



Landholders' perceptions of the Australian Government's Reef Rescue Program in the Wet Tropics region of North Queensland



N. Emtage and K. Shrestha



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



**THE UNIVERSITY
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Landholders' perceptions of the Australian Government's Reef Rescue Program in the Wet Tropics region of North Queensland

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Acronyms Used In This Report

BMP(s)	Best Management Practice(s)
BSES	Bureau of Sugar Experiment Stations
COMPASS	Combining Profitability and Sustainability in Sugar
CPSL	Cane Productivity Services Ltd
CRP	Current Recommended Practice
CRRP	Community Rainforest Reafforestation Program
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEWHA	Department of the Environment, Water, Heritage and the Arts (Commonwealth)
DSC	(Former) Douglas Shire Council
EMS	Environmental Management System(s)
FMS	Farm Management System
GBR	Great Barrier Reef
GLM	Grazing Land Management
ISO	International Organization for Standardization (standards classification)
MAT(s)	Management Action Target(s)
MTSRF	Marine and Tropical Sciences Research Facility
NRM	Natural Resource Management
RRP	Reef Rescue Program
RRRC	Reef and Rainforest Research Centre Ltd
QDNR	(Former) Queensland Department of Natural Resources and Water
QDPI&F	(Former) Queensland Department of Primary Industries and Fisheries
QEPA	(Former) Queensland Environmental Protection Agency

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Abstract

This report describes the results of a series of interviews of rural landholders in the Wet Tropics Natural Resource Management (NRM) region of North Queensland on the topic of the Australian Government's 'Reef Rescue' program (RRP). Interviews were conducted with fourteen landholders across the region, who were targeted on the basis of the results of analyses of a postal survey of rural landholders undertaken in 2007/2008 (Emtage and Reghenzani, 2008; Emtage and Herbohn, 2009; Emtage, 2009). A semi-structured interview schedule was used to examine landholders' perceptions of:

- The barriers to participation in the RRP;
- Landholders' motivations for participating in the RRP; and
- Their perceptions of classification schemes of agricultural practices.

The RRP was designed to provide financial and training assistance to landholders to adopt management practices that will lead to improvements in the quality of water in the Great Barrier Reef (GBR) lagoon. The program was developed by the Commonwealth Department of the Environment, Water, Heritage and Arts (DEWHA) in 2008, and a contract with Terrain NRM Ltd, the Wet Tropics NRM board, was finalised in November 2008 to undertake the first year's operations (June 2008 to June 2009). In October 2008 the Queensland Government announced their intention to impose regulations of land management practices in catchments that drain into the GBR lagoon at some point in 2009. Terrain NRM used consultations with industry organisations and individual landholders to develop a classification scheme of agricultural practices for use in the administration of the program; an extension of the process they had applied in the development of the Wet Tropics regional NRM plan. The announcement of the impending regulation of management practices upset a number of people who had been involved in the negotiations of practice classifications and many in the broader rural community.

Interviews revealed that many landholders have grave concerns for the future financial viability of their industries and their own enterprises and they do not perceive that the reef system is under the level of threat that governments have portrayed. There was also concern that those involved in the cane growing industry would not have sufficient resources to become involved in the program. Most landholders were sceptical about reported links between the degradation of water quality and their practices. Some pointed to their own observations of improvements in the past twenty years, which they linked to dramatic changes in agricultural practices. Others were aggrieved that rural landholders seem to be specifically targeted as the cause of all environmental degradation while other sectors, notably mining and urban areas, are not receiving the same attention. The majority of interviewees claimed that landholders will do all that is within their power to minimise environmental impacts, and that what they need most is a clear demonstration of the impacts of variations of nutrient, pesticide and soil management practices on both the environment and their production systems so they can make appropriate choices.

Landholders' preferred outcomes from possible involvement in the RRP were mostly confined to the desire for training and demonstration of the impacts of practice variations. Most were supportive of the concept of classifying practices on the basis of their environmental impacts, though they had concerns about how these could be used for regulations and the lack of flexibility of the classifications. While some thought that those clearly using poor practices should be 'pulled up', there was also concern for respecting landholders' 'rights' to choose their own management practices. There were concerns raised that the announcement of impending regulations was 'insensitive' and risked alienating landholders. The landholders thought to provide the greatest threat to the environment were

older landholders and 'inexperienced' landholders. Suggestions were made that these particular landholders should be approached with suggestions to help them improve practices rather than with threats of penalties.

The preferred agencies for involvement in the RRP included industry research and development organisations (including the Bureau of Sugar Experiment Stations and productivity boards), industry associations and to a lesser extent the then Department of Primary Industries and Fisheries. These agencies were seen to be the most experienced and trustworthy, and which have 'people on the ground' to provide opportunities for inter-personal contact with landholders.

It is concluded that the administration of the RRP by Terrain NRM has been very successful to date under difficult circumstances given delays in finalisation of contracts and Queensland Government announcements. Over the last five or more years, Terrain NRM has built up a network of contacts throughout the region with individual landholders, industry associations and those involved in research and development activities. Terrain NRM employed this network of 'embedded ties' within the community to help promote that program, securing approximately three hundred applications for participation and full subscription of all of the RRP sub-programs in the region in the first year of the programs' operation.

The report concludes with a series of recommendations to improve the RRP. The primary deficiencies at this point appear to be not the main instruments of the program (i.e. the provision of targeted financial assistance to landholders and support for training partnerships), or the processes that Terrain NRM has used to implement the program, but the lack of maturity of related activities that may prevent some sectors of the rural landholding community from participating. These include a lack of education and outreach activities that could help to address landholders' 'social concerns' relating to participation in NRM programs and the limited definitive knowledge about the mechanisms and impacts of particular practices. Greater efforts are needed to understand and publicise the impacts of practices at a paddock and catchment scale and to monitor water quality in freshwater systems. The existence of a set of locally based, experienced people involved in agricultural research and development is clearly valued and respected by rural landholders. Ensuring that these people and the agencies they are associated with can maintain or increase their research and extension activities will likely result in significant improvements in the voluntary adoption of improved management practices. Greater awareness of the existence of the RRP among the rural community is also required, together with greater awareness of the efforts being made to reduce the impacts of non-rural and non-agricultural activities on water quality to assure rural landholders that everyone is expected to play a role. At present the RRP budget does not appear to allow for the development and implementation of a comprehensive communication strategy. This activity could greatly assist in ensuring that the program maintains momentum after what appear to be a successful beginning.

Introduction

The Marine and Tropical Sciences Research Facility (MTRSF) project, 'Integrating ecology, economics and people in forest and landscapes' (Project 4.9.4) was developed to improve our understanding of rural landholders' perceptions of Natural Resource Management (NRM) issues and participation in NRM activities. The project was designed in collaboration with personnel from Terrain NRM Ltd, and has been used to, (a) aid in the evaluation of the Wet Tropics Regional NRM Plan for 2004-2008 (FNQ NRM Ltd and Rainforest CRC, 2004), (b) help design the plan for the period 2008 to 2012, and (c) provide information for the design, delivery and monitoring of associated programs.

In 2008 the Australian Government announced the introduction of a \$200 million program to be run over five years to improve the quality of water entering the Great Barrier Reef lagoon. Three quarters of the program funds have been committed to assisting landholders to adopt currently recommended practices (CRPs). The majority of these funds will be allocated to landholders in the form of devolved grants. Some funding will also be used to conduct training programs for landholders on topics such as property planning, and fertiliser, herbicide and pasture management. The Minister for the Environment, Heritage and the Arts announced the approval of the 'Reef Rescue' program¹ (RRP) on 24 October 2008 at the Reef Summit event in Brisbane.

Implementing the RRP will be challenging due to a variety of factors that affect all NRM programs. As described by Bellamy and McDonald (2005: 3), 'the regional natural resource management policy and planning environment is a complex system characterised by a number of core elements (e.g. Bressers and Kuks, 2003; Dovers and Wild River, 2003):

- Multiple levels of policy implementation;
- The multi-actor character of policy implementation;
- Multiple perceptions of the problem and the objectives of policy implementation;
- Multiple strategies and policy instruments for policy implementation; and
- The complex multi-resourced and multi-organisational basis for implementation of policy.'

Given the complexity of NRM policy and planning systems, it is important to try and understand the multiple perspectives of NRM in the community and rationale for these. Comerford *et al.* (2005: 1) suggest that, '[u]nderstanding the target group is essential for tailoring the grant program to achieve the desired outcome. For example, regional NRM bodies need to consider the number of potential participants, the area over which the changed management actions are required, and the difference within the target audience. It is then also prudent to consider if the required actions are likely to be acceptable by the community. Greater promotion will be required if there is some resistance to change within the community.'

The main rationale for this research is to help identify and describe why landholders may or may not participate in NRM and other agriculture training programs in the Wet Tropics region in 2009, and recommend ways to improve the impacts of the program. Fulton *et al.* (2003) suggest that participation in these programs is not well understood following a review of farmer training programs in Australia. Fulton *et al.* (2003: vii) stated that, '[t]he research on barriers to participation (in learning activities) is limited in its depth and breadth, particularly in terms of understanding who is participating, why and what can be done to address barriers to participation.' Comerford and Binney (2005: 11) suggest that there are a variety of reasons

¹ <http://www.nrm.gov.au/funding/2008/reef-rescue.html>

why landholders may not participate in incentive programs, stating that '[o]ften uptake of incentives is low, perhaps due to problems such as misunderstanding the implications of participation, dislike of dealing with the government, not wanting to be seen as accepting government 'handouts', a complicated application process or a high compliance burden. It is important to recognise and address these concerns.'

A number of researchers in Australia and New Zealand have trialled landholder typologies as a means of describing diversity within the community of rural landholders (as reviewed in Emtage *et al.* 2006, and more recently by Brown and Beswell, 2007; Jennings and van Putten, 2007; Kuehne *et al.* 2007; Bohnet, 2008; Maller *et al.* 2007; and Morrison *et al.* 2008) and as a means of identifying 'target audiences' as recommended by Commerford *et al.* 2005. Developing a thorough understanding of the community's perceptions of the issues that are being addressed, their perception of NRM programs generally and perception of specific aspects of programs is essential in order to design appropriate programs and supporting communication strategies. The research project reported in this document is designed to assist this understanding in relation to the implementation of the RRP in the Wet Tropics region of North Queensland.

In this report:

- The first section provides an overview of the research project;
- The second section describes the development of the RRP, the processes that were used to develop the classification scheme of agricultural practices used to assess and monitor the program and preliminary outcomes in the first year of operation;
- The third section describes the methods used to undertake interviews with rural landholders in the Wet Tropics region;
- The fourth section presents the results of the interviews, followed by a discussion of the findings; and
- The final section provides concluding comments and presents a series of recommendations of means to improve the program over the next four years.

Overview of the research program

The design for the research project involves the use of multiple methods of data collection. The first stage involved undertaking a postal-based survey of rural landholders that was designed to be representative of the population of rural landowners in the Wet Tropics region. The second stage, which is the focus of this report, involved interviewing landholders to generate detailed information about their perception of the reasons for and barriers to involvement in government sponsored NRM programs, in this case the Reef Rescue Program (RRP). The third stage, integrated with the first two stages, involves development of policy and program recommendations and review of these programs.

For the first stage of the project, a postal-based survey was used to gather information about rural landholders NRM practices and attitudes in the Wet Tropics NRM region of Australia. The survey gathered information to support the development and implementation of NRM policies and programs, including data regarding landholders' socio-economic and demographic characteristics, their property management goals and intentions, their participation in social groups, trust of other people and agencies and their use of information to support management decision making. The responses to this survey provided a comprehensive set of data about the character of landholders NRM perceptions and activities as well as the degree of variation in these among the community. The responses to the survey have been examined and reported in a number of formats. The reports include:

- A description of the responses to the survey (Emtage and Reghenzani, 2008);
- A principal components analysis of the responses to questions investigating attitudes and values and assessment of the variation between landholders on the basis of land use type and scales of operation (Emtage and Herbohn, 2008);
- A market structure analysis of landholders based on their interest in NRM issues and their use of recommended practices (Emtage, 2009); and
- Analysis of the relationships between the adoption of CRPs and other factors including the development of Bayesian Belief Networks (Emtage *et al.* 2009).

A market structure analysis was utilised to investigate the 'market' for NRM programs and communication (Emtage, 2009). These analyses identified five groups of landholders with varied interest in NRM issues and engagement in CRPs. Tests were undertaken to assess the characteristics and differences between the landholder groups which revealed a pattern of differences in the values and demographic and socio-economic characteristics of the groups. The analyses helped to build profiles of the target audience(s) for NRM programs. The profiles indicated that they have varied levels of concern about NRM issues, different levels of trust in agencies, varied communication behaviour, reliance on the property for income, varied land use types and other differences. The results of the analyses of the questionnaire responses support the proposition that landholders are likely to react in varied ways to the introduction of a new NRM program like the RRP and that detailed understanding of their perception of the program will help to ensure the success of the program over the long term. An overview of the characteristics of each of these groups is presented in Appendix A. The understanding generated by these analyses can be used to identify which types of programs will be of interest to the different groups in a general sense, but the data collected did not examine landholders' perceptions of specific programs.

Study objectives and questions

The overarching objective for the research was to investigate attitudes towards and expected forms and rates of participation in the RRP.

Research questions:

- Do landholders perceive there is a need for the Reef Rescue Program, classifications of practices and codes of practice for various rural industries?
- What factors are going to motivate landholders to participate in the Reef Rescue Program? What are they seeking to achieve?
 - In which elements of the program are they interested (i.e. enterprise practice change, biodiversity conservation, riparian management)?
- When landholders have previously participated or contemplated participating in an NRM program(s), what has been their motivation to do so, and what barriers have they encountered?
- How do the above factors vary across the rural community?
 - Are the predicted positions of landholders consistent with the hypothesised positions based on analysis of the responses to the mail based survey? (i.e. compared to the five market structure groups).

Development of agricultural practice classifications and the Reef Rescue Program

The primary objective for the RRP is to improve the quality of water entering the lagoon of the Great Barrier Reef through targeting non-point sources of pollutants. An 'ABCD framework' for agricultural practices in the Wet Tropics was to provide a clear indication to landholders about which activities would and would not be funded under the RRP. The broad objectives set for the RRP are largely identical to those defined for the Reef Plan (The State of Queensland and Commonwealth of Australia, 2003), i.e. to reduce the load of pollutants from diffuse sources in the water entering the Great Barrier Reef; and rehabilitate and conserve areas of the Great Barrier Reef catchments that have a role in removing water borne pollutants.

The 'ABCD framework' of practices for the RRP in the Wet Tropics uses the following definitions of practices:

- A-level practices are 'cutting-edge', i.e. those practices which research and or limited trial work have revealed to be promising in terms of improving NRM;
- B-level practices are those that the industry classify as 'best practice' (or alternatively currently recommended practice CRP);
- C-level practices are those classed as meeting minimum or duty of care standards which are common in the industry;
- D-level practices are those that were classed as unacceptable.

The development of classification schemes of agricultural practices by the Wet Tropics regional NRM board began with the development of Water Quality Improvement Plans for rivers in the Douglas Shire and Tully Murray river systems (Kroon 2008) and the region's 2004-2008 NRM plan (FNQ NRM Ltd and Rainforest CRC, 2004). Since that time further consolidation and refinement of the classification schemes has been ongoing, largely driven by the Reef Plan and Reef Rescue program (Table 1).

Table 1: Overview of the timeline for development of agricultural practice classifications in the Wet Tropics region.

Classification scheme	Period
Development of 'ABCD' classification scheme for pasture condition by the QDPI&F	1999 – present
Development of Codes of Practice for Agricultural industries	1994 – present
Development of the four-stage COMPASS program by the sugar industry	1999 – present
Development of Reef Water Quality Protection Plan (Reef Plan)	2002 – present
Development of four-stage classification of practices for the Douglas Shire Water Quality Improvement Plan	2001-2006
Development of an 'ABCD' classification of practices for the Mackay Whitsunday Water Quality Improvement Plan	2006-2008
Development of an 'ABCD' classification of practices for the Wet Tropics Reef Rescue Plan	2008 and ongoing

According to Drewry *et al.* (2008) the first application of an 'ABCD' classification scheme for NRM in Queensland was for the purpose of classifying the 'land condition' of grazing land. The classification scheme rated pasture on a four-point scale, ranging from 'A' for lands in good condition, to 'D' for lands that are in very poor condition. The classification scheme was developed to provide a means to rapidly appraise land condition as part of Grazing Land Management (GLM) education programs developed by the Queensland Department of Primary Industries & Fisheries (Chilcott *et al.* 2003).

The development of Water Quality Improvement Plans for the Daintree and Mowbray Rivers (now Douglas Water Quality Improvement Plan, Davis 2006) and the Tully-Murray Water Quality Improvement Plan stimulated research of practice appraisals and classification in the Wet Tropics region. For example, the development of classifications of practices for the Douglas Water Quality Improvement Plan was described by Kroon *et al.* (2006: 7-8): 'Agricultural BMPs for sediment and nutrient reduction for each major land use were sourced from existing Code of Practices for sugarcane (Canegrowers 1998) and horticulture (Queensland Fruit and Vegetable Growers 1998), as well as identified with the help of Mossman Agricultural Services (MAS), Daintree AgForce, BSES, CSIRO, QEPA, [Q]DPI&F, and DSC (Rudd and Bradley, 2005; Smith *et al.* 2006).' The existing COMPASS program of the sugar industry provided a framework for the development of practice classifications for other rural industries in the region.

The sugar industry began developing the COMPASS program in 1999 through a partnership with the Sugar Research and Development Corporation, led by the Bureau of Sugar Experimental Stations (BSES). The COMPASS program was seen as '... a tool to help farmers assess their on-farm performance against the Code recommendations and to focus extension efforts not only on environmental issues, but also on farm safety issues' (Hildebrand 2002: 32). The COMPASS program was launched in 2001 and the use of the framework, including a 'four-stage' classification of practices, was recommended for adoption in the Douglas Shire Water Quality Improvement Program (Sing 2003). As noted by Kroon *et al.* (2006) in their review of the development of the Douglas Shire Water Quality Improvement Plan, the decision to adapt existing programs of practice classification rather than develop comprehensive environmental management or farm management systems was partly because landholders in the Douglas Shire understood that the COMPASS system had the support of the sugar industry. This team also noted that most environmental management and farm management systems (EMS and FMS respectively) like the ISO 14001 program have onerous record keeping requirements that are unlikely to appeal to many landholders. Some authors (Sing, 2003) have noted the similarities of the COMPASS and Cotton Industry BMP programs and it is likely that the development of each was informed by the other.

Classification of agricultural practices under the Wet Tropics Regional NRM Plan 2004-2008

During the period leading up to the release of the Wet Tropics Regional NRM Plan 2004-2008 (FNQ NRM Ltd and Rainforest CRC, 2004), teams of researchers from FNQ NRM Ltd, the CSIRO, QDPI&F and Mossman Agricultural Services held a series of meetings with landholders with specific land use types across the whole Wet Tropics (i.e. separate series of meetings with cane growers, horticulturalists, banana and pawpaw growers, graziers and dairy farmers). This process coincided with the development of the pilot water quality improvement plans in the Douglas Shire and for the Tully-Murray river system.

A four-stage classification scheme was developed for each industry in partnership with relevant industry advisors. Neil Sing collated the outcomes of the consultative process used to develop the practice classifications (Sing, 2004). The purpose of the classification scheme was to assist discussions with industry representatives, including landholders and others, about the levels of environmental impact of various practices. The involvement of rural industries in the development of descriptions of BMPs for the NRM Plan was described in the document. The authors of the NRM Plan note that industry groups were wary of involvement in the process due to their previous experiences with regional vegetation management plans and the Reef Plan (FNQ NRM Ltd and Rainforest CRC, 2004: 144):

'Rural industries in the Wet Tropics region have become more directly involved in NRM planning through this Regional NRM Plan (although their experience with the regional vegetation management and Reef Plan has made them wary). They have actively assisted this Plan through the process of defining the suite of BMPs and management actions that underpin its anticipated improvements to sustainable natural resource use and environmental outcomes (including the region's commitment to the RWQPP). Industry groups have a significant role in implementing essential programs, especially the increased adoption of BMPs. There will also be a need to revise those BMPs produced by/for the aquaculture, dairying, forestry, dryland grazing, horticulture and sugar industries.'

The NRM Plan described a series of management action targets (MATs) in relation to the practice classifications (referred to subsequently as the NRM Plan). Where possible the NRM Plan noted the level of adoption of each practice in 2004. The MATs were expressed in terms of the proportion of landholders in each industry that would use the 'best' practices by the end of the planning period. While a four-stage classification of practices was used to gather and assess information about the current use of practices and 'rank' the alternative practices that could be used to undertake an activity, only one level of practices (i.e. 'best practices') were listed as MATs in the regional plan document.

Mackay Whitsunday Water Quality Improvement Plan

The first explicit use of an ABCD practice classification framework in an NRM planning document was recently published by the Mackay Whitsunday Natural Resource Management Group, which applied a framework to list practices for sugar, beef and horticulture in their Water Quality Improvement Plan (Drewry *et al.* 2008). Drewry and others (2008: 45) note that the development of the ABCD framework was 'pivotal' in the development of their plan, and further state that the ABCD framework '... was designed to facilitate communication about the different levels or standards of management practice (as opposed to resource condition) within an industry for different water quality parameters (i.e. soil management, nutrient management and pesticide management). The ABCD framework provides a standard definition and a scale of improvement from 'old' to 'cutting edge' practices. The framework is a planning tool, not an extension tool... The ABCD framework was used to communicate different levels of management practice to water quality researchers, social scientists, economists, industry research and extension organisations, and land managers. The framework provides the common reference point and requires many different people to work together to identify the most cost effective public and private investments in sustainable land management.'

Wet Tropics Reef Rescue Program

Terrain NRM Ltd began preparations for the RRP early in 2008 and finalised their contract to administer the program with the DEWHA in late October. The organisation used participatory methods to develop the conditions under which the program would operate.

The classifications of agricultural practices developed for the Wet Tropics Regional NRM Plan 2004-2008, the COMPASS program, industry codes of practice and Water Quality Improvement Plans provided the starting point for negotiations relating to the classification scheme for practices to support the implementation of the RRP. Preparation of the classification schemes involved series of consultations between staff of Terrain NRM, staff from State Government agencies, extension and research providers (including the CSIRO, several Universities and Mossman Agricultural Services) and industry groups (Table 2).

Given the history of development of practice classifications and the focus of Terrain NRM on participatory management approaches to NRM, the organisation adopted the strategy of consolidating and building on the earlier work defining agricultural practices. In doing so the personnel from the regions' NRM board sought to build on the relationships and trust that had developed between the many personnel that have been involved in NRM program delivery in the region. This includes people from a diverse range of cultural backgrounds representing a broad range of stakeholders in the rural landscape as alluded to in the above quote from Drewry *et al.* (2008). The involvement of the industry representatives and landholders from various rural industries has been central to the strategies used to implement land management and water quality improvement programs.

The emphasis throughout the development of the practice classifications has been, similar to the specification of EMS like the ISO 14001 system, to focus on the process of planning and management and less on specific management practices. In some cases specific practices are listed, such as avoiding fertiliser spreading in heavy rain. In many other cases, the processes that can be followed are classified e.g. the number and location of soil tests to determine fertiliser requirements, or the frequency of calibration of equipment used to administer pesticides.

Table 2: Groups involved in negotiations of practice classifications for various rural industries in the Wet Tropics.

Industry	Representative body(s)
Sugarcane growing	Canegrowers
Beef production	AgForce
Dairying	Queensland Dairy Organisation, plus Kristjan Sorensen (Terrain)
Banana growing	Australian Banana growers association, Innisfail Banana Growers Association, GrowCom
Pawpaw growing	Innisfail Pawpaw Growers association, GrowCom
Potatoes, peanuts and maize	GrowCom, Barron River Integrated Catchment Management Authority (BRICMA)
Pasture production	GrowCom

The refinement of the classification scheme of agricultural practices developed by Terrain NRM for the implementation of the RRP began with the establishment of technical advisory groups. In the case of the sugar industry the advisory group included representatives from the BSES, productivity board and other group members. Individual people were assigned by Terrain NRM to undertake consultations in each sub-region of the Wet Tropics (i.e. the various mill areas including the Mossman, Babinda/Mulgrave, Johnstone, Tully/Murray and Victoria/Macknade mill supply areas) with Neil Sing overseeing the process. The adaptation of the ABCD framework from the Grazing Land Management scheme has led to some confusion as they use the terms in a different sense.

The beef technical advisory group was organised by Ian Little from Terrain NRM. Negotiations started with the practice classifications by the Mackay Whitsunday NRM Group. Terrain NRM personnel then worked with QDPI&F personnel to update the practice classifications based on the Grazing Land Management (GLM) program. The drafting of the practice classifications also included ideas from producers on an informal basis as there are no formal bodies to represent landholders in this sector. Ian Little observed that the best practices within the beef industry have been developed by individuals and it takes a long time for these to be recognised by other agencies. Ian has sought out people he has identified as leading producers in the region. AgForce has also looked at the proposal and is now involved in negotiations.

The technical advisory group formed to negotiate classification of practices for banana growers included members of the Innisfail Banana Growers Association, who nominated up to five people to review the classifications. Personnel from GrowCom also discussed the proposed practice classifications.

The technical advisory group formed to negotiate classification of practices for pawpaw growers included members of the Innisfail Pawpaw Growers Association as well as GrowCom.

Adoption of practice classifications under the Reef Rescue Program

Terrain NRM has been allocated approximately \$6.8 million in funds for the first year (2008/2009) of the Reef Rescue program, to be split across three separate sub-programs:

- Water Quality Incentive Grants Program (\$3.5 million);
- Rehabilitation of regional system (\$1.5 million); and
- Partnership development (\$1.5 million).

Under the program for the Wet Tropics region the majority of funds will be allocated via a tendering process whereby proponents complete an application form to describe their present practices, what practices and activities they propose to undertake using funds from the program, a project budget and an action plan for their project (applications are described in further detail below). The Water Quality Incentives Grant program has the largest funding allocation, reflecting the priorities established for the project by the Australian Government whereby three quarters of the funds are targeted towards the support of on-ground practice change. The incentives program is further broken down into three sections. The first is for payments to individual landholders to support changes from 'D' or 'C' level practices to 'A' or 'B' level practices. The second part of the program is to support the adoption of 'cutting edge' practices only ('A' level). The third part of the program is to support practice changes that affect more than one landholding, for example funding to support equipment upgrades by harvest contractors who work on a number of landholdings.

Funding under the 'rehabilitation of regional systems' sub-program will be allocated to the rehabilitation and protection of riparian vegetation and wetlands that function to filter sediments, nutrients and other 'pollutants' before they reach the Great Barrier Reef lagoon. Funding for these projects will be provided to community groups within the region with a proven record in managing environmental restoration and rehabilitation projects. Funding under the third sub-project, 'partnership development', will be used to support the functioning of groups designed to facilitate communication between Terrain NRM, other agencies interested in NRM in the region, industry groups and interested landholders.

Terrain NRM has identified the breakdown of investment that will be allocated to each industry on the basis of a broad risk analysis that examined the area of land used for the industry, the relative level of fertiliser and pesticide use by industry participants, and the location of the industry in the landscape. Under this scheme the funds will be allocated to participants from various industries over the first transitional year of operations in the following proportions:

- Sugar (62%)
- Horticulture (20%)
- Dairy (10%)
- Grazing (8%)

Specific outcomes or targets have been developed in the Terrain NRM Reef Rescue plan for each industry in the Wet Tropics region over the first year and over the five years of the program. The one-year targets specify the number of landholders that will participate in the program and some specific practices that will be adopted. The five-year targets specify the proportion of landholders within an industry that will have adopted 'A' and 'B' level practices. The arrangements in place for the 2008/2009 financial year are viewed by Terrain NRM as interim arrangements. The timetable to design and implement the project has been very tight. Funding for the program was only finalised (i.e. contracts signed between the NRM boards

and the DEWHA) in November 2008. This will leave the organisation little time to call for and assess applications and little time for the projects to be implemented and then assessed prior to the end of the 2008/2009 financial year.

Terrain NRM has developed an application process and timetable for landholders to apply for Reef Rescue funds in order to change practices. The application form is designed to allow Terrain NRM to assess tenders for funding and provide information required to monitor and report on the outcomes of funded activities. Terrain NRM has developed data management policies to ensure that the information collected will not be provided to any other parties and that any reporting of the data will be undertaken in a manner which ensures that no individuals can be identified. Applicants were given until the middle of February 2009 to submit applications for funding under the first year of the program. Basic information concerning the current practices used and the specific changes in practice that are being funded are required for monitoring, reviewing and reporting against the objectives for the RRP. Applicants will be required to fill in a questionnaire about their current practices and indicate which practices they plan to adopt using the funds from the program. The questionnaire lists the 'C', 'B' and 'A' level practices. Other data that is being collected through the application process include:

- A section for mapping the condition and issues on the property as well as the location of the proposed project;
- A series of questions about the project scale and objectives, the soil type affected, the amount of reduction in the use of fertiliser/herbicide or insecticide expected, details regarding the sources of advice used to identify the action priorities;
- An action plan, including the type and proposed timing of activities and potential follow-up activities; and
- A table for the budget of the proposal.

The application forms also contain the following information:

- Background information about the scale and scope of the program;
- Details of the selection criteria to be applied;
- A list of obligations of landholders if they participate in the scheme;
- A list of people to contact for assistance in developing the application; and
- Notes to assist applicants.

Applicants can apply for between \$2,000 and \$40,000 under the Water Quality Incentive Grants Program. Applicants are expected to detail the anticipated costs of the proposed activity and to provide at least fifty percent of the total required funds either using cash or in-kind contributions. The applications will be appraised by industry-based advisory groups that will include members of Terrain NRM, the industry representative bodies and some individual landholders. If the project is deemed to be suitable for funding under the program, contracts will be signed by both parties and 75-80% of funds will be provided to the proponent to commence work. The balance of funds will be given to the proponent before the end of the financial year where satisfactory progress or completion of the project has been verified.

Project audits to be carried out by local area groups or by industry association representatives in conjunction with Terrain NRM personnel. Local area groups are expected to become increasingly prominent in the roles of project selection, auditing, the ongoing revision of practice classifications (e.g. the possibility of some 'A' practices becoming 'B' practices) in the implementation of the program in future years. Where possible it is planned to form local area groups for specific industries such as sugar cane grower area groups for

Mossman, Babinda/Mulgrave, Johnstone, and Tully/Murray and Victoria/Macknade areas. Other industries that are widely dispersed such as grazing enterprises will have different representation under the local area groups plan. It is anticipated that those industries that are primarily located in one or two sub-catchments like banana and pawpaw growing will be represented on groups in those catchments only.

Classification of agricultural practices for administering the Reef Rescue Program

Terrain NRM has been successful in negotiating classifications of practices to support the implementation of the RRP by building on their relationships with industry representatives and individual landholders that have been established through the work undertaken for the development of the Wet Tropics Regional NRM Plan and Water Quality Improvement Plans. The types and numbers of representatives and the level of participation between Terrain NRM personnel, industry representatives, government agencies and individual landholders varied between industries. The large scale of the industry, location of cane growers throughout the region, as well as their organisation into differing mill supply zones and history of coordinated activities, made it possible to conduct widespread consultations with members of this industry. On the other hand the lack of industry body representation for beef producers and their lack of industry coordination historically (i.e. lack of cooperative arrangements between growers similar to the cane and dairy industries) has meant that most of the negotiations with this industry have been with key landholders and government agencies, primarily the QDPI&F, who have been working to improve grazing land management.

There are differences in the development of codes of practice for the purpose of meeting the requirements of the Queensland Environmental Protection Act (1994) (EPA 2001) and for the purpose of implementing natural resource management programs like the Reef Water Quality Protection Plan, the National Heritage Trust and the Reef Rescue program. The Australian and Queensland Governments have primarily used a strategy of encouraging voluntary adoption of better agricultural practices to improve NRM outcomes through support for industry led programs defining best practices and adoption of these practices by landholders. In a media statement relating to the RRP the Minister for Agriculture, The Hon. Tony Burke MP, tried to give some acknowledgement to landholders for the improvements to practices they had already initiated, stating: 'Farmers are already leading the way in sustainable land management across Australia and this funding will help to continue that good work.'²

The Queensland Government announced that regulation of agricultural practices was to be introduced for the catchments draining into the lagoon of the Great Barrier Reef some time in 2009 (24 October 2008; Queensland Government 2008). This prompted considerable disquiet among those involved in the agriculture sector in the Wet Tropics region. The details about the way practices will be classified, how regulations will be administered and when they may come into force were not specified by the time of undertaking the landholder interviews or preparing this report.

The State Government announcement to introduce regulation of farming practices resulted in considerable disruption to preparations for the Reef Rescue program. Terrain NRM personnel report that a number of individuals and groups that have been involved in negotiating practice classifications feel they have been misled because they were told the reason for developing the classifications was to help implement the Reef Rescue program, not develop new regulations to apply to land management activities. It should be noted that

² ['Farmers, regional communities and agricultural industry to the \(reef\) rescue'](#), media statement by Ministers Tolny Burke and Peter Garrett, Australian Government, 7 August 2008.

the Terrain NRM personnel had no idea that the State Government was planning to use practice classifications to develop regulations when they started to develop their system of classifications for the RRP.

The prospect of the classifications being used for the purpose of prescribing regulations has upset some people involved in the discussions and has seriously affected the relationships of trust and good faith that has been developed between the people in Terrain NRM, those in State Government agencies, industry representatives and individual landholders. There were some reports that people that have been involved in negotiations have now withdrawn their support and have refused to participate further in the Reef Rescue program.

According to Terrain NRM personnel the planned regulation of practices did make some landholders to specify their current practices as part of applying for the program. This information is vital for Terrain NRM to be able to assess and monitor the projects funded under the program. Terrain NRM has to be able to prove they have applied the program efficiently and honestly so they can secure ongoing support for it.

It is evident that practice classification schemes have evolved over time and will continue to evolve in response to changes in the:

- Understanding of the impacts of various practices;
- Technology used in agricultural industries;
- Expectations of the broader community about the acceptable level of impacts;
- Regulatory framework governing agriculture; and
- Policies and programs that have been used to fund research and development of the practice classifications.

The expansion of conservation management programs and the enactment of the *Environmental Protection Act* (1994) stimulated the initial development of classification schemes. These schemes have become increasingly sophisticated with the passage of time as attempts have been made to make the classifications orientated towards clear processes and outcomes rather than specify particular practices, recognition of the highly varied biophysical and socioeconomic circumstances in which landholders operate their farm enterprises.

Terrain NRM personnel have anticipated that there will be a need for ongoing discussion about the classification of practices. This is catered for using the concept of Local Area Groups. Allan Dale, CEO of Terrain NRM, has stated that the development of Local Area Groups is viewed by the organisation as a vital mechanism to ensure local ownership and participation in the RRP as well as provide peer review of project activities, and local expert assessment of critical issues and practice classifications in the future.

Outcomes of the Reef Rescue Program in the Wet Tropics NRM Region to date

Terrain NRM began training of their personnel associated with the RRP in November 2008 following the settlement of contracts with the Australian Government. Approximately three hundred applications were prepared and assessed by assessment teams involving Terrain NRM personnel, industry representatives and individual landholders. Overall, Terrain NRM (2009) considered the results were very positive, commenting that, 'The numbers of applications for water quality improvement incentive grants across most of the industry sectors has been outstanding with all grants categories being oversubscribed. The level of interest from land managers in participating in the program has been greater than expected.'

This outcome was welcomed by Terrain NRM personnel, although apparently the large number of applications and the short time available for assessment placed strain on the assessment teams. The assessment teams did not know the name or location of the applicants at the time of assessment. Funds were allocated to individual landholders across a number of industry types, to industry groups for training courses and to Landcare and catchment groups for wetland and waterway rehabilitation activities (Table 3).

Table 3: Expected outcomes of the 2008/2009 Reef Rescue Program in the Wet Tropics region.

Industry	No. of contracts expected	Total funds (approx. AU\$)	Training activities
Sugar	75	1,600,000	Six training programs and eight workshops
Grazing	15	170,000	Property planning work with 30 landholders
Horticulture	23	650,000	Development of nutrient management workshops. 73 FMS developed
Dairy	10	100,000	Eleven landholders engaged in farm management training
Wetlands and other	9	1,000,000	Partnerships developed with four regional councils and five catchment management boards or Landcare groups

Terrain NRM reported that they needed to work hard to allay landholders' fears and promise to maintain confidentiality in order to secure applications in response to the State Government's proposed regulation of management practices. Terrain NRM (2009) reported that:

'The State Government's proposed reef regulation spread fear amongst much of the Wet Tropics farming community causing a reluctance to divulge information about current farming practices without an absolute guarantee of confidentiality of information supplied by individual land managers as apart of the water quality incentives grants application process. In response Terrain [NRM] guaranteed to supply catchment scale information only to third parties about farm management practices.'

Methods used to assess landholders' perceptions of the Reef Rescue Program

Personal interviews were used to assess landholders' perceptions of the RRP. In an attempt to better understand the diversity of perceptions of the community and the utility of the groups identified using the market structure analysis, the people approached for participation in the interviews were selected on the basis of their membership of the groups identified in the 'market structure' analyses. A sample of eight to ten members of each of the groups were selected at random together with five people that had been selected for inclusion in the mail survey who did not complete the survey. Interviews were undertaken with one to three members of each of the five groups and with three landholders that had been included in the original sample for the mail surveys but had not completed that survey. The research objectives and questions addressed by the interviews are described in the following section.

Interviews were commenced in mid-September 2008 once Terrain NRM personnel were able to complete their first round of negotiations regarding practice classifications with industry representatives and State Government agencies and lists of practice classifications were available to present to individual landholders. Final interviews were completed in early March 2009. A semi-structured interview format was used to gather information with interviews undertaken at landholders' residences. The topics of discussion addressed the research questions outlined above and are listed in Appendix B of this report. The sampling frame chosen for the research was based on results of analysis of questionnaire. As reported in Emtage (2009), responses to the survey were used to define and describe a series of groups of rural landholders with similar levels of 'interest' in NRM issues and similar levels of 'engagement' in their adoption of currently recommended practices.

Landholders' perceptions of the Reef Rescue Program

Interviewees involved in the research project were located in all parts of the Wet Tropics NRM region apart from the former Douglas Shire area. As expected it was more difficult to convince members of some landholder types identified by Emtage (2009) to undertake interviews than other groups members (Table 4). While it proved relatively easy to secure the participation of the 'production orientated farmers' and 'model landholders', members of the 'poor prospects' group were mostly unwilling to participate. The most common reason for refusing to participate in the interviews was that 'there is no future in farming'.

Table 4: Landholder 'types' by number of completed interviews and number of refusals.

Group	No. of interviews completed	No. of refusals
Did not respond to questionnaire	3	5
Prime prospects	3	2
Good prospects	1	4
Production orientated farmers	3	2
Poor prospects	1	7
Model landholders	3	1

The following section of the report presents the findings from the interviews. The section is split into two main parts. The first examines landholders' perceived barriers to participation in NRM programs. The second section examines landholders' motivations for participating, the benefits they expect to obtain and communication channels they prefer.

Through the interviews with landholders a range of barriers to participating in NRM programs were identified. These include lack of awareness about programs, dislike of the bureaucratic requirements of participation, dislike of the agencies involved in the administration of programs, resentment of the portrayal of landholders as causing the degradation of the reef, previous negative experience(s) with government programs and lack of funds available to undertake management changes or investment.

Awareness about programs

Interviews commenced in September 2008 and continued until February 2009. Some landholders had heard of the RRP, mainly through industry newsletters in the case of the sugar and dairy industries. Other landholders interviewed in early 2009 claimed there had not been sufficient publicity about the program.

'Non-respondent' 1: 'Firstly they need ... public awareness programs and that hasn't occurred. There has to be a process of informing people how the programs work, what's available ... those types of things.'

Other landholders, particularly those who had smaller sized properties and earned the majority of their income off-property outside the cane growing and dairy industry, did not hear of programs and had never been involved in them. Some of these people who have grown up on rural properties and worked in agriculture are confident they are able to effectively manage their enterprises and are not necessarily looking for assistance.

'Prime prospect' 3: '... maybe I don't know who's out there to provide stuff, provide information, because like I said we used to contract muster. We worked for a whole heap of different people and saw a whole heap of different management practices, so some of the stuff we picked up from them, what worked and what definitely didn't work ... so I suppose I probably haven't been looking for too much help.'

Application, monitoring and reporting requirements

Some landholders are uncomfortable or dismissive of the bureaucracy surrounding programs, e.g. length of application processes, lack of flexibility of program objectives and the potential for programs to provide money to 'mates'. Others feel that the time needed to attend many meetings of industry and catchment groups to hear about and follow up applications is too great.

'Production orientated farmer' 1: 'We've always done them [NRM activities] ourselves, we've never got any money from the government. You have to go through bullshit...like the 2010 Sustainable Regions Program. If you were good mates with this one you got a grant and a set up...'

'Non respondent' 2 (discussing meetings of conservation groups): 'Lot[s] of talking, not a lot of action, a lot of waste...'

'Model landholder' 3: 'I found it easy [to apply for programs], I know some growers didn't. A lot of farmers aren't even aware of opportunities for funding... Some (training programs) are straight out rip-offs. Most of the training and any accreditation you have to pay for. There (are) subsidies there. A few years ago we got it through 'farm biz', etc. The government changes the criteria for that and you have to have big groups ... to be eligible for funding. It's just too hard now I think.'

Experience with previous programs

If landholders or their friends and families have had previous negative experiences with programs it can make them unwilling to participate in these programs in the future. One highly relevant example that was provided was the lack of feedback from earlier water quality monitoring programs. Landholders were asked to gather regular samples of water to provide to the QDNRW, which a number did in the Tablelands region, yet they didn't hear back from the Department about the outcomes of the project. Another landholder involved in the grazing industry had a very poor experience with a government department when seeking assistance with problems experienced with young cattle. This, together with the perceived inflexibility and cost of the Meat and Livestock Identification Scheme meant that they were not inclined to trust government departments to undertake programs.

Program administrators

While some landholders reported negative experiences in their previous contacts with government departments, which has made them wary of any future involvement, this is not to say that all landholders did not want government departments to assist agricultural enterprises, particularly for older landholders who fondly remember interpersonal

government extension services. Several expressed disappointment over the downsizing of government research and extension services, including:

- QDPI&F withdrawal of support for on-farm trials;
- Tree planting schemes (like the Community Rainforest Reafforestation Program CRRP); and
- Cessation of the former soil conservation schemes.

'Model landholder' 1: 'There was a bloke who used to do silt runoff trials. He went around. Did a field day on different sites there with his sprinklers. Showing how certain soil covered with vegetation will bear it. That was his job. He ran that for years and now they got rid of him. Now they are worried about silt. He was the bloke. He was there 'til he retired – or they retired him early... They [claim now]... that you have to pay your way, but how do you pay your way with that? So they come in and say we need you to stop silting the place up, then they cut anyone who tries to do any of that work.'

Industry groups have mixed support, particularly the Canegrowers organisation in the region south of Cairns.

'Model landholder' 3 (in relation to the RRP): 'I am a little concerned it's going to be hi-jacked by organisations like Canegrowers. They are going to put their hand out to a lot of the funding and they are going to want to distribute it their way. I'm not sure that's a good thing sometimes. They are a bit out of touch with their ideas sometimes ... More grass-roots based would be better.'

'Non respondent' 1: 'As an organisation [Canegrowers]... they have some significant challenges ahead of them. They are not sure what their identity is at the moment, who to target. There are also a lot of disgruntled members in their organisation... Programs are some of the things they've been able to negotiate in the past. Basically Canegrowers is a union and unionism in Australia is on the decline. The other thing is that growers, especially younger growers are more educated, they can make more of their own decisions.'

The same landholder described a number of projects in which Canegrowers had or was presently helping to negotiate for funding to undertake nutrient recycling projects that could have beneficial outcomes for farm profitability and also reduce environmental impacts. Others had little positive comments about the organisation and thought they should not be involved, at least exclusively, as the agency handling applications for the RRP by cane farmers:

'Prime prospect' 2: 'I think what needs to be said too is that Canegrowers is a very political organisation. They don't give any information to anyone unless they are paying them a levy. So they are absolutely useless as a go-between between government and farmers to make sure that information trail is getting out there. Stop talking with organisations like that and talk with organisations that have respect for farmers like [the] BSES.'

Time scale of programs and industry viability

Some concerns were expressed about the 'sustainability' of financial aid programs following the experience of the dairy and sugar industry restructuring packages. A number of interviewees stated that they felt the money from these programs had been poorly applied, either used to build infrastructure that did nothing to change the viability of the enterprise, or

used for personal expenses. The underlying message stressed by many landholders was that some agricultural industries are not viable; the returns to landholders have been too low and input costs too high for profitable enterprises in recent time in some prominent industries in the Wet Tropics region, particularly cane growing and dairying. As a consequence landholders argue that fewer funds are available for investments in practice change and the establishment of infrastructure needed for lasting improvements to farm operations.

'Production orientated farmer' 1: 'They should be looking at a minimum of five or ten years to get it. Same with us, if you are going to do something, then make sure it is done to a standard that can be sustained and it works. But we also need the back up. But then on the other side we also need the back up to protect what we've got also with regards to weeds and dams.'

'Model landholder' 1: 'No big deal about planting a tree, it's the maintenance that is [important]. Because if you plant a tree and just leave it for a month ... you come back and you can't even see where the tree was...'

'Production orientated farmer' 2 (male): 'What we are trying to do is keep this industry alive, but we cannot go on without financial assistance. We don't want any more government loans, because government loans are used wrongly by people who buy a boat, who go for a world trip, who don't use the money for what its given, for the needs of cane growing. Now people are funny. They say means test... No that's wrong, we don't want government decisions, and we want to stand on our own two feet as an industry. But we've got to get the right amount of money to be able to survive and grow.'

'Non-respondent' 1: 'At the moment the industry is not financially viable. The industry is marking time. There is very little money to replace capital in the industry That's been identified in numerous reports. No capital replacement to buy new equipment, new machinery, etc. We're mining what our forefathers produced – financially – we've been doing that for ten years, and that's not long-term. I've done some figures with agro-economists, we'll need around \$35 a ton in this district to make us a viable resource. As an ecological investment. At the moment, \$27-28. Big gap.'

'Model landholder' 3 (on what the barriers are to participating in programs): 'Lack of money if finances got a bit tight. One reason I can participate is because the banana industry allows me to. Otherwise if I had sole sugar cane I'd be like a lot of the other farmers, resistant to any change at all.'

The high cost of fertilisers is affecting landholders in all industries. Together with the high cost of fertilisers and low prices for milk, the lack of meat processing facilities north of Townsville is a major concern for those in the dairy and beef industry, as described by the following landholder:

'Good prospect' 1: 'Sent a lot of cattle to the meat works August last year. Had to go to Townsville because there is no meatworks out here. I might as well have shot them and let them rot for the price I got for them.'

Perceptions of the impacts of rural land management practices

Many landholders, even those who have already adopted most or all of the 'best practices' for their industry challenge the validity of the RRP for a number of reasons. A fundamental objection is their perception of a lack of evidence that rural enterprises are causing

environmental damage to reef systems and claims that the majority of problems are caused by urbanisation. Several repeatedly asked 'Where's the proof?', citing the lack of monitoring and reporting of freshwater quality.

'Prime prospect' 2: 'How can you cut emission[s] if you don't know where they are coming from? The most important thing is that the science [is] clearly established. To do that... you need monitoring equipment that is giving permanent read outs: all day, everyday.'

'Non-respondent' 2: 'There's still sediment going out there ... They know why the sediment is going out there. There must be a whole lot of people employed to ... monitor these things.'

'Model landholder' 2: 'I am still waiting to be convinced that our activities impact on the reef. I want some evidence. There's a lot of conflicting advice. I spoke to a marine biologist discussing this very thing. We were actually discussing nutrients coming out of waterways. He told me that in twenty years of monitoring the only place they had seen [an] increase in nutrients and sediment levels were where cities had expanded. Not where agricultural hadn't changed in over twenty years. And whether that still holds true today I don't know. You hear that the reef is being destroyed. I used to fish the reef quite a lot once. It still looks good to me.'

'Model landholder' 1: 'Sick of sticking it to the farmers ... huge population areas that never get a mention, but farmers, cane growers, etc. ... some times I think it's a little lopsided. People are the same ... but they're bagging one lot. I'm very happy to help fix up the reef, but I hate being blamed for everything when it's not all my fault.'

'Production orientated farmer' 2 (male): 'This gentleman was saying things. He was a professor. I'm a devil for it, I would not cop any nonsense so I stopped being nice. I said, 'Where is your proof, where is your evidence?' 'I've got none', he said. I said, 'how dare you come here in all sincerity and stand in front this group and tell us what you are telling us with no evidence, no proof whatsoever?' It's just not on.'

'Production orientated farmer' 2 (female): 'It is very hard to infiltrate the mind of the common farmer. He is set in his ways and doesn't want to change. He's going broke. You've got to turn to cause-identification to infiltrate the mind of these people.'

Several interviewees made observations as to why landholders' activities are not impacting the reef. For example:

'Prime prospect' 2: 'People say the fertiliser is [running] off your farm, but if I leave one row out it's not fertilised. The fertiliser from the other row doesn't travel. Come harvest time you can see it's yellow. It's travelling all the way through the soil, [but] why hasn't it travelled over to that other [row] and made it nice like the [first] one? ... If I stop before I get to the end, why doesn't it get to the end? This is an uneducated person's perception of what is going on. And you the scientist has to [say] 'It mightn't do that but it's floating away'.'

'Production orientated farmer' 2 (male): 'At the moment they say our fertiliser affects the reef. But that won't reach the reef ... No way. We are not killing the reef. We are taking every precaution there is to protect a natural beautiful thing.'

Another perception of some landholders was that the impacts of agriculture are negligible relative to the impacts of urban areas and geological changes of landscapes over time.

'Poor prospect' 1: 'Thing is pollution in the reef – I heard 8-10 years ago they did a study about where the pollution come from. The majority of the pollution comes off the roads and [from] the towns, but you never heard any more about that. They are blaming the farmers ... What happened in the Barron Valley, Barron Gorge and the Herbert Gorge when they were forming? There was a hell of a lot of erosion there ...'

Generational issues were mentioned by some landholders; the fact that past practices had left a legacy of degraded landscapes that could not be fixed immediately.

'Non-respondent' 2: 'We can't fix everything we'd like to fix overnight. But we are working towards it, and a lot of farmers are working towards it.'

'Prime prospect' 3: 'It was just really flogged out from cattle. Yeah ... really bad actually. So it took us two years to get any grass back on the place at all really''

Feelings of persecution, resentment of accusations of damage caused

Two interviewees discussed reports of children's television shows that portrayed farmers as 'destroyers of the environment', fictional and non-fictional. Another stated that one reason he reduced efforts to tackle environmental issues is the resentment of the accusations and regulations directed at farmers

'Model landholder' 1: 'With the green revolution came 'hate the farmer'. Green's good and farmer bad. Saw it on a kids program... Irrigation and radiation was linked up in a word [to name] the dust. Real propaganda. It was going to smother Melbourne. Last minute it blew away. This is Sunday morning programs at seven o'clock, all the little kids are watching. Propaganda against farmers.'

'Model landholder' 3 (on what the barriers are to participating in programs): 'Heavy handedness from outside government bodies. [We] probably back off a ... bit.'

During the interviews many respondents discussed the tendency of the media to focus on negative stories about farmers and not report positive stories about improvements in practices. Similar discussions were also observed at the meetings to develop the practice classifications.

'Prime prospect' 2: 'What makes me angry is in the media the assumption is considered to be fact. The assumption that we're destroying the reef, polluting the rivers. ... That has to be proven. There's no scientific proof to say we're doing these things ... I want them to be proven...'

'Non respondent' 2: 'Every farmer doesn't want it to be them. We are bashed. We don't want it to be us; we don't want to be seen as the bad people. The media portrays us as the baddies. You hear all this stuff on TV...'

Threats of regulation of management practices by the Queensland Government

Some landholders are suspicious that heralded regulations will be a means to raise revenue, are based on incorrect information, and are an incorrect approach to getting farmers to take action.

'Non-respondent' 2: 'That's what I said [before], more revenue for government. "If you don't do it we fine you" ... Why hasn't [anything happened]? There has been a slow [build] up about sediment then all of a sudden it's a big issue. Why hasn't the government, etc., started changing practices straight away? [W]e are working towards it, and a lot of farmers are working towards it. So I don't know how Anna Bligh got her information that farmers aren't doing it ... Did she talk to the people? Where did they get [the] information? What are they getting out of it, the people who provided her with this "information"?'

'Non-respondent' 2: 'I think also the regulatory is probably a negative approach. I don't think it will work. I've seen first hand with development sites ... and there is a strong regulatory arm to look after construction, development and land clearing. I've seen plenty of sites in which even with those regulations in place ... there is a real lack of measures and a lot of sediment coming off those sites. What that makes me think is that if you are going to take that approach with farmers, you are going to get farmers offside automatically, even the ones who are trying their best to do the right thing. There [isn't] strong enough compliance to enforce the regulatory approach firstly, and secondly you are just really going to get people offside.'

'Non-respondent' 1: 'Anna Bligh's approach is the worst approach. She gets the big stick to whack everyone just to secure her vote ... If she does this with the big stick she is not going to get the outcomes she wants. She needs to work with people. From the environmental report card and what I've seen internationally, we have a pretty good report card for [the] sugar cane production system.'

There is a general feeling that politicians do not understand the pressures farmers face:

'Production orientated farmer' 2 (male): 'The message I want you to take to the bosses is this: do not listen to your minders only. Come out of your office and come and see us and come and stay with us in our homes for a week. And we will show you the problems we face, and then you will understand when you have to sit down and make a [conscious] decision. If you don't do that ... We had a senator from Western Australia come here. He said, 'I [am] leaving here but I don't believe what I am hearing. Are you folks fair dinkum?'

(female): '... How hard it is to live on the farm.'

Failure of the community to appreciate management changes over the past twenty years

Related to the perception that landholders are unjustly accused of causing all environmental damage is the perceived lack of acknowledgment of the changes that have been undertaken in respect to land management over the past twenty years. A number of landholders pointed out that the past two decades have seen considerable improvement in. One landholder described observing the improvement of the health of inner reefs in the Innisfail region since his childhood, with the return of fish species and decreased siltation, yet others reported

destruction of some inner reefs during their lifetime. Another example of major improvements in practices is the adoption of irrigation for cropping on the Atherton Tablelands which has meant that croppers no longer cultivate just prior to the wet season, thus resulting in severe soil erosion. Several cane growers mentioned that the wide-spread adoption of 'green trash blanketing' had revolutionised their industry.

'Non respondent' 1: 'We went through the green cane trash [blanketing] revolution ... If you look back twenty years ago, everything was fully cultivated. So the [runoff] and the sediment, everything was significantly higher ... The green cane trash blanketing system has been a positive. If you have a look at nutrient inputs, certainly in the last 10-15 years we've gone from over 180 kg of nitro to 150[kg]. [We're] not there yet, but we are getting pretty close to what is recommended by the best research, and what we take from the crop when we harvest – its what we put back ... we're getting pretty close to that....'

'Production orientated farmers' 2 (female): 'It's the past ... People are more environmentally friendly than what they used to be years ago. I was just looking at the prospectus ... In our district they are all trying to get onto the A frame ... they are using a lot of this (best practices).'

Many also think 'other farmers' or 'other industries' are the causes of environmental problems. At the very least, landholders ask that all members of the community be asked to take their share of responsibility for water quality:

'Production orientated farmer' 1: 'That's the other thing [we have] around here ... that really gets up my nose. You get across the Barron where most of the cropping is done. When you see the water coming out of the paddocks and the amount of soil [flowing in it]. Most of those paddocks are [ruined].'

'Model landholder' 2: 'Different farming practices. I can only speak for my own. Different industries. I don't want to point fingers at every industry ... I can only speculate on rumours. About some other industries where they put twice the amount of fertiliser we put on top of the ground.'

'Prime prospect' 2: 'The cane industry is being blamed for runoff and I can tell you it doesn't come out of my water. The banana fellows are in there all the time ... Especially when it's wet; out there in the red soil around South Johnstone ... half the farm [is] going down the river ... Some farmers are obviously worse than others. One farmer outside South Johnstone was terrible.'

'Production orientated farmer' 2 (male): 'The government is wrong in what it is doing to us cane farmers because they are telling us that our runoff from the fields is causing problems in the reef. "You can kill the reef with fertiliser." That is a blatant lie. [Anna Bligh] [needs] to be told to get her facts straight, they are wrong. I've got a river here that has a mine up in the headwaters of the Herbert River. The mine's closed down, but still when you get runoff, the water is coming from those areas. You have more cattle properties in that hinterland, don't blame the cane farmers. Blame everyone if you are going to be fair dinkum. Don't pick a selection because it suits you.'

Problems with viability of agricultural enterprises

A number of interviewees reported that agricultural enterprises were facing serious financial difficulties that make it difficult for them to invest in changes to production systems. A number

of cane growers stressed that the cane growing industry is unviable if sugar is the only product that is produced. Even though they are trying to be environmentally responsible, they are worried that they can't survive financially.

'Production orientated farmer' 2 (female): 'We have tried to become involved [in NRM programs], but our undertakings are such that we can't fully because of [lack of] money.'

'Production orientated farmer' 2 (male): 'We're in a situation where we growers can no longer grow sugar cane just [for] the manufacture of sugar. The high costs that [are] involved in growing cane, the price of fertiliser has gone beyond limitations. [It costs] \$1,300 a tonne for urea, which is unrealistic. Our insurances have gone to the sky, we need chemicals to control weed growth, we have gone into minimal tillage. We don't burn, we don't trash [any]more, we leave the trash on the ground. Because we are environmentally conscious ... if we were to throw it out we would get big floods that would take the soil out to sea and down the sewerage. We are taking every measure possible as people of the land to protect the environment ... for us to grow now we have to look at by-products. We are looking at ethanol. We're looking at coke generation, bio-diesel, bio-fuel and making paper. We are getting calls from major consortiums and the mining industry ... Most people in politics do not [understand the situation of farmers] and yet they make laws and regulations because they are controlled by major companies like [the] CSR. [The] CSR wants us taken in and that can no longer persist. That's why we farmers hate [the] CSR.'

Some landholders thought that the main problems were caused by a minority of mainly older farmers. Young farmers are generally seen to be keen to learn and adopt best management practices, but financially they are much better off in another industry.

'Production orientated farmer' 2 (male): 'What would you do in this situation? Would you stay with \$20,000 a year? You would go to the mines to pick up \$120,000. You can't expect a young farmer to stay on the farm knowing that there is so much expenditure to grow a crop, and be faced with nothing.'

In the Wet Tropics region, relative to other areas like the Burdekin, farm sizes are not large enough to provide an adequate income for households. Some landholders relate some of the environmental problems associated with overgrazing to a combination of smaller sized landholdings and the inexperience of landholders who do not understand the carrying capacity of the land they have purchased.

'Prime prospect' 3: '... I suppose a big problem is [that] all this country used to be one station ... it [was] all ... one big station, one hundred square miles or so. So we break all these big stations down into tiny little blocks and then people want to try and make a living off them, so they go and jam one hundred head of cattle on land that should only have five or ten.'

The 2009 announcement that Filipino-grown bananas could be imported into Australia was of great concern to banana growers. They argue that it is unfair that landholders are expected to provide environmental services that are not paid for by the community while the government is allowing the importation of cheaper products from countries that do not have stringent environmental regulations.

Governments charge rates that are applied across a whole property, not just to the 'productive' areas. Some landholders are frustrated that they are not allowed to use parts of their property (e.g. wetlands and some remnant forest areas), yet they are expected to pay

rates for these areas at a time when residential development in the area has resulted in dramatic increases in land valuations, and they are not allowed to subdivide and sell-off the 'unproductive' parts of their property.

'Production orientated farmer' 1: '... they do the valuations, we don't do the valuations. They say, "You've got ten acres there that you can't use. It's got an environmental purpose to it." Remember you're already paying interest on it ... You've got your rates, you've got no return on it. It's similar to if you had a retail shop. You've got your floor space. You know how much return you get from every square metre ... from that shopping area. If you've got walkways you either reduce your walkways to increase ... [*Interviewer: Display areas?*] ... to get a better return. We need to be seen to be doing the same thing. Work out on an acreage basis and this is what you are earning from the total farm. This is a refund. They don't want to take it and look after it, but they still want all the uses of it as an environmental issue. We're subsidising the rest of the environment. It's tax in reverse. If you were in the retail industry, and you weren't making any money off a certain shop or whatever, you'd [think to] either change it, or ... sell that part of the shop to create a return on the investment.'

Factors motivating landholders to participate in the Reef Rescue Program

The primary motivation mentioned by some landholders for participating in programs like the RRP was the potential to refine and improve their production systems, indicating pride in capability as a business person and land manager. They also mentioned the desire to improve environmental health as a source of motivation.

'Non respondent' 1: 'There are always opportunities to do better ... the growers will tell you that, and advance themselves, and it ... gives you a buzz if you are improving the business. Also the growers go fishing, they want to leave the land to the next generation – it's not the lifestyle ... They want a clean environment where fish can breathe and habitats ...'

'Model landholder' 3: 'I did the COMPASS [course] through the sugar industry. I got a grant for more efficient irrigation. Last year I got a grant for improving my roadways. [It was] helpful and an encouragement. It's not only the money. It's a recognition thing. You are proud of what you do.'

Some landholders thought that the prospect of receiving extra resources to upgrade or improve management practices while under tight financial pressure could be welcome, although the requirement for some input from landholders could still limit their ability to participate:

'Non respondent' 1: 'There is very little margin at the moment in most businesses ... there's going to be some real issues to try and manage. If you are going to match dollar for dollar, that is going to be difficult. If [we're offered] grants to do environmental things with no strings attached, that would probably be easier.'

Landholders also want to see extra resources made available to undertake conservation initiatives, particularly for the elderly or disabled, and see the government seek specific technical advice from experienced, locally knowledgeable experts. They see the governments' role as providers of research, to prove whether alternative production methods are viable economically.

Preferred elements for the Reef Rescue Program

Resources for research and development

Several landholders emphasised the importance of governments taking the lead in research and development of management practices. They argued that the greater majority of landholders want to minimise their impact on the environment, the rationale being: Provide the information and landholders will do their best. These landholders advocated for detailed evaluations of the effects of using different types of fertilisers and herbicides and differing application methods on both the environment and production systems. They then asked that clear information be made available to farmers from credible sources.

A number of landholders argued that the most useful function that government departments could play is to lead research and development in identifying new agricultural enterprises and refining production systems.

'Model landholder' 2: 'The industry has got to fix itself up, but government [could provide] incentives for research to prove the economic situation.'

'Model landholder' 1: 'You get a bit of money but it's hardly worth it for the time [invested]. I'd really rather go up there and [see] them do it. I'd [go] to a field day and [they] say, "If you use this and that, use this type of fertiliser, use *blood and bone* and legumes you'll get that much increase; if [you] use urea, you'll get that much increase". Miles of work to do ... The DPI – where's your funding? Everyone is looking all the time to see what we can grow ... We're all going broke.'

Interviewer: What would you like to see in government programs in order to participate?

'Production orientated farmer' 2 (male): 'If the government was prepared to put in funding, to help develop a product.'

Communication channels used to access information about land management practices

Access to knowledge

Training seminars appear to be a popular form of providing information for many landholders. Some argued that there still was not sufficient information available for landholders to make informed decisions about the implications of practice changes. They reasoned that if landholders were presented with clear information about the links between their practices and water quality issues they would be motivated to use practices that have the least impact.

'Model landholder' 1: 'If they could bring back the seminars where they could educate and get the young farmers going, they could lead the State. Don't need a big stick. If you teach young [fellows] to do it on their own back, they're keen, they want to do it.'

'Prime prospect' 2: 'I haven't been given any information about how to apply fertiliser in such a way as to minimise runoff. There [are] umpteen different formulations of nitrogen fertiliser, so what we need to know is, when these fertiliser types are applied, what's the result of it when there's some heavy rain? That's going to take some pretty serious analysis. The fact is that dropping fertiliser on the top seems to grow the biggest crops. Why that is and how that is I don't know.'

One common theme in regard to running successful training courses was the importance of having trainers with some experience and local knowledge to earn farmers respect:

'Prime prospect' 3: '... to have someone teach that actually knows what they are on about would be better than someone who's just in the book. They will get more respect as well.'

Training workshops need to be pitched to the right level of knowledge/experience in order to be worthwhile.

'Model landholder' 3: '[With] some of the courses you go to, you come away and think "that was a complete waste of time", and all of that is to do with – there

is a lot of different levels growers are at – and if you got to a course with beginners, presenter has to go to their level.'

Timing is critical as many landholders are working full-time off-farm and only work on the farm on weekends. It was apparent from the analysis of the survey responses that more people in the lowlands had attended training than in the upland areas of the region. It is difficult to say whether this is a result of the differences in the types of enterprises that people are engaged in, i.e. the greater proportion of cane growers in the lowland areas, or whether there is a lack of opportunity, or perhaps demand, for training in the upland parts of the region serviced by the townships of Mareeba and Atherton.

Personal consultation: The ability to discuss particular issues on-property with an expert

Some landholders reported that they miss the interpersonal contact with extension officers and the information they were able to provide. One discussed seeking help from the QDPI&F to set up a new enterprise on their farm:

'Poor prospect' 1: 'Programs like [those] run by [the] DPI, etc., are very good. I can remember back in the 1950s we had tobacco and if we had a problem we would go and see the chap from [the relevant agency]. He'd give us advice, he'd come out and have a look, [it] worked out quite well. But now I don't know if you get much advice at all from them. [The situation has] changed completely. I think farmers these days are paying a lot more tax [but] not getting [the] service in that respect. Or maybe the service is in a different format.'

'Non respondents' 2 (male and female):

(Male) '[A] lot of farmers are busy. It's a hard day. You can do well and you can also struggle for a long time. Meetings ... are hard to get to. [To] actually go to a farmer and put in the time when it suits them would be better than [holding a] meeting.'

(Female) 'Having someone from [Terrain NRM Ltd] coming out, meeting each farmer and seeing where they are at ... Having someone talking to the farmer, seeing what they want to do.'

(Male) 'Especially the older generations. If someone came here ... [my father would be] intimidated. You'd want someone who would come and say ... "we're here to help; we are not here to shut you down ... how can we help you help the environment?" Instead of "This is what you've got to do." They need to do more of the proactive things. Pushing more "OK, we'll give you assistance for getting the right avenues, getting people out to the farmers and talking about what needs to be done and providing resources rather than coming out with the big stick approach.'

The majority of cane farmers appear to have greatest respect for the BSES. Without the technical expertise and local knowledge in the extension services, some were dubious about their usefulness.

'Prime prospect' 2: 'The thing is [that] at the moment most of our useful information isn't actually coming from the bodies. It's coming from our neighbours ... As far as my perception goes, I'd have to know what the science is. From my point [of view], someone like the BSES would have to send out something saying "These are the fundamental things. This is what happens. This is how the runoff occurs, [and] this is how to stop it. This is how it needs to be done." If [the] BSES

sent out bulletins saying “We have to clean up our act, and this is what our research has shown”, most farmers ... would [listen].’

One of the perceived advantages of the BSES is that they have people on-the-ground and an industry profile, unlike the relatively new organisation Terrain NRM Ltd (Terrain), even though Terrain have deliberately worked to develop and support links and the operations of the existing agriculture and extension agencies in the Wet Tropics region.

‘Non respondent’ 1: ‘CPSL has nine staff here. [The] BSES has seven staff here. Terrain has one staff [member]. It comes down to [the number of] people on the ground. And if you look at initiatives in this district, [I] can’t talk for other areas, most of the new initiatives ... were put out by the main agencies. BSES productivity services ... It will come down to the extension and field officers in the industry, BSES and productivity, to move change forward. There is a bit of work done with DPI. DPI has two people on the ground here as well. They work with other people and they may have some impact. But on the Terrain side there is not enough of them. They don’t have an industry profile.’

Funding needs to be put through agencies with significant numbers of people ‘on the ground’. In terms of reaching cane farmers, one landholder thought the sugar mill was best placed to advertise and handle applications.

‘Prime prospect’ 2: ‘Better off going through the [sugar] mill. The mill sends out information all the time, about futures pricing, varieties that are available. They deal directly to the miller. It gets handled by the mill. If you want to go through your industry body to get it, Canegrowers do up an application to a third party, there is no conflict, they are not the ones handling the money and they can help.’

Attitudes to practice classifications

There is considerable confusion about the implications of classifications in relation to the proposed regulation of management activities. Some landholders have heard about the practice classifications, but claim that most have not.

'Model landholder' 3: 'I think it's going to cause a bit of confusion among growers. How are they going to know how [their holding is] classified? Is someone going to come up to the farm and do a survey? I'm aware of it, but I guarantee only ten percent of farmers are.'

The practice classifications developed by Terrain NRM Ltd in conjunction with industry representatives are mainly focussed on processes rather than specific practices, for example, the use of soil tests prior to fertilising, rather than a prescribed amount that should be applied. A key concern for many landholders is that the practices will be specified to rigorously and therefore not be relevant to all farmers; else the list of classifications will have to be so long as to be unworkable.

'Model landholder' 1: 'When you put it like this its a lot more complicated – there's a lot more to farming than doing 1,2,3,4,5. There's a lot of ways [to do] things.'

'Prime prospect' 2: 'It's all well and good to say "follow best practice", but best practice for one farm is not even relevant to another. A code of practice would end up massive and it would actually be irrelevant ... If you were going to derive a code of practice relevant to everyone, it would be "Always ensure your farming is causing the least amount of environmental damage". You can't say "Do this", because in my case that would actually cause problems.'

'Non respondent' 1: 'If you have to categorise people, that's probably OK. The same guy might be an "A" for [one thing] and a "C" for others. This is the same guy. He might be an "A" for pesticide application [and] has the newest equipment; he might be a "C" for other fertiliser application. It's just putting badges on things. Really what we need is significant industry change for environmental sustainability and financial sustainability.'

There is a general impression that the majority of landholders are trying to use practices that have the lowest impacts on the environment. Most thought it was reasonable to have a code of practice for their industry, and that it was only a few landholders who would be causing the majority of impacts because of their lack of knowledge either through lack of experience else because they are 'stuck in their ways'.

'Prime prospect' 3: '... my husband would be really [in favour of] this one actually; he reckons when you drive past a place that has about this much [very little] grass at this time of the year ... they should be pulled up, and either told to sell some cattle, or to de-stock for two years. So in a way I do believe that, because there's a lot of country that has been flogged down like that, is just weeds anyway after that. So yeah, I think that people who continually practice, well I suppose you'd say in the "D" practice, should be pulled up about it.'

'Model landholder' 2: 'I'd have to wait and see what they are before I pass judgment ... [they] might be alright.'

'Model landholder' 3 (with respect to the announcement of the impending regulations of management practices): 'I thought it was insensitive. I was fine

with it. You get local councils. They have to conform like that, don't they? I think they do, and they are a landholder. National Parks, everyone else does, so why can't the farmers?'

'Production orientated farmer' 2: *Interviewer:* 'Do you think there is a need for a code of practice in your industry?'

(Male and Female): 'Yes.'

(Female): 'It is good, but how can you tell a farmer what to do on their property? See, some of them just won't ... An example is [a] farmer across the road. He doesn't go to any of the meetings, he isn't interested. He grows the cane how he wants to grow it.'

Variations in perceptions towards NRM programs in relation to landholder typology

There is a tendency for the landholders that have been identified as 'production orientated farmers' and 'model landholders' – the landholders types that have adopted the most CRPs with larger property sizes and greater dependence on the property enterprises for income – to be better connected with industry and/or catchment management groups (Emtage, 2009). Several of these landholders had either been councillors in local government (else had members of their family or close friends in local councils) or were part of the management of industry, Landcare or catchment groups. Some had family members involved in agricultural research and training as well, helping them to keep abreast of developments in management practices.

Members of the 'prime prospects' and 'good prospects' groups appear to be less 'connected' to industry and other groups. These people were undertaking their own development of management practices as they could afford them and were less likely to be involved in the development of 'cutting edge' practices. They appear to have less inclination to become involved in publicly funded NRM programs although they did appear to support the need for improved practices. Landholders of these groups who did have substantial agricultural enterprises were more likely to want to obtain information rather than funding for practice development, and wanted the information from research organisations rather than industry lobby groups.

The 'poor prospects' group were labelled as such following the analysis of the survey results because of their reported lack of interest in 'environmental issues', and their lack of involvement in the use of CRPs or government NRM programs. The members of this group were the most difficult to secure interviews with – only one member of this group would agree to an interview. They were of the opinion that the 'old ways' of management were the best and that the environmental damage caused by agriculture was trivial in comparison to the impacts of natural landscape processes.

While all interviewees claimed that they want to do the right thing by the environment, the proposition that the 'production orientated farmers' are more 'politically motivated' to adopt CRPs and appear more upset by accusations of farmers causing environmental damage was confirmed by the interviews.

Conclusion

The results of interviews with rural landholders in the Wet Tropics region indicate that there are substantial differences in landholders' readiness to engage in programs like the Reef Rescue Program.

The majority of interviewees broadly support the concept of a 'code of practice' for various rural industries and the classification of practices developed by Terrain NRM Ltd in conjunction with industry representatives, with some reservations about how these would be used particularly in regard to the State Government's intentions of regulating management practices. Issues about the financial viability of agricultural industries dominated interviews with most of the 'commercial' landholders. The program is specifically designed to provide funding to landholders to adopt practices that will improve water quality, which could be of use to landholders if they have resources to contribute to the process. There appear to be considerable 'social' barriers that are reducing landholders' motivations to participate in water quality improvement programs. As argued by Breetz *et al.* (2005: 175):

'[P]roviding economic incentives without addressing social concerns will not be sufficient to establish efficient and effective trading programs. Farmers need to be reassured that their long-term ability to farm will not be impaired and that benefits and responsibilities are equitably distributed.'

Previous research in Australia has also stressed the critical nature of trust between parties and the effects of this on affecting participation in NRM programs, with Morrison *et al.* (2008: 80) concluding that '... trust [of the agency running a program] was consistently found to be a primary determinant ...' of participation. Previous studies have identified a high degree of cynicism regarding government involvement in NRM, due partly to the governments' failure to acknowledge and value landholders' land management experience (Stanley *et al.* 2005). Stanley *et al.* (2005: 28) point out that this cynicism about the link between environmental issues and landholder practices is widespread in Queensland. 'The work undertaken by Greiner *et al.* (2003), Lockie and Rockloff (2004), Byron *et al.* (2004) and Byron *et al.* (2006) in natural resource management regions in Queensland, demonstrate that ... there is still much work to be done to convince land managers of the importance and value of changing management practices.' They further argue that while a positive attitude to environmental management is important, landholders will only act if they believe something is an important issue.

Breetz *et al.* (2005:171) found that mistrust of agencies administering or related to programs had hindered landholders' involvement. '... [W]e find that historical mistrust of regulators and other actors has hindered productive communication, contributing to farmers' initial unwillingness to participate in water quality trading.' The issues these authors identified in the United States as constraining the success of water quality improvement programs are remarkably similar to those identified during the interviews in the Wet Tropics, including, '... fears that participating in trading could carry significant risk: loss of autonomy regarding farm operations; opportunities for increased government oversight; and negative publicity about agricultural pollution... [plus] strong pride in private property, a history of tensions with industrial actors, or a desire to be recognised for land stewardship' (Breetz *et al.* 2005:172). Breetz *et al.* (2005:186) conclude that a variety of communication strategies can be used to successfully engage landholders in NRM programs including 'education and outreach' activities, the involvement of third party negotiators, and the use of embedded ties. They further argue that the context in which a program operates is critical in determining which strategy to employ, stating that:

'[A] program's ability to attract farmers to the negotiating table is not based solely on communication mechanism choice; nor is it based solely on inherent program

characteristics or goals. Rather, it seems that the interaction between these two – that is, a program's mechanism choice given program conditions – is the critical factor for program success.”

Terrain NRM Ltd has successfully used ‘embedded ties’, having put in place a set of liaison officers who are locally known and who were able to encourage enough landholders to apply for the program in its first year. This was despite the delays in settling contracts with the Australian Government, resulting in limited time to advertise and prepare applications, and despite the announcement of the State Government’s intentions to regulate management practices before the program had commenced. It remains to be seen, however, whether these established networks will be sufficient to engage a broad range of landholders to become involved in the next four years of the program given the outlook of many landholders as revealed through the questionnaire responses and the interviews. As noted by Morrison *et al.* (2008:83), ‘[t]he use of formal and informal networks has the advantage of building on pre-existing trust but is also potentially limited in terms of reach.’ Terrain NRM Ltd personnel are reasonably confident that they will be able to continue to attract interest in the program in the next few years, but state that additional support to advertise the program and showcase its operation in the region would be useful (pers. comm., D. Carey, Manager, Reef Rescue, Terrain NRM). A problem facing Terrain NRM Ltd personnel is that the communication budget for the program is tied to the monitoring of the program. Monitoring systems are not simple and take time and resources to establish, meaning that fewer resources have been made available for communication efforts. As noted by Breetz *et al.* (2005), the interaction of the program’s goals and characteristics necessitated the use of embedded ties in the community to start the program. These networks need to be maintained, however switching of some resources or assigning new resources to other communication efforts, primarily outreach and education activities, would seem to be required at this stage.

The need to address the ‘precursors’ to participation in government NRM programs is not well catered for under the existing measures of ‘success’ of the RRP, which stress only the goal of practice adoption over a certain area. This current focus could logically lead to bias in the running of the program to target the ‘large’ operators, who are more likely to have the resources and inclination to adopt best practices, or targeting the western parts of the region where landholdings are larger. The set up of the program by Terrain NRM and the Australian Government whereby industries were allocated shares in the funds has meant that this did not occur. Nevertheless, it would seem reasonable and productive in the long term if the ‘key deliverables’ of the program contract included objectives of increasing landholders’ awareness about the existence of the program, and increased landholder awareness of practice alternatives. The current strategy to fund the development of new training programs and expansion of the existing ones could help to channel interest in developing applications under the RRP (Fulton and Kilpatrick, 2006; Kilpatrick and Johns, 1999).

There would still appear to be a need to make landholders aware of programs through specialist media (including industry newsletters) to reach the ‘commercial’ landholder segment, supported by mass media awareness campaigns to reinforce awareness and reach sectors not well served by ‘industry’ information, i.e. hobby and lifestyle landholders and those in the beef production sector. As noted by Breetz *et al.* (2005), education and awareness raising can have relatively immediate impacts where landholders are motivated to act, but a longer term ‘trust building’ strategy is required if landholders are deeply suspicious or sceptical:

‘If farmers are willing to listen, then education can reduce opposition based on misinformation and routine. The factors that education and outreach do not systematically address, however, are the motivational barriers where farmers’ suspicion of trading initiatives or program administrators prevents them from coming to the table at all. This approach can successfully build up trust and

facilitate productive dialogue over time, but it can be a long and laborious process if farmers are entirely unreceptive.'

Breetz *et al.* (2005) recommend that a hybrid model of communication be used to support programs, starting with the use of 'embedded ties' as has been the case with the Terrain NRM administration of the RRP to date, and moving to broader education and communication strategies as a program becomes established:

'[A] hybrid model might structure the mechanisms in a series, distinguishing between approaches that benefit program initiation and approaches suited to long-term program evolution. An initial partnership with existing relations or programs might help a program establish itself quickly and cost-effectively, while a gradual shift towards education and outreach could ensure long-term flexibility and inclusiveness.'

The experience of the first participants in the program is particularly important to build support and momentum of the program. The key will be to ensure positive participation of early users of the program to get positive messages in the community. This could be best achieved if there is availability of interpersonal contacts to assist with management and application advice. A comprehensive communication strategy is needed because there are limits to the potential reach and influence of differing information sources used by landholders (Emtage and Herbohn, 2008; Morrison *et al.* 2008; Emtage, 2009). Different types of landholders have varying levels of usage and trust in different information sources. Some landholder types including the 'production orientated' and 'model' landholders are highly likely to receive and believe information through industry newsletters, while others including significant numbers of the 'prime', 'poor' and 'good' prospects landholder groups will not use these information sources.

Many landholders that are reliant on their property enterprises for a substantial portion of their household income report are concerned about whether their industries can remain viable. They are feeling financial stress from the low prices being received for their products plus the high price of their inputs (particularly fuel and fertiliser costs). A number of them reported financial difficulty was or would prevent them from making investments on their property, limiting their ability to apply for funding under the RRP. A consistent argument made by landholders was that in order for landholders to adopt 'best practices' their overall industry must be sustainable and financially viable. At the same time a general dislike of 'government handouts' and bureaucracy was evident, with interviewees commonly stating that industry needed to 'fix their own problems'.

A legitimate role of government was seen to be supporting research and development in partnership with the industries, including the organisation of training. Previous studies have emphasised that the provision of training courses leads to greater participation in practice change funding programs (Cary *et al.* 2002; Pannell *et al.* 2006; Morrison *et al.* 2008). The use of short training programs to provide landholders with the results from research and development activities can provide a platform to then interest landholders in participating in NRM programs like the RRP. Overall the provision of training courses to assist practice change had greater support by interviewees than participating in NRM programs that involve applying for funding. This finding was expected given the results of previous research, as was the varied level of engagement in training programs between landholders in differing industries (Emtage and Reghenzani, 2008: 64). There are provisions in the existing Reef Rescue Terrain NRM and Australian Government contract to provide funding to other organisations to run training programs. These training programs provide a useful opportunity to inform landholders of the potential to apply for funds under other sub-programs of the RRP.

The interviews confirmed the findings of previous research, that an important source of motivation for improving practices and involvement in NRM programs is the desire of landholders to be 'on top of their game'. Some landholders reported a sense of satisfaction in being capable managers, which motivates them to seek out information and resources to improve their operations. This is consistent with the findings of many studies of the adoption of new farming practices (e.g. Black and Reeve 1993; Cary *et al.* 2001, 2002; Rogers, 2003; Morrison *et al.* 2008; Emtage and Herbohn, 2008; Emtage, 2009) which describe the characteristics and motivations of 'innovators' and 'early adopters' of practices in the community. These people have been commonly reported to be the most interested in seeking information, and have the greatest level of interaction with researchers and industry organisations. Getting these types of 'industry leaders' successfully involved with the RRP is an important first step to provide momentum for the program and to get positive messages flowing to the rest of the community. The success of the programs first year application rate could also create some difficulties. According to Terrain NRM, approximately three hundred applications for funding were received in 2009 but less than half of these can be funded. It will be important to provide feedback to the unsuccessful applicants and encourage them to resubmit applications so they are well disposed towards the program and will potentially participate in the future (pers. comm., D. Carey, Terrain NRM).

Most landholders reported that they have a great love and respect for the natural terrestrial and aquatic environment. Those who have made efforts to change their practices and have the least possible impact on the environment are feeling very aggrieved that sections of the community, particularly the media and environment groups, appear to be accusing rural landholders of being the primary cause for the degradation of the reef. The announcement of the intention to develop a regulatory instrument to control property management practices by the Queensland Government in late 2008 was described by landholders as insensitive, and likely to alienate landholders and be ultimately ineffective. This finding is consistent with the findings of Morrison *et al.* (2008:25), who noted the importance of 'the provision of awards that acknowledge innovation' to help motivate greater participation in NRM programs. The use of motivational advertising is commonly employed to support recycling and other 'environmental' programs (for example, the advertisement illustrated in Figure 1), and some public recognition of landholders' efforts would be greatly appreciated by the landholders themselves, and potentially make them more open to participating in the RRP. Although the effectiveness of media advertising of NRM programs was regarded as 'contentious' by Morrison *et al.* (2008: 84), they nevertheless concluded that

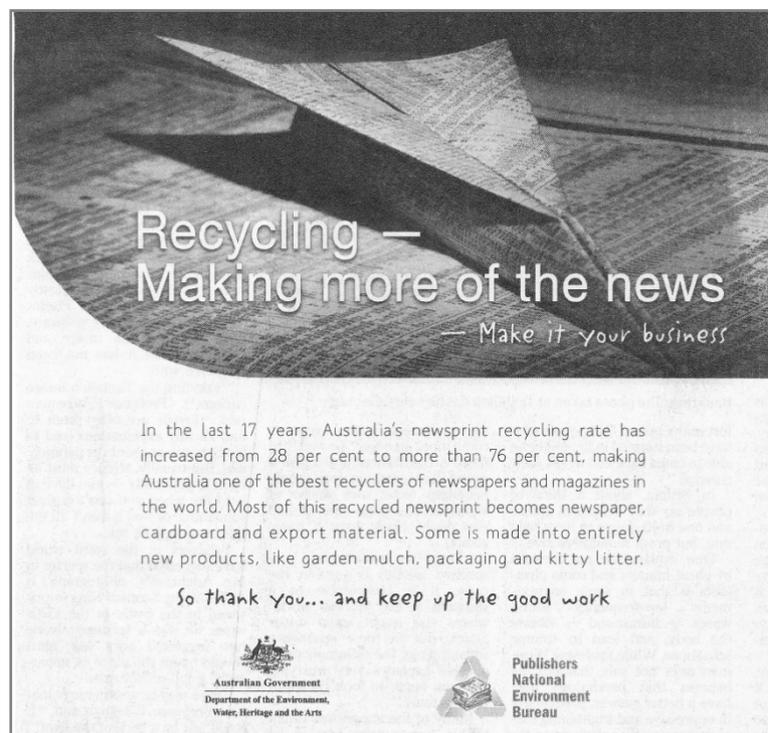


Figure 1: Advertising in the Weekend Australian newspaper, 28-29 March 2009, used to encourage the community to recycle paper products.

'... a range of communication tools (including advertising) are needed to reach a broad range of landholders, particularly if the extent of networks are limited.'

Interviewees recognise that there is still a minority of landholders who persist in using practices that are known to have unacceptable impacts on the environment. Mention was made of landholders who 'do things as they have always done'; generally thought to be older landholders without family involved in the property management and who have never attended seminars or meetings of farmers. It was suggested that these types of people could be best persuaded to change their practices if they were approached by experienced, locally known people that work with, rather than confront, the landholder. Other landholders identified as having inappropriate practices were thought to be inexperienced and lacking knowledge about sustainable management practices. Some interviewees argued that those who were causing degradation through poor management should be 'pulled-up'. Other interviewees were of the opinion that 'people who want to take up practice will, while others will not; you can't tell people what to do on their own land'. Once landholders had viewed the practice classifications many appeared to be relatively comfortable with them and supportive of the idea of having a minimum 'code of practice' for their industry. There was considerable debate as to how any regulation of management practices would be enforced.

Landholders appreciate the existence of a core set of people 'on-the-ground', retained to coordinate detailed field trials and monitoring of the effects of management practices on the natural environment and on agricultural production systems. These people can further present results to landholders at shed meetings, seminars and field days, providing advice and coordinating training with industry. Having locally known, experienced people available to liaise with landholders can make a critical difference to the success of NRM programs. While the use of personal contacts with landholders is generally recognised as the best method to communicate programs, it is not always easy to retain appropriate people in regional areas.

'The use of personal contact by extension staff was emphasised as it could be used to clarify the application process, deal with misinformation, facilitate best practice and build trust. However, it was recognised that it is challenging to find and keep staff that are sufficiently skilled and experienced for this purpose.'
(Morrison *et al.* 2008: 83).

Like other NRM groups, Terrain NRM has experienced a relatively high turn-over of staff (see for example, Fitzroy Basin Association 2008), primarily due to the uncertainty of funding for the organisation limiting the length of employment contracts. Consistency of staff members is vital to ensuring the development of trust between partners. If Terrain NRM had not developed ties with industry associations and landholders in the period prior to the announcement of the RRP and the announced pending regulations by the State Government, it is likely they would have had considerably more difficulty in attracting grant applications. The established relations between the parties provided the trust that was needed to get them through a negotiating period. As argued by Breetz *et al.* (2005: 174):

'Compared to arms-length relations, embedded ties not only promote access to more accurate information at a lower cost but also guarantee the transacting parties that the information is not misrepresented... These characteristics of embedded ties have significant implications for water quality trading, where farmers' mistrust of regulators and environmentalists has created communication barriers. Working with farmers through a trusted partner or agency can not only facilitate greater information dissemination but also reassure farmers that they can trust the information they receive ... the combination of trust and established information channels creates significant economic advantages for communicating and transacting through embedded ties.'

As noted by Terrain NRM in their (draft) report to the Australian Government on the RRP (Terrain NRM, 2009), the organisation's commitment to establishing networks with industries has paid-off, and landholders' involvement in securing participants has been critical:

'The number of applications for water quality improvement incentives grants across most of the industry sectors has been outstanding, with all grants categories being oversubscribed. The level of interest from land managers in participating in the program has been greater than expected. Improved working relationships between Terrain NRM, land managers and their industry representative bodies is clearly evident as is the improved level of cooperation between industry partners like the BSES, [Q]DPI&F, Growcom, QDO, etc. Farmer members of selection panels played a critical role in assessing the application projects.'

Landholders want detailed information about the impacts of different practices on water quality and their enterprises, similar to that developed by Roebling and Webster (2004a; 2004b), Roebling *et al.* (2004), Rudd and Bradley (2005), Smith *et al.* (2006) and Drewry *et al.* (2007). There are many variations in the production systems used in different industries that could be assessed. For example, what is the difference in terms of productivity and losses of nutrients to the aquatic environment between applying fertilisers beneath the ground and on the surface? How does this vary with differing soil types, crop types, differing slopes, or when using irrigation or relying on natural rainfall? A number of landholders argued that without the answers to these sorts of questions and detailed water quality monitoring it will be impossible to achieve the objectives for the RRP. They further argued that if this information was provided, landholders would act to minimise their impacts on aquatic systems on their own accord.

Better coordination of the activities, policies and programs of the Australian and Queensland Governments in relation to Natural Resource Management is required. There is a lack of coordination in data collection activities planned by both governments, as well as other interested stakeholders, which increases the likelihood that landholders will be 'over surveyed'. Australian Government agencies are currently preparing to undertake a 'baseline' survey of rural landholders in the catchments draining to the Great Barrier Reef lagoon in the near future without the involvement of the Queensland Government. While such information is required to better understand what is presently happening and the potential for improvements, the proposed survey will not cover many aspects about the circumstances, attitudes and values of rural landholders that are of fundamental interest to regional NRM bodies. Landholders already report being overwhelmed by surveys from industry organisations, research organisations, regional NRM agencies and governments. Any additional surveys should be carefully coordinated between these groups to ensure that they have adequate information to carry out their functions as argued by Nelson *et al.* (2005) and Emtage *et al.* (2006).

Recommendations

The recommendations outlined below are aimed to improve knowledge of the program within the community, to encourage awareness about water quality issues and to improve the motivations of landholders to adopt recommended practices and participate in the Reef Rescue Program:

1. That greater resources be devoted to publicising the Reef Rescue and other NRM programs in the general media to complement information in industry and 'environment group' newsletters (i.e. catchment and Landcare groups). An ongoing, targeted media support campaign should be developed to:
 - Further develop awareness among rural landholders about NRM issues in the Wet Tropics region;
 - Provide some feedback to landholders and maintain awareness in the community about the rates of adoption of improved practices;
 - Raise awareness among rural landholders and the broader community of the efforts that are being put into controlling pollution from other industries and urban areas;
 - Develop awareness about the existence of programs to assist landholders to understand and adapt their practices, and provide points of contact for these programs.
2. That landholders and the broader community be well-informed about the status of and trends in the health of the reef and aquatic ecosystems, including:
 - Specifying the levels of pollutants present in the environment – establish and maintain a network of water quality monitoring stations throughout the freshwater and estuarine systems;
 - Specifying threats to the health of the reef in terms of the actual pollutants that are being found, the way they affect reef health and the processes that lead them to be transported into aquatic systems;
 - Specifying the expected levels of nutrients and sediments that will affect aquatic systems which result from different practices in the various industries, and the impact of these variations in practices on productivity and profitability of enterprises; and
 - Use of the [WaterWatch](#) program to engage landholders in water quality monitoring. Commit sufficient funding over a long time period (i.e. ten years or more) to ensure that the results are properly tabulated and reported both to the public and landholders involved.
3. That support is provided to develop and maintain a core set of people in the region with expertise in various industries within the region who can coordinate research, development and extension programs over long periods.
4. That a significant portion of the resources from the RRP are made available for conduct of training and seminars by locally based experts in the various industries once they have detailed information about the implications of various practices for the environment and the productivity of enterprises.
5. That recognition is given, through 'awards' and publicity, to the efforts already made by farmers to improve practices, e.g. publishing the rates of adoption of 'best practice' by landholders in various industries, giving regional awards of excellence in land management to landholders who have showed exceptional initiative and dedication in developing best practices within their industries.
6. That improved coordination of the timing and nature of incentives, regulations and the monitoring of practices over time is undertaken between the Queensland and Australian Governments.

References

- Bellamy, J.** and McDonald, G. (2005) Through multi-scaled lenses: A systems approach to evaluating natural resource management policy and planning. In: Bellamy, J. (ed.) *Regional natural resource management planning: The challenges of evaluation as seen through different lenses*. CIRM Monograph Series, June 2005. The State of Queensland, Department of Natural Resources and Mines, Indooroopilly (pp. 3-10) (Available for download from: http://www.regionalnrm.qld.gov.au/research_sips/sips/social_economic/pdf/se03_monograph_chapter_2.pdf)
- Black, A.** and Reeve, I. (1993) Participation in Landcare Groups: The relative importance of attitudinal and situational factors. *Journal of Environmental Management* 39: 51-71.
- Bohnet, I.** (2008) Assessing retrospective and prospective landscape change through the development of social profiles of landholders: A tool for improving land use planning and policy formulation. *Landscape and Urban Planning* 88: 1-11.
- Breetz, H. L.,** Fisher-Vanden, K., Jacobs, H. and Schary, C. (2005) Trust and Communication: Mechanisms for Increasing Farmers' Participation in Water Quality Trading. *Land Economics* 81(2): 170-190.
- Bressers, H. T.** and Kuks, S. M. M. (2003) What does 'governance' mean? From conception to elaboration. In: Bressers, H. A. and Rosenbaum, W. A. (eds.) *Achieving Sustainable Development*. Praeger, Westport, Connecticut (pp. 65-88).
- Brown, M.** and Beswell, D. (2007) Using a Market Segmentation Approach to Better Target Extension Programs – Aligning learner needs with learner programs. In: Navarro, M. (ed.) *Internationalizing with Cultural Leadership. Proceedings of the 23rd Annual Conference of the Association for International and Agricultural Extension (AIEE)* (pp. 36-46) (Available for download from: <http://www.aiaee.org/2007/compiled.pdf>)
- Butler, B.J.,** Tyrell, M., Feinburg, G., VanManen, S., Wiseman, L. and Wallinger, S. (2007) Understanding and Reaching Family Forest Owners: Lessons from Social Marketing Research. *Journal of Forestry* 105(7): 348-357.
- Byron, I.,** Curtis, A. and MacKay, J. (2004) *Providing social data to underpin catchment planning in the Queensland Murray-Darling region*. Bureau of Rural Sciences, Canberra (Available for download from: http://adl.brs.gov.au/brsShop/data/13217_qmd_final.pdf)
- Byron, I.,** Curtis, A. and MacKay, J. (2006) *Providing social and economic data to support regional natural resource management in the Burnett Mary*. Bureau of Rural Sciences, Canberra (Available for download from: http://adl.brs.gov.au/brsShop/data/bm_final_report.pdf)
- Canegrowers** (1998) *Sustainable Cane Growing in Queensland: Code of Practice*. Canegrowers, Brisbane (27 pp.)
- Cary, J.W.,** Webb, T.J. and Barr, N.F. (2002) *Understanding landholders' capacity to change to sustainable practices: Insights about practice adoption and social capacity for change*. Bureau of Rural Sciences, Canberra.
- Chilcott, C. R.,** Paton, C. J., Quirk, M. F. and McCallum B. S. (2003) *Grazing land management education package workshop notes – Burnett*. Meat and Livestock Australia Limited, Sydney.

Comerford, E. and Binney, J. (2005) *Choosing between incentive mechanisms for natural resource management: A practical guide for regional NRM bodies*. State of Queensland, Department of Natural Resources and Mines, Brisbane (Available for download from: <http://www.environment.gov.au/biodiversity/publications/choose/pubs/choosing-incentives.pdf>)

Comerford, E., Binney J. and Clouston, B. (2005) *Grant programs: Key elements for regional NRM groups*. The State of Queensland, Department of Natural Resources, Mines and Water, Brisbane (Available for download from: http://www.regionalnrm.qld.gov.au/research_sips/sips/social_economic/pdf/grants_guide.pdf)

Davis, R. (2006) *Douglas Shire Water Quality Improvement Plan*. Douglas Shire Council. (Available for download from: http://www.dsc.qld.gov.au/dsc/Files/WQIP_January07.pdf)

Dovers, S. and Wild River, S. (eds.) (2003) *Managing Australia's Environment*. The Federation Press, Sydney.

Drewry, J., Higham, W. and Mitchell, C (2008) *Water Quality Improvement Plan: Final report for Mackay Whitsunday region*. Mackay Whitsunday Natural Resource Management Group, Mackay

Drewry, J., Higham, W., Mitchell, C. and Rohde, K. (2007) *Water Quality Improvement Plan: Modelling Sediment and Nutrient Exports and Management Scenarios*. Mackay Whitsunday Natural Resource Management Group.

Emtage, N. (2009) *Market segmentation study of rural landholders in relation to the promotion of natural resource management on private lands in the Wet Tropics region of Queensland*. Report to the Marine and Tropical Sciences Research Facility. Published by the Reef and Rainforest Research Centre Limited, Cairns (65pp.) (Available for download from: http://www.rrrc.org.au/publications/marketsegmentation_nrm.html)

Emtage, N. and Herbohn, J. (2008) *Profiles of Rural Landholders in Relation to Natural Resource Management in the Wet Tropics Region of North Queensland*. Report to the Marine and Tropical Sciences Research Facility. Published by the Reef and Rainforest Research Centre Limited, Cairns (77pp.) (Available for download from: http://www.rrrc.org.au/publications/landholders_profiles.html)

Emtage N., Herbohn J. and Harrison S. (2006) Landholder typologies used in the development of Natural Resource Management programs in Australia – A Review. *Australasian Journal of Environmental Management* 13(2): 79-94.

Emtage, N. and Reghenzani, J. (2008) *Wet Tropics Sustainable Agriculture Survey Interim Report: A Survey of Rural Landholders in the Wet Tropics Natural Resource Management Region*. Report to the Marine and Tropical Sciences Research Facility. Published by the Reef and Rainforest Research Centre Ltd, Cairns (81pp.) (Available for download from: http://www.rrrc.org.au/publications/agriculture_survey.html)

Emtage, N., Smith, C. and Herbohn, J. (2009) *Modelling factors affecting landholders' adoption of recommended natural resource management practices in the Wet Tropics region*. Report to the Marine and Tropical Sciences Research Facility. Published by the Reef and Rainforest Research Centre Limited, Cairns (147 pp.) (Available for download from: http://www.rrrc.org.au/publications/adoption_nrmpractices.html)

EPA (2001) Preparation of Codes of Practice for approval under the Environmental Protection Act 1994. Brisbane (Available for download from: http://www.epa.qld.gov.au/publications/p00506aa.pdf/Preparation_of_Codes_of_Practice_for_approval_under_the_Environmental_Protection_Act_1994.pdf)

Fitzroy Basin Association (2008) *Submission to Senate Inquiry into Natural Resource Management and Conservation Challenges*. 14 August 2008 (Available for download from: http://www.aph.gov.au/SENATE/committee/rrat_ctte/natural_resource/submissions/sub25.pdf)

FNQ NRM Ltd and Rainforest CRC (2004) *Sustaining the Wet Tropics: A Regional Plan for Natural Resource Management 2004-2008*. FNQ NRM Ltd, Innisfail (208pp.) (Available for download from: http://www.rirc.org.au/rirc/nrm_plan.html)

Fulton, A. and Kilpatrick, S. (2006) *Options for integrating NRM and production extension*. Proceedings of the Natural Resource Management Extension Symposium, 28-29 September 2005, Toowoomba, Queensland. Available for viewing at: http://www.regional.org.au/au/apen/2005/2/2780_fultona.htm)

Fulton, A. Fulton, D., Tabart, T., Ball, P., Champion, S., Weatherley, J. and Heinjus, D. (2003) *Agricultural Extension, Learning and Change. A report for the Rural Industries Research and Development Corporation*. RIRDC Publication No. 03/032, RIRDC Project No. RDP-1A (Available for download from: <https://rirdc.infoservices.com.au/downloads/03-032.pdf>)

Greiner, R., Stoeckl, N., Stokes, C., Herr, A. and Bachmaier, J. (2003) Natural resource management in the Burdekin Dry Tropics: Social and economic issues. A report for the Burdekin Dry Tropics NRM Board. CSIRO Sustainable Ecosystems, Townsville (202 pp.) (Available for download from: http://www.bdtprm.org.au/resources/downloads/Burdekin_Socio_Economic_Profile_Final%20Report_1.pdf)

Hildebrand, C. (2002) Independent assessment of the sugar industry. Report to the Minister for Agriculture, Fisheries and Forestry. Australian Government, Canberra.

Jennings, S. M. and van Putten, I. E. (2007) Typology of non-industrial private forest owners in Tasmania. *Small-scale Forest Economics, Management and Policy* 5(1): 37-56.

Kilpatrick, S. and Johns, S. (1999) *Managing farming: How farmers learn*. RIRDC Publication No. 99/74, RIRDC Project No. UT-18A. Rural Industries Research and Development Corporation, Canberra (Available for download from: <https://rirdc.infoservices.com.au/items/99-031>)

Kotler, P. and Lee, N. (2008) *Social Marketing: Influencing behaviours for good*. Sage Publications, Thousand Oaks, Calif.

Kroon, F.J. (2008) *Draft Tully Water Quality Improvement Plan*. CSIRO: Water for a Healthy Country National Research Flagship.

Kroon, F., Bradley, P. and Roberts, B. (2006) *Strengths and weaknesses in the development and delivery of the Douglas Shire Water Quality Improvement Plan*. CSIRO Sustainable Ecosystems, Atherton (29pp.) (Available for download from: <http://www.cse.csiro.au/publications/2006/DouglasWQIPReview.pdf>)

Kuehne G., Bjornlund, H. and Cheers, B. (2007) There is more than one type of farmer. *International Journal of Interdisciplinary Social Sciences* 2(2): 179-186.

Lockie, S. and Rockloff, S. (2004) *Landowner attitudes to wetlands and wetland conservation programs and incentives*. Draft report prepared for the Coastal CRC.

Maller, C., Kancan, R. and Carr, A. (2007) *Biosecurity and small landholders in peri-urban Australia*. Australian Government, Bureau of Rural Sciences, Canberra (Available for download from: http://adl.brs.gov.au/brsShop/data/biosecurity_and_small_landholders.pdf)

Morrison, M., Durante, J., Greig, J. and Ward, J. (2008) *Encouraging Participation in Market Based Instruments and Incentive Programs*. Australian Government, Land & Water Australia, Canberra (Available for download from: <http://lwa.gov.au/products/pr081458>)

Nelson, R., Webb, T. and Byron, I. (2005). *Integrating Conceptual Frameworks to Coordinate Information for Natural Resource Management Decision Makers*. NLWRA Socio-economic Workplan Project B0. Report to the National Land and Water Resources Audit (NLWRA), Canberra.

Pannell, D. J., Marshall, G. R., Barr, N., Curtis, A., Vanclay F., and Wilkinson, R. (2006) Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture* 46: 1407-1424.

Prochaska, J. and DiClemente, C. (1994) *Changing for good*. Avon Books, New York.

Queensland Fruit and Vegetable Growers (1998) *Farmcare: Cultivating a better future. Code of Practice for Sustainable Fruit and Vegetable Production in Queensland*. Queensland Fruit and Vegetable Growers, Brisbane.

Queensland Government (2008) *Reef science is call to action*. Joint Statement by the Premier The Hon. Anna Bligh and Minister for Sustainability, Climate Change and Innovation The Hon. Andrew McNamara. Brisbane, October 24, 2008. (Available at <http://www.cabinet.qld.gov.au/MMS/StatementDisplaySingle.aspx?id=60968>)

Roebeling, P. C. and Webster, A. J. (2004a) *Financial-economic analysis of management practices in sugarcane production. Report on the cost-effectiveness of BMP implementation for water quality improvement for the Douglas Shire water quality improvement plan*. CSIRO Sustainable Ecosystems, Townsville (29 pp.).

Roebeling, P. C. and Webster, A. J. (2004b) *Financial-economic analysis of management practices in beef cattle production. Report on the cost-effectiveness of BMP implementation for water quality improvement for the Douglas Shire water quality improvement plan*. CSIRO Sustainable Ecosystems, Townsville (34 pp.).

Roebeling, P. C., Smith, D. M., Biggs, J., Webster, A. J. and Thorburn, P. J. (2004) *Private-economic analysis of drivers promoting the adoption of best management practices for water quality improvement in the Douglas Shire. Report on the cost-effectiveness of BMP implementation for water quality improvement for the Douglas Shire water quality improvement program*. CSIRO Sustainable Ecosystems, Townsville (95 pp.) (Available for download from: http://www.terrain.org.au/images/stories/programs/water/water-quality/tully/PrivaEcoAna_04-09_041.pdf)

Rogers, E.M. (2003) *Diffusion of Innovations*. The Free Press, New York.

Rudd A, and Bradley P. (2005) *Adoption of best management practices for sediment and nutrient reduction in diffuse sources in Douglas Shire*. Final Report, Project One, Water Quality Improvement Plan for the Douglas Shire. Mossman Agricultural Services Limited and Douglas Shire Council, Queensland (44 pp.)

Sing, N. (2003) *Adoption of best management practice for sediment and nutrient reduction from diffuse sources in the Douglas Shire*. Report to Douglas Shire Council, Mossman, Queensland.

Sing, N. (2004) *Sustainable Land Use Management Action Targets*. FNQ NRM Ltd, Innisfail.

Smith, D. M., Webster, A. J., Roebeling, P. C., Rudd, A. V., Parker, D. and Bartley, R. (2006) *Determination and demonstration of agricultural best management practices in the Saltwater Creek catchment of Douglas Shire*. Report for Douglas Shire Council and Department of the Environment and Heritage. CSIRO Sustainable Ecosystems, Townsville (49 pp.)

Stanley, J., Clouston, B. and Baker, R. (2005) *Understanding Land Manager Constraints to the Adoption of Changed Practices or Technological Innovations: Literature Review*. The State of Queensland, Department of Natural Resources, Mines and Water, Brisbane (32 pp.) (Available for download from: <http://www.csu.edu.au/research/ilws/research/docs/WP1Understanding-land-manager-constraints.pdf>)

Terrain NRM (2009) *Reef Rescue – 2008/09 delivery progress update*. Report prepared for the Department of the Environment, Water, Heritage and Arts, Canberra.

The State of Queensland and Commonwealth of Australia (2003) *Reef Water Quality Protection Plan: For catchments adjacent to the Great Barrier Reef World Heritage Area*. Queensland Department of the Premier and Cabinet, Brisbane (Available for download from: <http://www.reefplan.qld.gov.au/library/pdf/reefplan.pdf>)

Appendix A

Profiles of members of the various social marketing cluster groups

In the following section the characteristics of each groups' members are summarised individually. Details about the analyses used to define and describe these groups are provided in Emtage (2009). Indices were developed to represent landholders' interest in NRM issues and to represent their level of adoption (engagement) in CRPs. The indices were used to undertake a cluster analysis of the responses and five groups were identified. These groups range from 'model owners' (10% of the sample), who are highly motivated and engaged in using CRPs, to 'prime prospects', who are interested but not engaged (20%), and 'poor prospects' (40%), who have low levels of interest or engagement in NRM activities. Profiles of these groups were developed through examination of the differences in management objectives, trust in others, communication behaviour and landholders' behaviour in relation to the adoption of recommended practices.

'Prime prospect analysis' is a type of market segmentation technique used to identify and describe target markets. It involves categorising landholders according to their level of (a) engagement and (b) interest in desired behaviours to form a matrix that summarises the prospects of behavioural change (Table 5). The rationale for the naming of the groups used for prime prospects analysis (as shown in Table 5) relates to the limited resources typically available to organisations seeking to promote behavioural change for 'social good' reasons. It is reasoned that funds spent to assist groups already interested in NRM issues to adopt improved NRM practices will have more chance of succeeding (in the short term) than if funds are spent trying to change peoples' awareness and value systems. The terms reflect the rationale that the programs are voluntary.

Table 5: Overview of prime prospect analysis (adapted from Butler *et al.* 2007).

	Interested in NRM issues	Not interested in NRM issues
Engaged in the use of CRPs	'Model owners'	'Production orientated farmers'
Not engaged in the use of CRPs	'Prime prospects'	'Poor prospects'

The theoretical basis for using prime prospects analysis is based on an understanding of the manner by which people change their behaviour. Kotler and Lee (2008) refer to the 'stages of change' research work of Prochaska and DiClemente (1994) in which the authors describe a six-stage process of changes from a state of non-awareness of any problems or issue with the behaviour ('pre-contemplation') through to the 'termination' stage by which time a behaviour has become normal and accepted by the individual.

Table 6: Frequency and relative frequency of membership of social marketing cluster groups.

Social marketing cluster groups	N	Proportion of sample (%)
'Prime prospects'	68	21
'Good prospects'	61	19
'Production orientated farmers'	36	11
'Poor prospects'	127	40
'Model owners'	29	9
All respondents	321	100

Characteristics of the 'prime prospects' group

Members of the 'prime prospects' group are so named because they have a relatively high interest in NRM issues yet also have relatively low adoption of currently recommended practices. Members of this group gave the highest ratings of importance to concerns about the health of the natural environment in their region and relatively high ratings of concern about the health of the natural environment on their own property.

This group includes the lowest proportion of respondents who listed 'agriculture' as their primary purpose for owning rural land (40% of the group). The remaining group members include 'hobby farmers' or 'residential' landholders (22% each), and 'conservation' landholders. The 'prime prospects' group has twice the proportion of 'conservation' landholders of any of the other groups, consistent with their high interest in NRM matters. They also have the smallest landholdings on average. Members of this group:

- Generate the lowest proportion of their income from the property, have the lowest proportion of members reporting a profit from property enterprises in 2006/2007 and support the least number of people with this income;
- Have lived on rural properties, in the local district and on their current properties for the shortest period of time;
- Have the highest proportion of members with post-graduate formal education qualifications; and
- Have a high proportion of female members;

Less than ten percent of the members of this group have prepared a property management plan, attended a short course on property management or participated in a government NRM program.

Members of this group rate 'media sources' of information about property management as the most useful and trust environment groups (including Landcare groups) as much as their neighbours.

Members of this group have an average of more than half their landholding under native vegetation. They have the highest score on the 'engagement index' for native vegetation management and a high score on the 'interest index' for native vegetation, making them very similar to the 'model owners' with respect to this aspect of property management. A high proportion of members of this group have encouraged regrowth of vegetation and gather non-timber forest products on their land, yet a relatively low proportion have obtained a map classifying their forest types from the QEPA.

Characteristics of the 'good prospects' group

The 'good prospects' group was named such because they have a relatively high interest in NRM issues together with a relatively high level of engagement in the adoption of currently recommended property management practices. More than seventy percent of this group reported that their primary purpose of landownership was for agriculture, which is less than the other two groups dominated by 'agricultural' landholders, but substantially more than the two other groups with less than fifty percent. The balance of non-agriculture group members is split between the purposes of 'hobby farms', 'conservation' and 'residential', each comprising 8-10% of members.

Of the 'agricultural' members of this group, approximately twice as many undertake solely cropping enterprises compared to grazing enterprises. Their farm sizes are the smallest of the groups dominated by agricultural landholders. Members of the 'good prospects' group reported undertaking approximately forty hours per week of on-property work, and half reported making a profit in 2006/2007, which provided an average of fifty percent of their income. A relatively high proportion (23%) of members of this group reported a formal education level of primary schooling.

Only 45% of the 'good prospects' group have prepared a property management plan compared to 65-75% of the other 'agriculture' groups. Only fifteen percent use an environmental or farm management system compared to 45-50% of the other 'agricultural' groups. Members of this group have relatively low levels of concern about the health of the natural environment on their own property and moderate concern about the health of the natural environment in the region.

Members of the 'good prospects' group rated the three scales for property management goals ('to build business', 'to improve the environment' and 'family and lifestyle') as equally important. They reported they are equally unlikely to be considering expanding their operations or selling their property. They rated 'finance institutions and family' as the most useful source of information to assist property management decisions followed by 'media sources'. The members of this group have moderate levels of trust in 'environmental groups', significantly higher than those in the 'production orientated' and 'poor prospects' groups.

With an average of approximately one-third of their landholdings under native vegetation, the members of the 'good prospects' group have a relatively high level of interest and engagement in native vegetation management. In this regard the group members stand out for their confidence in being able to access information about vegetation management and faith that sustainable timber production can be carried out on their landholdings. Approximately sixty percent have encouraged the regrowth of native vegetation, while forty percent have a map of remnant vegetation on their land.

In terms of adoption of recommended grazing and cropping practices, the 'good prospects' group is consistently third ranked after the 'model owners' and 'production orientated' in terms of adoption rates.

Characteristics of the 'production orientated' group

The 'production orientated' group was so named because while they report a currently high level of engagement in CRPs, they also report low interest in NRM issues. A very high proportion of the 'production orientated' group listed agriculture as the primary purpose for landownership (94%). Approximately 75% of the members of this group have some cropping land and have the second largest property sizes. They report working the longest hours per week on their property (up to 53 hours), have the highest proportion of landholders who

made a profit in 2004/2005 (69%) and are the most reliant on property enterprises for income (at 64% of household income).

A small proportion of this group has formal education ending at primary schooling, and small proportions with postgraduate education levels. This group has the smallest proportion of female members. They have lived on rural properties, in the local district and on their current properties for longer than any other group with the exception of the 'model owners'.

Members of the 'production oriented' group reported the highest rates of participation in short training courses, preparation of property plans and use of environmental or farm management systems. They further report the highest proportion who has undertaken pest and weed control, and the second highest participation in government NRM programs in the last five years. Concern about pests and weeds dominates their concerns regarding on-property NRM issues while concern about the viability of agriculture dominates their concerns in regard to rural development issues. Building their business is their most important property management goal, although they were the group most likely to be planning to sell their property in the future. The most important information sources for this group are 'financial institutions and advisors and family', followed by 'enterprise groups'. Their trust is highest for their neighbours, followed by 'productivity groups' like the BSES and the productivity boards. They had the lowest trust of all groups in State Government agencies and 'environmental groups'.

With regard to native vegetation management, members of this group reported very low levels of both engagement and interest. They have the smallest proportion of their properties covered by native vegetation (15%), although just over half reported they have encouraged vegetation regrowth. None of these group members reported gathering NTFPs from the vegetation areas. Their antipathy toward native vegetation is further illustrated by the fact they have the highest rate of agreement with the statements that they would 'prefer to clear their forests' and that having forest areas 'decreases the aesthetics and value' of their properties.

Members of the 'production orientated' group report relatively high levels of adoption of CRPs in the cropping and grazing industries, and appear to be confident to manage the impacts of these practices although they are less convinced than others about the need for them.

Characteristics of the 'poor prospects' group

The 'poor prospects' group is the largest group in the sample, comprising forty percent (127) of all survey respondents. This group was so named because they have the lowest interest in NRM issues and engagement in utilising CRPs. Within this group, half listed 'agriculture' as their primary purpose for landownership; 25% are 'residential' landholders; almost 20% are hobby farmers; and the remainder are categorised as 'other', which includes a variety of land uses. Thus the members of this group are, together with the 'prime prospects' group, the majority of 'residential' landholders in the sample.

The members of the 'poor prospects' group have the second smallest average landholdings of all the groups and have the second lowest dependence on their property for income generation (above the 'prime prospects' group). Approximately 25% reported making a profit in 2004/2005 and generate an average of 25% of their income from their property enterprises. Members of this group work an average of 26 hours per week on their property. They have also been living on rural properties, in their local district and on their current property for the second shortest time on average compared to the other groups. In keeping with this pattern they further have the second least number of people living on the property and support the second least number of people from property enterprises. Approximately one

third of the members of this group are female which, together with the 'prime prospects' group, is double the proportion of the next highest group (the 'model owners').

In terms of their engagement in NRM activities, the 'poor prospects' group have:

- The equal lowest proportion who have undertaken a short course;
- The lowest proportion who use an environmental management system;
- Had no involvement with government NRM programs in the past five years;
- The least reported involvement in pest and weed management; and
- The lowest proportion of members who have prepared a property management plan.

Members of this group had the lowest scores of importance for all the scales relating to both property NRM issues and regional development issues. Their lack of motivation with regard to property management is illustrated by the fact that they are the least likely to be considering expanding their business and had the lowest scores for all scales relating to property management goals. They further had the lowest scores for all scales relating to the usefulness of information sources to assist property management decisions and the lowest or equal lowest ratings of trust in other people and institutions.

While the members of the 'poor prospects' group have an average of 54% of their property under native vegetation which is equal highest, they have the lowest score on the 'interest in native vegetation index' of all the groups. They have the lowest proportion that have encouraged regrowth of vegetation, the fewest members that have maps of their vegetation types and the second lowest proportion that gather NTFPs on their properties.

In terms of currently recommended grazing practices, members of the 'poor prospects' group have the lowest proportion that use soil testing to determine fertiliser requirements. Only 25% of the members of this group have cropping land. They have the lowest proportion of members with crop land who have adopted minimum tillage, soil testing, legume rotations and equal lowest proportion who have applied lime or gypsum in the past five years.

Characteristics of the 'model owners' group

The 'model owners' group are so named as they have high levels of interest in NRM issues and engagement in CRPs. Ninety percent of the members of this group listed 'agriculture' as their primary purpose for property ownership, half of whom are specialist croppers and a further twenty percent of whom have mixed cropping and grazing enterprises with no hobby farmers. This group comprises only ten percent of the overall sample. They gave the highest average ratings of usefulness for information, have the highest participation in NRM groups and high average participation in other groups, as well as high levels of trust in other people and agencies operating in the region.

Members of this group have lived the longest time on average on rural properties and on their current property and equal longest time in the local district. They have the largest property size on average, although there is a great deal of variation in property sizes. They work an average of 50 hours per week on the property, with approximately half reporting a profit in 2006/2007 and use property enterprises to provide approximately half of their income. This group also has the highest number of people living on the property and support more people than those living on the properties, implying that many employ extra labour. Nearly twenty percent of the members of this group are female and they have the second highest proportion with postgraduate degrees. Almost forty percent of the 'model owners' group has a degree or diploma.

Approximately 85% of the 'model owners' group have attended a short course, and similar proportions have completed or are preparing a property management plan. Sixty percent of members of this group have participated in a government NRM program over the past five years – double the proportion of the next highest group.

In terms of property management goals, members of this group rated 'improving the environment' highest of the three scales. They have the highest score for the property management intention 'to expand the business', and the highest scores for the usefulness of all potential information sources to aid decision making. They further gave the highest ratings of trust in all people and institutions.

While this group has an average of only 25% of their property under native vegetation compared to the 44% across all groups, they have the highest score on the 'interest in vegetation management index' and high levels of engagement in native vegetation management CRPs. They have the highest proportion of members who have encouraged growth of native vegetation and have a map of their vegetation types.

The 'model owners' group have a high proportion of members with grazing enterprises that use soil testing for determining fertiliser requirements and who use controlled grazing in all paddocks. Sixty-five percent of this group has some cropping land with 90% having adopted the use of soil testing and minimum tillage, while 85% also use legume rotations. All of the members of this group with cropping enterprises reported applying lime or gypsum to their fields over the past five years.

Appendix B

Topics covered in the landholder interviews

Background information

- Main/core land use activities
- Perceptions of the health of the industry

Participation in government or industry property management programs in the past

If 'Yes':

- What was the program or training?
- What was the reason for participation, i.e. what were the expected benefits of participating in the program?
- Who ran the program?
- How did the landholder learn about the program?

Advantages and disadvantages of the program

- Did participation match the landholder's expectations (were their objectives for participating met?)
- Was support timely and adequate?
- Was the application process straightforward?
- Was the landholder required to supply information about the outcomes? Were these requirements reasonable?
- Would the landholder participate in similar or other programs in the future?
- How could schemes be improved?

If 'No' (include landholders who said 'Yes' also):

- Have any friends or family participated in an NRM program? If 'Yes': What was their experience like?
- Would the people respected by the landholder in terms of their land management skills and objectives support participation in NRM programs?
- Have any schemes (or which other schemes have) interested the landholder in the past?
- If the landholder could choose or design a scheme, what would be the purpose?
- Who would the landholder prefer to have run such a scheme?
- What factors would encourage the landholder to participate?
- What factors would put the landholder off participating?

Questions relating to practice classifications used for the RRP

- What are the landholder's impressions of the classifications of practices for their industry?
- Which practices are they presently following?
- Does the landholder think, in general, that improved land and water management practices are needed on private rural land in the region?

- Which practices is the landholder currently using?
- Does the landholder believe the classifications are appropriate in terms of the expected off-property impacts of the practices, i.e. are the 'B' practices better than 'C' practices, and are these better than 'D' practices?
- If the landholder is not presently using all of the 'B' classified practices, are they interested in adopting any of these practices?
- What do they expect would be the outcome of taking up various practices? How certain are they about these outcomes?
- What amount of support would they require to take up various practices? For example, training, money for resources, access to machinery, etc. Specify for each practice where possible.

Coordination of activities with neighbours

- Has the landholder ever considered or tried cooperating with neighbours in land management activities?
- Would the landholder be interested in undertaking any joint projects with neighbours involving forest or riparian management?
- Establish the landholder's awareness of duty of care guidelines and regulations.

Whether a formal code of practice is needed for the industry

- Does the landholder believe that codes of practice are needed for their industry?
- Who would the landholder ask if they had questions about management practices best for their landholding?
- Does the landholder trust/respect these people? Why, why not? **or** Why would the landholder ask these people?
- Does the landholder have any involvement with Industry associations, NRM groups, Landcare groups and/or farming groups? Which ones?

Further Information

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This document is available for download at http://www.rrrc.org.au/publications/research_reports.html

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