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Factors that Influence Sustainable Land Management and Wetlands Conservation on Freehold and Leasehold Land in the Great Barrier Reef Catchment

Recommendations for Incentives in a Regional Natural Resource Management Context

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This work is a <u>DISCUSSION PAPER</u> based on:

Volume 1. *Capacity of NRM Regions and Local Governments in the Reef Catchment to Support Sustainable Land Management Practices and Conservation on Private and Leasehold Land*

Volume 2. *Review of Incentives Encouraging Improved Land Management In The GBR Catchment: Criteria For Effective Incentives*

Volume 3. *Landowner Attitudes to Wetlands and Wetland Conservation and Incentives*

Executive Summary and Project Recommendations

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Introduction

This paper summarises and builds on the findings of a study entitled *Sustainable Land Management and Wetlands Conservation on Freehold and Leasehold Land in the Great Barrier Reef Catchment* (Mackenzie et al. 2004) conducted by the CRC for Coastal Zone, Estuary and Waterway Management for the Department of the Environment, Water, Heritage and the Arts. The study provided an insight into the factors that influence the uptake of sustainable land management practices by private and leasehold landholders, with specific reference to wetland conservation on private land. It made a number of recommendations concerning currently available incentive programs so as to improve their efficacy. The purpose of this paper is to provide resource managers with a summary document of the major findings and recommendations from the study, but also incorporates additional stakeholder input and places the outcomes of the original study into a regional NRM context within the Great Barrier Reef (GBR) catchment.

Background and methodology

The purpose of this study was to provide recommendations to the Department of the Environment, Water, Heritage and the Arts on an appropriate mix of incentives to increase sustainable land management practices on freehold and leasehold land, particularly with reference to wetland areas in the Great Barrier Reef catchment Natural Resource Management (NRM) regions. It investigated the social, economic and institutional factors influencing sustainable land management. The study was reported in four separate but linked volumes:

- Volume 1, *Capacity of NRM Regions and Local Governments in the Reef Catchment to Support Sustainable Land Management Practices and Conservation on Private and Leasehold Land*, consists of a socio-economic and demographic profile of the Natural Resource Management regions in the Great Barrier Reef catchment. It includes an assessment of the level of institutional support for sustainable land management and the opportunities provided to private and leasehold land managers in each region for participation in planning. The socio-economic and demographic information was collated from published data, while the institutional information was obtained from interviews and surveys of regional NRM bodies, local government, State agencies and industry groups.

- Volume 2, *Review of Incentives Encouraging Improved Land Management in the GBR Catchment: Criteria for Effective Incentives*, provides a review of incentives currently available to encourage sustainable land management practices and biodiversity conservation on private land in Queensland. It considers incentives that facilitate, induce, or compel improved land management practices impacting on the quality of water entering the Great Barrier Reef (GBR) lagoon. Although this report categorises incentives according to whether they facilitate, induce, or compel change, it acknowledges that the incentives reviewed (apart from regulations that set and enforce environmental standards) demonstrated elements of all three mechanisms. The review forms the basis for the identification of a number of criteria for effective incentive programs. Interviews were undertaken with State government agencies, industry organisations and local government.

- Volume 3, *Landowner Attitudes to Wetlands and Wetland Conservation Programs and Incentives*, comprises an assessment of landowner knowledge, attitudes and participation in sustainable land management and conservation of wetlands; it also identifies underlying

factors influencing landholders' adoption of sustainable land management practices. Finally, current levels of awareness and participation in existing incentive schemes were examined. This information was obtained, firstly, from focus groups within each of the NRM regions (with the exception of the Northern Gulf region) to identify key issues. Secondly, information came from an attitudinal survey of 800 landholders within the GBR catchment to obtain more specific information: landholder socio-demographic background, awareness of current programs and incentives, participation in government sponsored schemes, communication and information networks, and perceived barriers and incentives to adopting sustainable land management and practices and conservation.

- *Executive Summary and Project Recommendations*. This document provided recommendations to the Department of the Environment, Water, Heritage and the Arts on an appropriate mix of incentives to increase sustainable land management practices on freehold and leasehold land, particularly with reference to wetland areas in the Great Barrier Reef catchment NRM regions.

Factors that influence the uptake of sustainable land management practices

Successful uptake of sustainable land management practices is influenced by three types of factors. These are the characteristics and attitudes of the landholders themselves (termed landholder factors in this paper), the structure and features of incentive programs (termed program factors), and the level of institutional support and capacity in the regions (termed regional capacity factors). Ideally, these factors should be considered simultaneously when investigating the uptake of sustainable land management practices.

This paper examines landholder characteristics of six NRM regions comprising the GBR catchment (Burnett–Mary, Fitzroy, Mackay–Whitsunday, Burdekin, Wet Tropics and Cape York) and assesses the program characteristics operating within the catchment (and, where relevant, identifying regional differences). This information informs recommendations about the characteristics of an incentive package that could increase sustainable land management and wetlands conservation in the GBR catchment.

Landholder factors

Landholder factors broadly cover landholder and property characteristics such as financial stability, attitude toward the environment, stewardship/conservation ethic, social dynamics within the local area and location in the catchment. According to the focus groups conducted as part of the assessment of landholder attitudes (Volume 3: §2.1), financial viability was a major factor in landholders' ability to adopt new practices. In addition, the attitudinal survey indicated that landholders who were confident about their financial viability were more likely to undertake sustainable land management (Volume 3: §4.2). Landholders indicated that it was difficult to 'act green' when their financial outlook was poor (Volume 3: §3.1.1).

A number of factors influence financial viability, including structure of debt, farm business profit at full equity, rate of return, size of enterprise and diversity of enterprise. All regions in the GBR catchment are subject to relatively low rates of return on invested capital (1–4%) that militates against spending on improved NRM (Volume 1: 9).

With regard to profit levels at full equity, farms in the Burdekin and Fitzroy appear to be better positioned than those in other regions; however, both the Burdekin and the Fitzroy are burdened with high levels of debt. According to Hildebrand's estimate of sugarcane farm viability based on minimum farm crop size (Hildebrand 2002: 17), only cane farms in the Burdekin region appear to meet the requirements for a viable farm.

The study suggests that, on its own, the actual amount of farm debt relative to equity in the GBR catchment is not a problem. However, uncertainty arises from the structure of the debt, the age of farmers incurring the debt (generally between 45 and 65) and the poor return on capital and equity. Interest-only debts have the potential to destabilise the farm unit and therefore affect capacity to invest in sustainable land management (Volume 1: §1.1.3.1).

The economic data indicated that the size of an enterprise had a significant impact on the financial viability of beef enterprises. Larger producers (managing herds in excess of 1000 head) are generally able to sustain positive rates of return, including during periods of climatic extremes (e.g., drought), whereas smaller operators (less than 1000 head) struggled to produce non-negative rates of return at any stage since 1990. Although there was no data available on beef enterprise size at a regional level, Queensland-wide data suggested (Volume 1: §1.1.5) that there were a large number of financially marginal beef farms (i.e., those operating herds less than 1000 head). This has implications for uptake of sustainable land management practices. The beef industry is an important contributor to the regional economies of the Burnett–Mary, Burdekin, Fitzroy and Cape York regions (Vol. 1: §1.1.2).

There is evidence to suggest the existence of a positive correlation between size of enterprise and financial viability, particularly in the beef and sugarcane industries. Further, the attitudinal survey (Volume 3) across all industries indicated that larger landholders tend to perceive environmental issues more seriously. In addition, the attitudinal survey indicated that those deriving incomes solely from agriculture controlled significantly larger holdings and, in turn, were more likely to implement conservation practices.

Based on the evidence presented in the socio-economic study (Volume 1), it is likely that farmers will need to increase productivity levels and consider diversifying production to maintain or increase their return on capital. Given the variability and unpredictable nature of world commodity prices, diversification of production at a regional level is important. This is of particular concern for the Mackay–Whitsunday region where 80% of the value of agricultural production is derived from sugar cane. The Burnett–Mary has the greatest distribution of agricultural production across a number of sectors (Volume 1: §§1.1.1, 1.1.2).

At a regional level, it is important to look at the relative contribution of agriculture to the overall economy. A simple indicator of a region's economic structure is the sectoral distribution of employment. In 2001, with the exception of Cape York, the major employer in all the regions was the trade sector, followed by community services (including education and health services). The Cape York and Burdekin regions have the least percentage of total population employed in the agriculture/forestry/fisheries sector (around 5%) and the Burnett–Mary region the highest (13.6%). The Burnett–Mary region also has the highest overall unemployment. This has implications for finding alternative sources of employment for those managing financially unsustainable enterprises (Volume 1: §1.3.1).

A reliable supply of water for irrigation will likely facilitate the stabilisation of existing farm production and enable diversification, which in turn might lead to increased financial stability. Given that most of the irrigated land within the GBR catchment (with the exception of the Burnett–Mary and Mackay–Whitsunday regions) relies on relatively inefficient furrow irrigation (Volume 1: §1.1.6.1), programs that encourage and facilitate improved water use efficiencies (such as the Rural Water Use Efficiency Initiative), as opposed to the construction of new water infrastructure such as dams, could offer a cost-efficient solution to water shortage and provide both financial and environmental benefits. However, proposed initiatives should ensure that sustainability outcomes are not discounted in the pursuit of increased productivity.

The attitudinal survey (Volume 3) identified several landholder factors that were associated with implementing sustainable land management practices: involvement in landcare or catchment management groups, participation in training for land and water conservation, training for farm and business productivity, and awareness of conservation schemes and incentive programs. Conversely, participation in farm/business productivity groups (as opposed to training) was a negative factor in implementing sustainable land management. At a regional scale, the data was not reliable; however, over the whole of the GBR catchment, around 23% of landholders surveyed were involved in productivity groups and 18% were involved in landcare or catchment management groups. This is significantly lower than the national landcare participation rate of 34% (Volume 3: §4.2.5). Nearly 30% of participants had been involved in either productivity training or land and water conservation training, which seemed to have a positive effect on uptake of conservation practices (Vol. 3: §4.2.5).

Awareness and involvement in existing incentive programs was a positive influence on implementing sustainable land management practices. The landholder survey (Vol. 3: §4.3) found awareness and participation rates in a number of prominent programs were low.

Interestingly, whether a landholder perceived environmental issues to be important or not did not appear to be a major factor determining their uptake of sustainable land management; the explanation probably has to do with more important landholder and program factors and the complex relationship between attitudes, stimuli and responses (Vanclay & Lawrence 1995). Also, demographic factors such as age did not seem to influence uptake of sustainable land management practices (Volume 3: §4.3.2).

Program Factors

Program factors refer to the structure and features of programs, offered by government, community and industry, to facilitate sustainable NRM. These program factors may include financial incentives offered, duration and continuity of the program, flexibility (ability to be used in a variety of enterprises and farming regimes), information and education provision. A number of program factors influencing the uptake and the outcomes of sustainable farm management programs were identified both by the focus groups conducted as part of the attitudinal survey (Volume 3) and the analysis of existing incentive schemes (Volume 2). Program factors encompass the structure, features and administration of the programs offered and other associated factors such as the overall approach and scale of delivery.

Often a program is considered successful if it has a high level of participation. However, the criteria for effective implementation should encompass relatively high take-up, minimal unintended outcomes, and effectively meeting their stated objective (Volume 2: §5).

Desirable program factors include:

A holistic integrated approach

Government agencies and non-government sectors attempt to modify the behaviour of land managers by using instruments that either facilitate, compel or induce change; alternatively, they can design policies combine these mechanisms. Instruments to compel change generally refer to command and control regulations that prohibit certain activities. In most cases regulations are only useful for achieving a minimum duty of care with respect to environmental issues and may not promote long-term sustainable management outcomes. Regulations are generally more cost-effective when applied to point sources of pollution. Where the source of pollution is diffuse, as is frequently the case in agriculture, regulations tend to be relatively less cost-effective. Nevertheless, regulations offer a major disincentive and can prevent gross breaches of environmental legislation by recalcitrant or unresponsive land managers (Volume 2: §1.1.1).

On the other hand, instruments that facilitate change can encourage natural resource users to meet and exceed an environmental duty of care. Facilitative mechanisms (also known as motivational or suasive measures) involve policy designed to increase the supply of, or create a flow of, new and useful information. Due to their voluntary nature, facilitative mechanisms are likely to be most successful where the desired behavioural modification results, directly or indirectly, in increased returns to the targeted industry or individual (Productivity Commission 2003: 189) – in short, where public interest and private benefits are closely aligned. Where self-interest is lacking, the success of facilitative mechanisms alone is likely to be limited (Gunningham and Sinclair 2004).

The inherent limitations of legal and facilitative instruments reinforce the need for economic incentives. Change can be induced by providing financial incentives to landholders to implement sustainable management practices (Volume 2: 1.1.3). This type of policy is needed to deal with farmers who see no particular benefit from adopting sustainable practices (Bromley 1997: 51). Policies designed to induce change include economic instruments such as tax incentives, fees, subsidies and grants, management payments, offset schemes and tradeable permits.

Clearly defined objectives/performance indicators and monitoring of outcomes

The objectives of the program must be made explicit: for example, identifying NRM targets and timeframes. Within any program, monitoring should be routinely incorporated and budgeted for, providing encouragement for policy-makers to be explicit about the purpose of the incentives. Thus, if the objective is for all land managers to develop property management plans, then monitoring would focus on the number of properties with plans in place. Similarly, if the objective is for the plans to be implemented, then monitoring would be directed towards identifying on-ground progress towards meeting NRM targets.

On-going monitoring of outcomes associated with incentive payments is essential. Monitoring provides justification for the provision of public funding; it also helps determine whether regional or catchment targets, and program objectives, are being met. Often, at the property level, on-going monitoring of processes and management tools is non-existent. For example, the myriad of property management plans currently required from resource users are checked once; subsequently, however, no monitoring is undertaken to determine whether documented plans have been implemented, a situation making an assessment of outcomes against stated NRM targets impossible.

Monitoring and data collection, analysis and compilation would aid the evaluation of current incentive programs and the creation of new, more cost-effective programs in the future (Volume 2: §5.2).

Flexibility

Landholders and industry bodies considered flexibility to be one of the most important characteristics of successful NRM programs. In this context, flexibility refers to programs that can:

- meet the needs of individual landholders in terms of how funding can be spent at the farm level. For example, FarmBis has high take-up rates and this could be a response to the program's flexibility that allows landholders to choose training courses that are most useful to them. The Rural Water Use Efficiency Initiative included a financial incentive that provided funding for investment in water use efficiencies. How the money was spent at the farm level was left largely to the discretion of the land manager (however, decisions were often informed by the assistance of an industry or government extension officer);
- be adapted to match local priorities, allowing the use of local knowledge and negotiation of desired outcomes; and
- adjust to changing community preferences and allow for scientific uncertainty (i.e., based on an adaptive management model).

In addition, it is important that programs be flexible in terms of eligibility. The use of eligibility criteria that are not related to the desired NRM outcomes can result in unintended consequences. For example, means testing is important when income support is provided. However, when applied to programs designed to bring about the provision of public benefits, it is less relevant. Means testing can result in artificial allocation of funding with little or no relevance to the level of public benefits. Where funding for NRM is allocated for specific purposes, then a number of criteria, including the level of ecosystem services to be provided, are recommended. Therefore, broad-based projects, such as the Commonwealth Environmental Management System incentive scheme, should not necessarily be means tested (Volume 2: §5.3). Means testing also has the potentially negative consequence of rewarding poor performers/managers, an accusation that has often been levelled against drought-relief schemes.

Landholders also identified that they wanted incentives to be flexible in terms of the type of economic incentives offered (e.g., rate rebate, tax rebate, direct incentive, in-kind support) since that enabled them to choose the incentive most suited to their personal circumstances (Volume 3: 12). Flexible program delivery might be encouraged by regional facilitation.

Auctions of conservation contracts provide incentives for landholders to improve natural resource management and the auction mechanism introduces flexibility and cost effectiveness into the payment process (Volume 2: §2.1.5).

Marketing incentives: Extension, education and community engagement

Marketing is an important component of effective incentive programs. The landholder survey indicated that awareness of some existing incentive schemes was low, a result that might reflect inadequate marketing. For example, more than 90% of respondents to the landholder survey were unaware of the Australian government's Envirofund (Volume 3: §4.2.4).

Incentives need to be marketed directly to the target resource users. It is not enough for programs to be announced through the popular media, nor is it enough simply to announce that funding is available for a particular purpose.

It should be explained why an incentive is being offered and why landholder involvement is important. Landholders identified the importance of communicating the multiple benefits – for example productivity benefits, fisheries benefits as well as environmental benefits – of adopting sustainable land management practices (Volume 3: §3.1.4).

Marketing of broad-based programs (such as FarmBis) should be done in a way that targets all land users, not just those with a pre-existing interest in sustainable land management. It is unrealistic to think that land managers would enrol in a course in sustainable production or NRM if they have no understanding of why this would be beneficial to their farm business. Therefore, the FarmBis program, although highly successful in terms of overall participation, should encourage enrolment across the entire range of courses (i.e., NRM, marketing, management, etc), not just participation in financial management courses (Volume 2: §5.4).

Both the attitudinal survey and review of incentives indicated that farmers were either unaware of, or not interested in, opportunities for wetlands management. This highlights the need to improve promotion, education and extension. Land managers appear to respond favourably to direct engagement through workshops and grower group meetings where there is peer motivation and exchange of local knowledge. This suggests that education and community engagement should be managed and implemented at the local level (Volume 2: §5.4).

Interestingly, the survey indicated that while landholders believed their activities had an impact on farm businesses, few believed these impacts extended to marine water quality (Volume 3: Table 6). Discussions with industry suggest that if the importance of specific NRM management techniques is conveyed effectively, the need for financial inducements might be reduced and enforcement of regulation made much easier (Volume 2: 52).

Structure and administration of programs and incentives

Landholders indicated that inadequate funding and lack of program continuity, including provision of extension services, were impediments to their uptake of sustainable land management initiatives. In addition, landholders indicated that the complex and confusing

process to access incentives, and the large volumes of associated paperwork, also discouraged them from participating (Volume 3: 11). A streamlined application and delivery process and long-term support, including extension for incentive schemes, is likely to increase uptake of these schemes.

Comprehensive risk analysis

The review of incentives indicated that an effective risk analysis is an important component of all incentives as it can identify outcomes (both intended and unintended) that might occur. It is critical that the risk analysis extends beyond the government agency or division responsible for implementing the policy or incentive program and includes all relevant stakeholders (Volume 2: §5.5).

A well-conducted risk analysis could avoid unnecessary re-evaluation and review. Incentives subjected to reviews and refurbishment to address avoidable outcomes run the risk of losing credibility, both with the industry groups charged with their promotion and with resource users who regard government commitment to incentives as critical for their involvement (Volume 2: §5.5).

Public benefit

Public funding for NRM incentives is limited. Available funds must therefore be allocated to produce an economically efficient and environmentally sustainable outcome.

Where financial incentives are provided to private landholders as part of a program to increase sustainable land management, payments should be restricted to those *contributing* to the provision of public goods. Private benefits should not be funded from the public purse. However, in particular situations, financial incentives can be used as a ‘circuit breaker’, offered for a limited period of time and set at a level that encourages investment, but it should not provide full funding for on-ground, capital works.

When financial incentives *are* provided for capital works, the longevity of the initial investment is important. This is particularly the case for wetlands, where the long-term ecosystem services provided by these areas can be easily lost (e.g., by weed infestation). Incentives should incorporate on-going management payments to ensure the continued supply of public benefits (Volume 2: §5.1).

External Factors

Factors influencing landholders’ decisions about participation in sustainable land management programs are complex and dynamic. All landholders and programs operate within an organisational context comprising other landholders, community groups, industry organisations, regional NRM bodies, and local, state and federal government agencies.

The level of institutional support and promotion of sustainable land management is not uniform across the GBR catchment. However, direct comparisons between regions are difficult as NRM regions have different areas and populations. Additionally, the NRM regions

themselves are not homogenous and there are a number of socio-economic, demographic and ecological differences within each region. While this paper highlights some of the differences between the regions, the factors influencing uptake of sustainable land management are complex and it would be inappropriate to suggest resources should be directed toward one region at the expense of another.

The attitudinal survey of landholders, the focus groups and discussion with industry bodies indicated that landholders in the GBR catchment did not have a high level of trust and confidence in government. This perception has significant consequences for how incentive packages are delivered. The focus groups indicated there was a high level of scepticism about the promotion of new practices, often because of past experiences with trying to implement agricultural research findings and the under-utilisation of local understanding of the region (Volume 3: §5). Building effective relationships with landholders and recognising and using local knowledge can go some way toward building trust with landholders; however, this requires fairly intensive on-ground human resources.

Alternatively, incentive packages can be delivered through trusted sources, such as industry organisations or local NRM bodies – provided they are not perceived as another 'arm of government'. The Rural Water Use Efficiency Initiative was delivered by industry organisations that had already established relationships with the landholders. Relatively high numbers of extension officers were employed to deliver the package, further increasing the capacity to build relationships and trust between the landholders and industry organisations. This approach means delivery tends to be more regional and therefore more flexible, thus meeting the program factor identified above. The limitations of this approach are that the government does not obtain the benefits of the improved relationships with the landholders and that the extension input is very much project-dependent (Volume 1, Part 2). Focus groups specifically identified the lack of government extension officers as contributing to poor communication between government agencies and the community (Volume 3: §3.2.6).

Burdekin and Fitzroy NRM regions

Land managers within the NAPSWQ regions of Burdekin and Fitzroy appear to have access to more support for sustainable land management activities than those in the Burnett–Mary, Wet Tropics, Mackay–Whitsunday and Cape York regions. They have access to more programs and funding as a consequence of being NAPSWQ priority areas, have more facilitators and co-ordinators and they receive a higher level of support from local governments (Volume 1: §2.4.2). It should be said that these regions are the largest regions in terms of area; however, in terms of employment, fewer people are employed in the agricultural sector than in either the Burnett–Mary or Wet Tropics regions (Vol. 1: §1.1.8).

The Burdekin, as a consequence of being more agriculturally diverse, has a potentially higher level of support from industry organisations than does the Fitzroy. The latter is larger and has a bigger population than the Burdekin, although this may be compensated by the fact that the Fitzroy has more facilitators and co-ordinators employed by the NRM body (Vol. 1: §2.3.2). This illustrates the balance regional groups need to strike between the number of coordinators and population considerations: while having many coordinator/facilitators may increase capacity, employing coordinators is expensive and the funding could otherwise be used for on-ground activities. Discussions with the Burdekin NRM group indicate local government capacity in rural areas is limited.

The Wet Tropics NRM region

The Wet Tropics region has the second highest number (after the Burnett–Mary) of people employed in the agricultural sector (Volume 1: 1.1.8). While not being a NAPSWQ priority region, it does appear to have a comparatively high level of capacity to support sustainable land management practices. This is reflected by the number and diversity of programs offered by local government within the area and the high number of environmental organisations (Volume 1: §2.5). Local government support, however, is not necessarily in those shires where there is a high level of agricultural activity (in Herberton and Atherton, for example). This region has been able to attract consistently high levels of Australian government Envirofund funding (Volume 1: §2.3.4), which may reflect a healthy level of support for on-ground activities, although it is difficult to establish how much of this activity would relate to sustainable land management on private land.

The Wet Tropics NRM body is an amalgamation of two pre-existing organisations, and they have a relatively high number of facilitators and co-ordinators. Although there appears to be fewer programs focussing specifically on sustainable land management on private land, this could be a consequence of the high proportion of land within this region being allocated for nature conservation (McDonald and Weston 2004).

Each year nearly 2 million domestic visitors and 1 million international visitors come to the region, directly supporting tourism businesses and indirectly supporting a substantial part of the regional economy. Tourism is by far the major source of revenue and total visitor expenditure levels exceed $2 billion annually (OESR 2002). According to the background report of the FNQ NRM regional plan (McDonald and Weston 2004), nature-based activities underpin tourism in the Wet Tropics and local residents (i.e., those residing in the Wet Tropics bioregion, *sensu* Sattler and Williams 1999) view the Wet Tropics World Heritage Area as an integral and cherished part of their natural environment and cultural landscape (Bentrupperbaumer and Reser 2003). It could be suggested that such nature-based tourism acts as a driver for sustainable land management, since it has a demonstrable economic benefit; however, this was not examined in the original study. In addition, the high intrinsic value placed on the Wet Tropics World Heritage Area could reflect a heightened level of environmental awareness. However, how this translates to individual landholder's management of their properties has not been explored, and the fact that a large percentage of landholders in the attitudinal survey did not relate their own land management activities to downstream environmental impacts (Volume 3: §4.2.1) needs to be taken into consideration.

Burnett–Mary NRM region

Of the whole GBR catchment, the Burnett–Mary region has the highest number and percentage of people employed in the agricultural sector (Volume 1: §1.1.8). Ostensibly this region has, as a consequence of the NAPSWQ initiatives, a large number of sustainable land management programs, but the level of overall support may not well reflect the importance of agriculture to the local economy and the large number of landholders. The region has the lowest farm income (Volume 1: §1.1.3), potentially resulting in a reduced likelihood of uptake of sustainable land management activities. This is of particular concern, since the

region has fewer facilitators and co-ordinators (Volume 1: §2.3.2) than other NAPSWQ regions, although this may be because the NRM body in this area uses a membership-based model; there is also a perception that this area is overlooked by research funding agencies as it is intermediate between South-East Queensland and the Great Barrier Reef and there is a high level of anti-government/bureaucracy sentiment in this region (personal communication, Burnett–Mary Regional Group for NRM Inc.). There also appears be a genuine lack of available resources and skills for NRM within local governments in this region (personal communication, Local Government Association Queensland).

Mackay–Whitsunday NRM region

The Mackay–Whitsunday region is significantly smaller in area than the other regions but has the highest population density (Volume 1: §1.2.1). The number of people employed in agriculture is similar to the Burdekin. The region's almost complete dependence on sugar within the agricultural sector, and the limited effort by local government for NRM activities, would indicate a need for increasing support to land managers in this region for facilitation of sustainable land management practices.

Cape York NRM region

Land managers in the Cape York region receive very little support for sustainable land management activities. This area is sparsely populated and has the lowest percentage of population employed in the agriculture sector (Volume 1: §1.1.8). However, 62% of all land use in this region is agricultural and of that, 62% is grazing (Volume 1: 1.1.1).

Conclusions and recommendations

Because wetlands have been identified as priority areas for conservation and management under the Reef Water Quality Protection Plan, programs that encourage wetlands conservation should be prioritised. However, apart from the wetlands mitigation-banking scheme adopted in the USA, there are few programs related specifically to wetland conservation. Therefore, Volume 2 was unable to specifically identify program factors related to wetland conservation.

The factors identified above are as applicable to wetlands conservation as any other sustainable land management practice. In terms of delivery it is not so much doing something special and different for wetlands conservation, but identifying which wetlands are conservation priorities, then examining the landholder, program and external factors that may influence the uptake of the desired practices and targeting resources to design the best suite of incentives for that area. This section will make a number of general recommendations applicable for the whole of the Great Barrier Reef catchment and provide a number of concluding recommendations for specific NRM regions.

Two important aspects of program delivery to increase the implementation of sustainable land management practices in the Great Barrier Reef catchment are regional delivery and the establishment of an effective extension and education program. It should also be pointed out that these two factors are interdependent.

Regional delivery

Whereas generic programs with broad land management objectives such as tax rebates do have their place, the study indicated that general take-up rates were low and their outcomes difficult to define and measure. Regional delivery has been demonstrated to overcome some of the key factors impeding both the uptake of sustainable land management programs and their success in meeting land management objectives.

First, by delivering at a sufficiently local scale, the objectives of the program can be clearly tailored to fit within broader land management objectives for the region. Second, regional delivery can ensure programs are sufficiently flexible to meet landholder's requirements in terms of their own land management objectives and financial situations; the activities can also be carried out in a way that best suits the individual or area. For example, in areas where a large proportion of farms are small and marginal, financial incentives to diversify or move off the land may be more appropriate than for areas with large holdings where overcoming labour shortages might be more of an issue.

Regional delivery also facilitates better environmental outcomes as groups of landholders can be targeted and there can be some coherence in management actions (e.g., a watercourse can be continuously fenced). Regional delivery can overcome issues of mistrust and allow for peer motivation and incorporation of local knowledge, two factors identified by landholders as being important for their participation in programs.

Another advantage of regional delivery is that new programs can complement existing ones since regional officers have a better knowledge of the current programs in that area than does a central administration. Landholders can obtain more support to assist with applications and the process is likely to be perceived as more personal and less bureaucratic.

In general, responses from the focus groups indicated that NRM groups were seen as an effective way of delivering natural resource management initiatives. This was particularly favoured where the actual delivery was highly localised, for example in the Fitzroy Basin Association Neighbourhood Catchment Programme. However, discussions with industry organisations and even NRM bodies themselves indicated there is a perception by some landholders that NRM bodies are "another arm of government" (Volume 2: §2.1.1) or they have no long-term future (Volume 3: §3.2.6).

Delivery via a partnership between NRM bodies and industry organisations may be the most effective mechanism, provided it is undertaken at a sufficiently local scale. To optimise these partnerships, it would be useful to assess how the different industries operate in different regions. For example, detailed information, in particular relating to the beef and horticulture industries, is not provided on a regional and sub-catchment level. This information is important, as there are substantial differences in land management practices and socio-economic characteristics between the different industries on a regional and catchment scale. It would be useful also to assess the effectiveness of existing sub-catchment programs initiated by NRM bodies.

Local government could potentially deliver incentive packages; however, with some notable exceptions, their capacity appears to be limited at this stage. This is being addressed through the NAPSWQ SIP local government capacity-building project (Volume 1: §2.4.3). Therefore,

a partnership approach between NRM bodies and regional industry groups could be appropriate as capacity increases.

Industry organisations have a good track record in the delivery of incentive programs. However, landholders who are potentially affecting wetlands often participate in more than one industry and there is often more than one landholder relevant to wetland impacts. The Farm Management System initiatives being developed by the intensive agricultural industries (within the Queensland Farmers Federation) are engaging NRM bodies and other partners to deliver an integrated property-level management system with the potential to overcome sectoral and other implementation issues and it should be supported where possible.

Education and Extension

In terms of increasing implementation of sustainable land management and wetlands conservation, there are potentially three main objectives for any education and extension program for landholders in the GBR catchment. The first is to increase understanding of the link between wetland degradation, agricultural practices and water quality in both the catchment and on the reef itself. The second is to increase understanding of which land management practices contribute to improving wetland water quality and how these actions can also often result in better profitability outcomes. The third is to educate landholders about what incentives are actually available and how they can access them.

It would appear that existing education and extension programs are inadequate. The landholder survey identified that a large proportion of landholders were not aware of (or did not believe) the link between their land management practices and reef water quality. In addition, their level of awareness of existing programs was very low. While 52% of respondents to the attitudinal survey did believe that wetlands conservation was important, it was considered less important than other issues such as soil erosion, pest plants and animals, salinity and chemical run-off (Volume 3: Table 10).

The attitudinal survey showed that by far the most important information sources alerting people to the availability of existing incentive schemes were friends and neighbours, followed by government agencies, then personal observation and the media. Environmental and community groups, and the Internet, were generally not responsible for initial awareness-raising (Volume 3: Table 12). These results, combined with low awareness, suggest that traditional mechanisms of communication are failing to reach landholders effectively. Therefore, any education and extension campaign needs to go beyond the traditional top-down, broad-brush approaches of developing and distributing brochures and posters and mass media campaigns; rather, it should directly target landholders via regional extension officers and local activities.

Both the review of the incentives programs and the focus groups indicated that there needs to be a more supported and better funded network of extension officers. As well as acting as a conduit of information from government and research providers to landholders, extension officers also play a significant role in trust and relationship-building. Additionally, they can facilitate peer interaction and knowledge exchange, considered the primary information source of the majority of landholders surveyed.

A well-functioning network of extension officers needs long-term support. Short-term, project-funded extension officers do not have the time to gain the trust of landholders, especially since mistrust of existing information about sustainable land management practices and existing incentive schemes is a key impediment to their implementation.

The establishment of a network of extension officers aligns closely with the concept of regionally delivered programs, since extension officers would be the ones dealing directly with landholders in delivery of incentive packages. Extension officers do not have to be government employees and can be employed through local government, regional NRM bodies or industry organisations. The Rural Water Use Efficiency Initiative provides a successful model for regional delivery through industry extension officers.

Regional extension officers are best able to meet the information needs of the local area and are most able to conduct their activities in a way that suits that community. An example of regional flexibility is the neighbourhood catchment scheme in the Fitzroy. Here it was identified that in some areas opportunities for peer interaction have to be designed outside of working hours to cater for landholders reliant on off-farm income, whereas in other parts of the region this is not such an issue.

Incentives for wetland conservation at a regional level

Due to the complexity of NRM – as well as the multiplicity of program, landholder and external factors influencing the effectiveness of incentives for industry in the GBR catchment – risk evaluation is difficult, even though it is certainly the case that some wetland areas are at risk and should be prioritised for specific conservation measures. Therefore, an evaluation tool for prioritising wetlands conservation is essential. The Decision Support System being developed by the Department of the Environment, Water, Heritage and the Arts is likely to provide an effective evaluation tool to identify priority wetlands based on environmental, social and economic criteria. In addition, providing support for sustainable land management practices in general and providing effective education and extension, financial incentive programs (including education and extension) need to be targeted at those areas with wetlands deemed to be of highest priority.

As discussed above there are no intrinsic program factors specific to wetlands conservation; however, some of the landholder and external factors identified in each region may point to appropriate mechanisms for implementing wetlands conservation.

Burnett–Mary region

Even though the Burnett–Mary has a reasonably diversified agricultural industry, profit levels are generally low and many sugar cane farmers in particular do not meet the minimum estimates for financial viability (Volume 1: §1.1.5.2.4). There is also a lack of local government capacity as a consequence of the high number of agricultural shires with low rate bases (Volume 1: 116), and there are few co-ordinators and facilitators considering the large number of people employed in the agricultural sector. Improving general capacity in this region and providing additional support to regional delivery mechanisms could lead to better NRM outcomes.

Sediment from grazing and forested lands supplies the majority of the sediment to the catchment and these land uses comprise up to 80% of the land use area within the region (Burnett–Mary Regional Natural Resource Management Group 2004). The Burnett–Mary Regional NRM Group Inc. is implementing the grazing land management (GLM) package in the Burnett–Mary region and additional incentives to support its initiative could have positive consequences for wetlands conservation and sustainable land management. In regard to cropped land, incentives might usefully target improved cultivation techniques since about half the relevant landholders in this region do not utilise zero or minimum till practices (which are considered more sustainable than other tillage practices). Assisting non-viable operators into other industries could have beneficial NRM outcomes; however, this is being undertaken through other programs such as the Sugar Industry Restructure Package (SIRP) and there are other issues regarding alternative sources of employment in this region.

Fitzroy region

Based on the landholder factors identified above, landholders in this region appear to be well positioned to invest in NRM. In addition, the Fitzroy Basin Association's existing neighbourhood catchments program seems to be reasonably successful, although it is still at a relatively early stage. Funding could be directed toward additional support of the neighbourhood catchment program, with the proviso that there be an increased focus on wetland conservation. The program would have to demonstrate that it meets the program factors identified above, particularly in terms of establishing clear objectives and monitoring outcomes.

There is scope in this region for programs that encourage increased irrigation efficiency. Improved irrigation efficiency has direct environmental benefits through water conservation, but it also improves financial viability – which in turn increases the likelihood of using sustainable practices. Nevertheless, it is important to ensure productivity gains are not made at the expense of environmental outcomes. A potential mechanism for delivery would be through the second phase of the Rural Water Use Efficiency Initiative, which has an established regional delivery mechanism.

Mackay–Whitsunday region

Although landholders in the Mackay–Whitsunday region are highly dependent on sugar cane, the sugar cane farms are, on average, not considered financially viable (Volume 1: §1.1.5.2.4). As in the Burnett–Mary, incentives could be offered for non-viable operators to move off the land. However, discussions with the Mackay–Whitsunday Natural Resource Management Group (MWNRMG) indicate that there is still a relatively high level of optimism about the long-term future of the sugar industry, and the attitudinal survey found that it was *perception* of financial viability that was an indicator of undertaking sustainable land management (Volume 3: §1.1.8).[1] Nevertheless, it would still be necessary to encourage greater diversification of agricultural output, remembering that while the region is small in area, it does have a relatively high proportion of people employed in agriculture. The

[1] The attitudinal survey did not assess actual financial viability and it may be useful to examine whether there is a direct link between farm income levels and sustainable land management in the GBR catchment.

MWNRMG is currently implementing the sustainable landscapes program, which incorporates a number of attributes identified for successful incentives. Additional support for this program could increase sustainable land management and wetlands conservation in the region.

Burdekin region

From the perspective of profit levels, landholders within the Burdekin region are well positioned to invest in NRM. The region is the only one where cane farmers are, on average, financially viable. As it is a NAPSWQ region, landholders have greater access to support for sustainable land management activities. The Burdekin is also the region least dependent on agriculture as a source of employment, although it does have the highest percentage of land use for agriculture (Volume 1: 30). As some of the main impediments for involvement in sustainable land management programs do not figure as prominently in this region, it could be an appropriate location to trial wetlands conservation auctions. This could build on what has been learnt from the biodiversity corridor auctions currently being trialed in the same region.

There is a large amount of land in the Burdekin under irrigation and there is scope for programs that encourage increased irrigation efficiency. Improved irrigation efficiency has direct environmental benefits to wetlands through water conservation but also increased farm financial viability. However, it is important once again to ensure productivity gains are not made at the expense of environmental outcomes. A potential mechanism for delivery would be through the second phase of the Rural Water Use Efficiency Initiative.

Wet Tropics region

The capacity of individual landholders to implement sustainable land management practices within the Wet Tropics is not particularly high, although there does appear to be a high level of external support for sustainable land management. Like with the other sugar-growing regions, assisting some producers out of the sugar industry through SIRP would have potential NRM benefits. The proactive nature of some local governments in this region, and the strong links between them and the regional NRM body, suggest that regional delivery in this area could be through regional body partnerships and local government or industry partnerships. This region, in conjunction with industry organisations, has focussed heavily on defining best management practice. The FNQ NRM group is planning to trial an auctions-based approach to incentive delivery; however, details are not yet available. This region also has scope for improved irrigation efficiencies delivered through the Rural Water Use Efficiency Initiative.

Cape York region

Due to the sparsely distributed population and lack of access to support, this region particularly needs strong education and extension networks to facilitate peer interaction. In addition, the almost complete dependence on grazing within the agricultural sector indicates that efforts to support sustainable grazing programs such as the Grazing Land Management program would be worthwhile.

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