management planning		

8. What do you consider were the key objectives of your project?

1.

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2.

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3.

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9. Please rate the following factors in influencing your decision to take up the FBA Devolved Grant?

Influencing Factors vs. Importance	Not at all important	Not very important	Neither important or unimportant	Somewhat Important	Very Important
Availability of financial support (e.g. grant)	1	2	3	4	5
Availability of technical support/ information	1	2	3	4	5
Environmental benefits	1	2	3	4	5
Ease of application	1	2	3	4	5
Improvement in long-term productivity	1	2	3	4	5
Wanted to support FBA	1	2	3	4	5
Wanted to fix particular issue on property	1	2	3	4	5
Interested in trialling some environmental action	1	2	3	4	5
Support from friends and neighbours	1	2	3	4	5

10. What was your contribution to the Devolved Grant activity?

Contribution	Quantity	Measure
Time involved in construction work associated with the activity:		hours
Time involved in subsequent management and/or maintenance:		hours per year
Time involved in applying for / organising the grant with the FBA:		hours
Money to purchase materials/labour:		dollars
Area of land involved:		hectares
Change in net farm income:		dollars
Any other (e.g. legal, accountancy) costs - please specify:		dollars

11. What management changes have occurred as a result of the activity?

Management Changes	No Change	Not much change	Some change	Some significant change	Very significant change	Not applicable
Pasture management	1	2	3	4	5	6
Stock management	1	2	3	4	5	6
Infrastructure maintenance	1	2	3	4	5	6
Weed management	1	2	3	4	5	6
Cropping practices	1	2	3	4	5	6
Irrigation practices	1	2	3	4	5	6
Property planning	1	2	3	4	5	6
Monitoring	1	2	3	4	5	6

Comment on management changes that have occurred (or other management changes):

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

12. What change in environmental condition have you observed as a result of the activity?

Environmental conditions	Significant improvement	Some improvement	No change	Some decline	Significant decline	Don't know
Cattle pads						
Native vegetation						
Ground cover						
Water quality						
Weeds						
Erosion						
Wildlife						
Water use efficiency						
Overall condition						

Comment on change in environmental conditions observed (or other changes you expect to observe in the future):

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

13. Has there been any change in groundcover in the target area on your property since completing the activities?

+10%	+5%	0%	-5%	-10%

14. What has been the % increase or decrease in productivity due to the activity?  
Or is the change too early to detect or simply not measured?

+10%	+5%	0%	-5%	-10%	Too early to measure	Not measured

15. Do you think you are financially better or worse off after doing this project?

	0%	5%	10%	20%	>20%
Better off					
Worse off					

16. Would you have done the project anyway if you had not received a grant?

1. Yes
2. No
3. Maybe (Please explain):

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If Yes, how long would it have taken for you to implement them?

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17. Has the project changed the way you manage other parts of your property?

1. Yes (Please give some examples):

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2. No

18. In hindsight, would you have done the project differently?

1. Yes (Please explain):

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2. No



19. In hindsight, would you have accepted the project if you knew how much work was involved?

1. Yes
2. No

20. Did the project increase the level of cooperation or communication with your neighbours?

1. Yes (Please give some examples):

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2. No

21. Did you do Property Management Planning (PMP) as a part of your grant?

1. Yes (below)
2. No (go to question 27)

Please rate how important you thought the following aspects of PMP were to you:

Aspect of program	Very Unimportant	Somewhat Unimportant	Neither Important or Unimportant	Somewhat Important	Very Important	Not applicable
Consultants	1	2	3	4	5	
Training	1	2	3	4	5	
Workshops	1	2	3	4	5	
Software	1	2	3	4	5	
Imagery	1	2	3	4	5	
GPS	1	2	3	4	5	

Comment on what aspects of the PMP activity are you still using or problems you have experienced:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

22. As a part of your project, did you agree to do some monitoring?

1. Yes (below)
2. No (go to question 23)

3. Don't know (go to question 23)

If Yes, was the monitoring completed?

1. Yes
2. No

1. What type of monitoring did you do?

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2. Do you think it worked to show changes in outcomes?

- Yes  
No

Can you suggest better ways of doing the monitoring?

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THE FOLLOWING QUESTIONS ASK YOU ABOUT YOUR PERCEPTIONS AND ATTITUDES TOWARDS THE FBA AND THE CONTRIBUTION YOU MADE TO THE DEVOLVED GRANT PROGRAM.

23. Have you received adequate follow up communication and support from the FBA?

1. Yes
2. No, please explain:

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24. Has your involvement in FBA devolved grants programs changed your attitudes towards the FBA and these types of farm management practices?

1. Yes – Increased support
2. Yes – Decreased support
3. No change in support (go to question 31)

- 25a. If Yes, how have your perceptions or attitudes towards the FBA changed?  
(Indicate for each statement if there has been an *increase, decrease, or no change*)

	Increased a lot	Increased a bit	No Change	Decreased a bit	Decreased a lot
Your level of effort in involvement with FBA programs					
Your level of trust of the FBA in promoting specific environmental actions					
Your level of knowledge about management actions promoted by the FBA					
Your level of interest in FBA programs					
The level of conflict with government over environmental issues on your property					
Your level of cooperation with the FBA over environmental issues					
Your willingness to take up or adopt specific environmental actions promoted by the FBA					

- 25b. How likely are you to have future involvement with FBA programs?

Program type	Much more likely	A bit more likely	No Change	A bit less likely	Much less likely
Information workshops					
Grants to help improve environmental outcomes					
Monitoring activities					
Payment for providing ecosystem services					

26. Have you since been involved with any other program / incentive scheme from the FBA in the last five years?

No

Yes (please specify) \_\_\_\_\_

27. Have you applied for any follow-up grants?

1. Yes (Go to question 28)

2. No (Question below)

Were any of the following reasons relevant in influencing your decision not to apply for another grant?

Reason	Yes	No	N/A
I did not have a new project			
Didn't want to be involved			
Not aware of any other grant on offer			
No programs in your area			
My new project was not eligible			
Contact people were not helpful enough or able to provide information			

Were there any other factors influencing your decision?

1. \_\_\_\_\_

2. \_\_\_\_\_

28. How important is support and opinion of the following groups in your decisions to enter into devolved grants with the FBA?

Statement? Reason?	Very Unimportant	Somewhat Unimportant	Neither Important or Unimportant	Somewhat Important	Very Important
Fitzroy Basin Association	1	2	3	4	5
Landcare, environmental, and conservation groups	1	2	3	4	5
Government Agency	1	2	3	4	5
Consultants	1	2	3	4	5
Neighbours	1	2	3	4	5
Urban Australians	1	2	3	4	5
Friends	1	2	3	4	5

29. The following statements ask about your views about the introduction of the FBA as the regional natural resource management group.

*After I read out each statement, can you tell me whether you: strongly agree, agree, disagree, strongly disagree with the statement, or don't know.*

- The FBA has led to reduced levels of conflict between landholders and the government.
- The FBA has led to improved levels of adoption and take-up for environmental programs.
- The FBA programs have more flexibility than government programs in dealing with environmental and conservation issues.
- The FBA has allowed natural resource management actions and programs to be tailored to local knowledge.
- The FBA has improved the likelihood of achieving environmental outcomes.
- The FBA programs will help farmers improve their production.

30. The following statements are about how programs run by the FBA could be structured.

*After I read out each statement, can you tell me whether you:  
strongly agree, agree, disagree, strongly disagree with the statement, or don't know.*

- Landholders should be able to suggest the actions suitable for their property.
- It's okay for there to be competition between landholders for access to funding.
- Priority support should be given to land managers on properties in good condition.
- Priority support should be give to land managers on properties with damaged areas.
- Funding programs should try to involve most farmers rather than just focus on the ones that can give cheapest environmental improvements.

31. The following statements relate to your personal outlook on rural land management and conservation.

*After I read our each statement, can you tell me whether you:  
strongly agree, agree, disagree, strongly disagree with the statement, or don't know.*

- People who practice good land management and environmental conservation should be given recognition and provided with subsidies to promote management actions.
- Agricultural activities in this region have relatively little negative impact on water quality in the river systems.
- Agricultural activities in this region have relatively little negative impact on marine water quality.
- Farmers have many options to implement practices that are good for the environment and good for production.
- Investment by landholders in conservation practices is important to ensure future profitability.
- Penalties should be imposed on people who cause environmental damage.

JUST TO FINISH UP, WE'D LIKE TO COLLECT A FEW DETAILS ABOUT YOURSELF.

32. What is your gender?

Male

Female

33. Are you or have you been a member of a local landcare or catchment group?

1. Yes

2. No

34. What age group do you belong to?

1. 18-24

4. 45-54

2. 25-34

5. 55-64

3. 35-44

6. 65+

35. What is the highest level of education you have completed?

Primary school (up to age 12)

Grade 10/Form 4/Junior/Intermediate (up to age 15)

Grade 12/Form 6/Senior

Trade/technical certificate

Diploma or Advanced Diploma

Bachelor degree

Post-graduate degree

Other. Please specify: \_\_\_\_\_

36. Which of the following statements best describes how you feel about the long-term financial viability of your farm over the next 10 -15 years?

Very confident

Reasonably confident

A little concerned

Very concerned

Don't know

No Response

THE FOLLOWING QUESTIONS ASK YOU PERSONAL DETAILS ABOUT YOUR INCOME. REMEMBER THAT ALL OF THIS INFORMATION IS CONFIDENTIAL AND WILL NOT BE ASSOCIATED WITH YOUR NAME.

37. Roughly, what has been your average annual take home income over the last five years?

- |                          |                          |
|--------------------------|--------------------------|
| 1. \$0 - \$20 000        | 5. \$250 001 - \$500 000 |
| 2. \$20 001 - \$50 000   | 6. \$500 001 +           |
| 3. \$50 001 - \$100 000  | 7. Don't know            |
| 4. \$100 001 - \$250 000 |                          |

Approximately what percentage of your family income is from off-farm sources? *This may include income from wages, other businesses, investment and social welfare payments.*

- |            |                 |
|------------|-----------------|
| 1. None    | 4. 20-29 %      |
| 2. 1-9 %   | 5. 30-39 %      |
| 3. 10-19 % | 6. 40 % or more |

In your opinion, what were the good and bad aspects of the devolved grants program you were involved in?

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Any other comments:

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*Thank you very much for your time and collaboration!*



## **Appendix B: Survey Design**

The following is a description of the survey questions and rationale for inclusion in the FBA devolved grants survey reported in this thesis.

- **Questions 1 and 2** relate to the length of time the respondent had been farming in the district, time spent on the current property and time they planned to continue farming the property. This enquired whether farmers with greater time spent on their property were more likely to participate in conservation programs to protect environmental attributes.
- **Question 3** asked whether respondents had plans to pass the property to a family member.
- **Question 4** was concerned with the size of the participant's farm in order to assess if larger or smaller farms were more likely to participate in the program. A landholder with a larger landholding may be able to afford to remove some areas for conservation than one who has a smaller property size. Scale of operations, as measured by the area of the farm, has been found to influence landholders' conservation behaviour (e.g. Cary 1992; Nowak 1987). Luzar and Diagne (1999) found that larger farms in Louisiana were more likely to participate in a wetland conservation program, while Curtis *et al.* (2000) noted that property size was a major influence on adoption of sustainable practices in the Goulburn-Broken catchment in Victoria. Drake *et al.* (1999, p.111) found that European farmers with larger farm sizes were more likely to participate in agri-environmental schemes (stewardship schemes). Black and Reeve (1992, p.65) revealed that farmers with farms over 2000 hectares (ha) in size are more likely to join a Landcare group. They suggest that this may be linked to the need for large farm sizes in order to generate sufficient income to devote some resources towards conservation works. Turrell and McGuffog (1997, p.144) found that large scale farmers were less likely to rinse chemical containers, which they saw as an activity that denoted awareness of the environment and of possible externalities.
- **Question 6** asked about tenure in an attempt to ascertain if landowners are more likely to participate in the program than those with weaker security of tenure. Crabtree *et al.* (1998, p.312) investigated the characteristics of entrants versus non-entrants in the Scottish Woodland Incentives Scheme, and also found that participants were more likely to own their land than non-participants. Similarly,

Soule *et al.* (2000) found that amongst American corn farmers, owner operators were more likely to carry out soil conservation practices than farmers leasing their land. The authors of this study suggest that the longer timing of the benefits from some conservation practices may prove to be a disincentive for lessees. Queensland farmers may experience greater certainty of tenure than the landholders in these two studies; however the upcoming changes to the leasehold land strategy may be causing some uncertainty.

- **Question 7** asked respondents to identify the types of land management actions associated with the devolved grant received from the FBA.
- **Question 9** was concerned with the relative importance of different factors in influencing landholders' decision to take up the grant. These included the following: availability of financial and technical support; environmental benefits, ease of grant application process; improvement in productivity; addressing particular issue on property; trialling an environmental action; and support from friends and neighbours.
- **Question 10** invited respondents to outline their contribution to the devolved grant activity in relation to time and money involved in the grant application, construction and maintenance of on-ground works, and area of land involved. This question is an attempt to document the range of transaction costs incurred by landholders through their participation in the FBA devolved grants program. This provides useful information on the level of indirect costs and proportion of cost sharing taking place in delivering the activity. In a related matter, respondents were also asked if they would have still accepted the project in hindsight given the level of work involved (**question 19**).
- **Questions 11 to 14** asked respondents to identify the management changes that have occurred and any changes in environmental condition observed as a result of the grant activity.
- **Question 16** asked respondents whether they would have undertaken the grant activity regardless of whether or not they received the grant. This sought to determine whether the devolved grant investment was worthwhile.

- **Questions 17 and 18** investigated whether participation in the program influenced the way respondents managed other parts of their property and whether they would have done the project differently.
- **Question 20** concerned whether involvement in the grant activity had increased the level of cooperation or communication with neighbours.
- **Question 21 and 22** asked respondents whether they had prepared Property Management Plans and undertaken monitoring as part of the grant activity.
- **Question 23** assessed whether adequate follow-up communication and support was provided by the FBA as part of the grant program. This may influence landholder decisions to participate in future incentive programs.
- **Questions 24, 25, and 29** concerned whether participation in the FBA devolved grants program has changed respondents' attitudes towards the FBA and the types of land management practices promoted. Respondents were also asked to rate how their attitudes towards the FBA had changed in relation to the following aspects:
  - effort of involvement in FBA programs;
  - trust in the FBA;
  - level of knowledge about actions promoted by the FBA;
  - level of interest in FBA programs;
  - level of conflict with government over environmental issues on property;
  - level of cooperation with FBA over environmental issues; and
  - willingness to adopt environmental actions promoted by the FBA.
- **Question 26 and 27** asked if respondents had been involved in any other FBA incentive programs in the last five years and the reason for their decision, with the expectation that a farmer who has chosen to participate in a program in the past will be more inclined to participate in similar programs in the future. The opposite could be true, however, if the experience of the participant in these other programs was negative.
- **Question 28** asked respondent to rate the level of importance of support and opinion obtained from different groups about the decision to participate in the FBA devolved grants program. These groups included: the FBA, Landcare groups, government agencies, consultants, neighbours, urban Australians, and friends.

These groups have been identified after consultation with a wide range of individual including DNRW officials and FBA staff, and were confirmed by the experiences of the National Market-based Instruments (MBI) Pilot Programs<sup>119</sup> which involved engaging with regional NRM groups and CMAs across Australia.

- Nelson *et al.* (2004) influenced the question about keeping the farm in the family (i.e. plans to pass farm on to children) (**question 3**) and the influence of off-farm income (**question 37**) on participation in NRM conservation programs. It is expected that individuals with children would be less likely to participate as involvement may incur additional financial and time resources and potentially reduce the property's option value should sections be taken out of production. This is supported in part by Luzar and Diagne (1999) who found that the presence of dependents in a household reduced the likelihood a farmer would participate in a wetland conservation program that involved the establishment of permanent easements over parts of the property enrolled. In contrast, farm households with dependents might choose to participate in NRM programs to keep the farm in good condition for their children or possess high ecological values.
- **Question 32** asked for the participant's gender, with no set expectation. Bord and O'Connor (1997) found that women are more likely to exhibit environmental concern than men when there is a known or specific risk arising from an environmental problem. Kilpatrick *et al.* (1999) similarly noted that male and female farmers have different preferences for learning and seeking new information which has implications for adopting more sustainable farming practices.
- **Question 34** sought to determine respondents' environmental orientation by assessing whether respondents held membership in a Landcare group. The hypothesis adopted was that landholders involved in Landcare were more likely to participate in NRM programs. Cary and Wilkinson (1997, p.18) found that Landcare

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<sup>119</sup> The researcher was the resource economist on the team responsible for designing and implementing the National MBI Capacity Building Program, a key NAP-funded initiative under Round 2 of the National MBI Pilot Program delivered by the Community Partnerships Social and Economics unit at DNRW on behalf of the Commonwealth Government. The program involved conducting and disseminating social and economic research, and implementing surveys and programs aimed at building the capacity of regional NRM groups and CMAs to consider the use of MBIs as mechanisms to more cost effectively deliver NRM investments. This involved engaging and collaborating with regional NRM groups and CMAs across Australia to identify the factors that may influence stakeholder involvement and support for MBIs for achieving NRM outcomes.

membership significantly but not substantively predicted decisions to carry out sustainable farming practices.

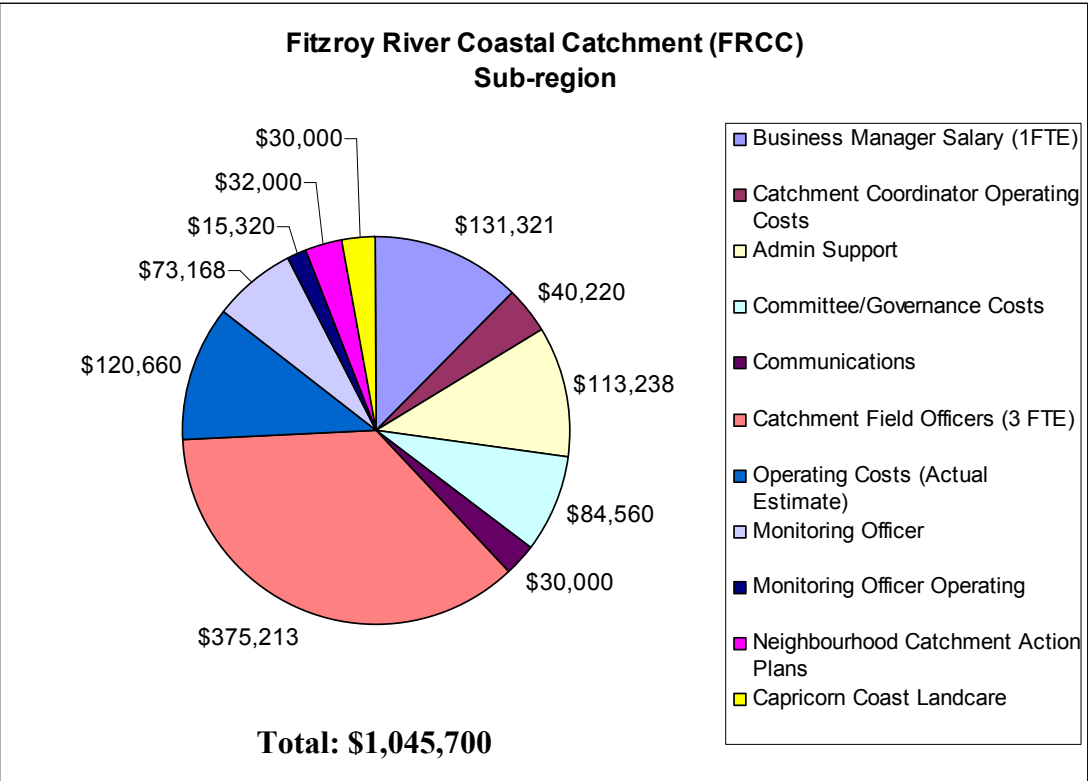
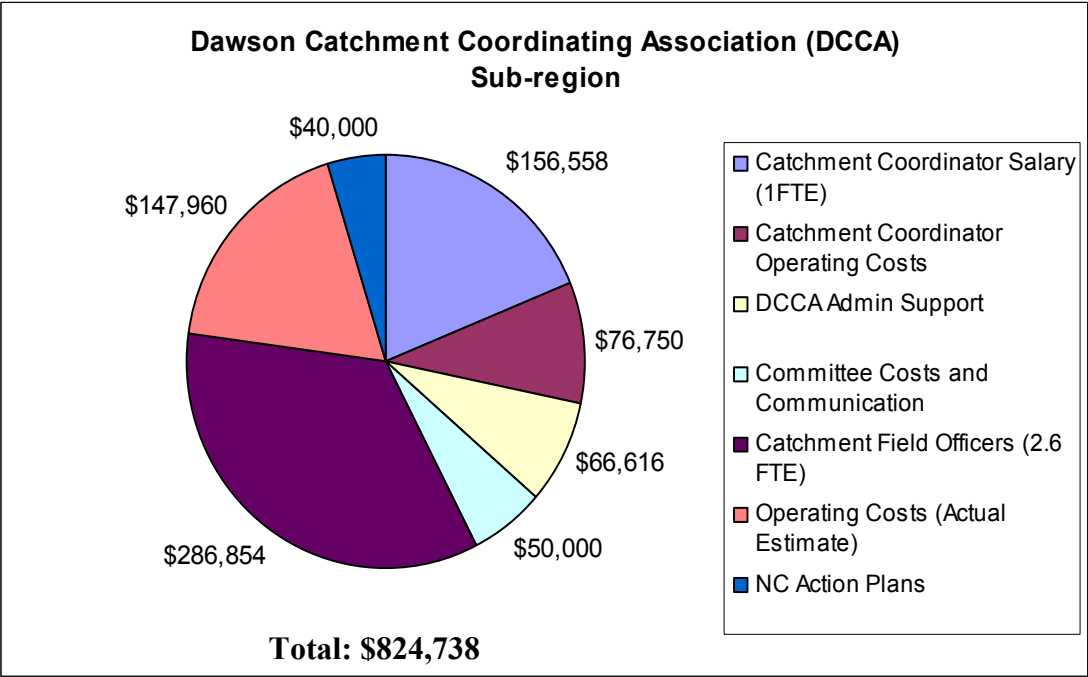
- **Questions 33 and 35** (about age and education) were compatible with the Australian Bureau of Statistics census categories, allowing for comparisons with the distributions of other regions. These questions were interested in testing the hypothesis that younger and better educated farmers were more likely to participate in conservation activities and programs. Jones and Dunlap (1992) reviewed the US National Opinion Research Centre's (NORC) General Social Surveys, and found that younger and better educated people consistently were more supportive of environmental protection than other respondents. Cary *et al.* (2002, p.30) revealed mixed evidence on the link between age and the adoption of sustainable farming practices in a survey of factors influencing capacity to change. Drake *et al.* (1999, p.103) revealed that more educated farmers and older farmers were more likely to participate in EU stewardship programs. Luzar and Diagne (1999) noted that more educated landholders were less likely to participate in a wetland conservation program. Turrell and McGuffog (1997, p.144) concluded that tertiary educated farmers were more aware of environmental impacts of their operations and less likely to rinse chemical containers. Cary *et al.* (2002, p.31) concluded that the relationship between formal education and the adoption of sustainable farming practices is not clear.
- Perceived profitability of actions is considered an important consideration underlying the decision to participate and adopt changed practices (e.g. Cary and Wilkinson 1997; Clearfield 1983; Erwin and Alexander 1981). Cary and Wilkinson (1997, p.18) assert that perceived profitability was the main factor influencing the decision to establish deep-rooted pasture or planting trees as conservation measures. Saltiel *et al.* (1994, p.339) found that perceived profitability was a key driver behind the adoption of sustainable farm practices. Pannell *et al.* (2006, p.1415) noted that environmental benefits can be "most readily achieved by developing conservation practices that provide a commercial advantage to farmers". **Question 36** assessed respondents' perceptions of future farm financial viability and impacts on the decision to participate in NRM incentive programs. Gasson and Potter (1988) and Parton and Cumming (1990) demonstrate that

conservation orientation is lower for farmers under greater financial constraint. Cary *et al.* (2002) concluded that the perception of future farm viability has a larger impact on adoption than objective measures of farm business viability. On a similar note, respondents were also asked whether they were financially better off or worse off after undertaking the project (**question 15**). It is anticipated that those who feel less financially secure would be less likely to participate in conservation programs.

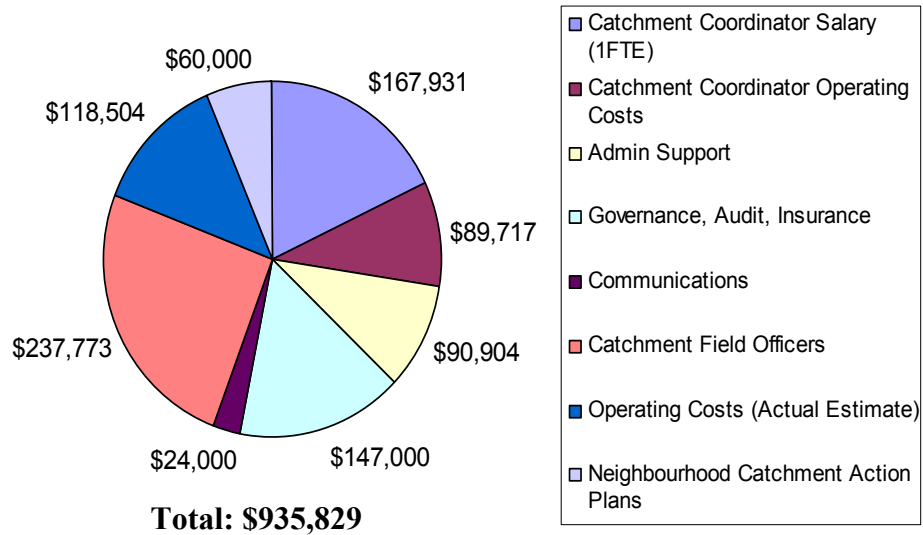
- The income categories in **question 37** were adopted from the Greiner *et al.* (2003). The influence of income on farmer participation in incentive programs is not clear, as it may affect participation in two ways. Farmers on higher incomes may: (i) not participate due to less need for additional income; (ii) participate as they have fewer constraints to involvement in a conservation program (i.e. they can better afford not to farm some of their land). If they do participate, people with higher incomes may be able to provide more in-kind or co-contribution to subsidise works. Studies have generally linked higher levels of farm income with higher adoption levels of conservation practices (e.g. Camboni and Napier 1993; Curtis and De Lacy 1998; Saltiel *et al.* 1994; Witter *et al.* 1996). Luzar and Diagne (1999) found that higher incomes were significantly and positively related to participation in a wetland conservation program. Similarly, Crabtree *et al.* (1998, p.312) also identified that farms with larger economic sizes were more likely to participate in a Woodland Incentives Scheme in Scotland.

## **Appendix C: FBA Sub-regional Group Costs (2006-08)**

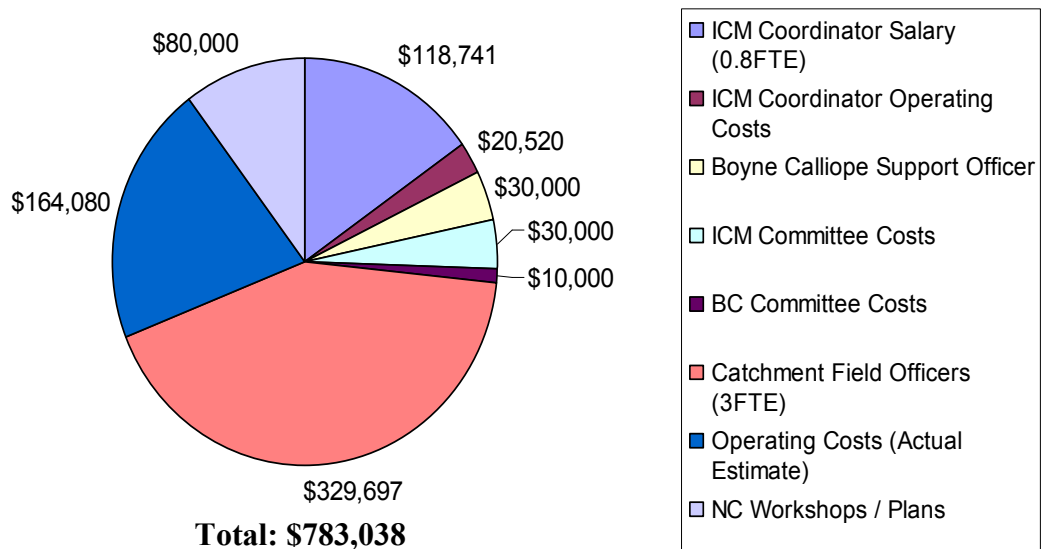




**Central Highlands Regional Resources Use Cooperative (CHRRUP)  
Sub-region**



**Boyne Calliope (BC) and Issac/Connors and Mackenzie (ICM)  
Sub-regions**



**Total Operating Costs for all FBA Sub-regional groups (2006-08): \$3,589,305**