1 Introduction

1.1 Background

The premise for investment in sustainable agriculture under the Bilateral Agreements between the Australian and Queensland Governments for Natural Heritage Trust and National Action Plan for Salinity and Water Quality is the achievement of the relevant Resource Condition Targets and Management Action Targets contained in regional natural resource management plans.

The activities to achieve these targets usually involve the development and adoption of better management practices and / or farming systems which are expected to maintain or enhance the resource base and related ecosystems both on and off the farm. This involves the engagement of land managers to build their understanding of natural resource management issues and create an environment that supports and influences them to make changes to the way in which they manage natural resources.

The Department of Natural Resources and Water (NRW) commissioned this Sustainable Agriculture Evaluation titled 'Assess the alignment between NHT and NAPSWQ Sustainable Agriculture objectives and relevant regional NRM plans and funded regional investment strategies' as one of six state level evaluations.

The evaluation may assist in guiding prioritisation and design of future initiatives in relation to sustainable agriculture under national funding programs.

The *Natural Heritage Trust Act 1997* defines 'sustainable agriculture' as: 'the use of agricultural practices and systems that maintain or improve the following:

(a) the economic viability of agricultural production;

(b) the social viability and well-being of rural communities;

(c) the ecologically sustainable use of Australia's biodiversity;

(d) the natural resource base; and

(e) ecosystems that are influenced by agricultural activities.

1.2 Objectives

The project seeks to identify and assess the impact of investment from the national programs under the National Action Plan for Salinity and Water Quality (NAPSWQ) and Natural Heritage Trust (NHT2) in sustainable agriculture in Queensland since the inception of NHT2 in 2002. The sustainable use of natural resources, including agriculture, is a key objective of the NHT2, and is influenced by the NAPSWQ. Under the Bilateral Agreements between the Australian and Queensland Governments for NHT2 and NAPSWQ, investment in sustainable agricultural systems has occurred via funding at the state-level, and at a regional NRM delivery level including cross-regional collaborative arrangements.

The specific objectives of the project are to determine:

1. the level of investment, at both the regional and state scale, in activities directly related to sustainable agricultural outcomes of the NHT2 and NAPSWQ programs, the objectives of

these activities, the location and extent of their operation and identification of gaps and overlap in investment and effort

2. the mechanisms employed, partnerships formed, tools developed and processes applied to achieve NHT2 and NAPSWQ programs objectives

3. the strength, nature and effectiveness of the relationships, partnerships and networks between the providers of various sustainable agriculture activities

4. the change in attitude of targeted NRM personnel toward, and awareness of, sustainable agricultural practices and outcomes; and the application of sustainable agriculture systems thinking in land management decision-making by these key personnel as a result of these investments

5. the effectiveness and efficiency of monitoring, evaluation and reporting (MER) strategies to measure, assess and report on the impacts of NHT2 and NAPSWQ investment in sustainable agriculture outcomes and how these approaches might be improved for future investment

6. the major learnings from the design, conduct and reporting of both operational and strategic activities that should be used in future initiatives in relation to sustainable resource use and what actions may improve the outcomes in relation to sustainable resource use.

The Terms of Reference for this project are included in Appendix 1.

1.3 Sustainable Agriculture Initiatives

The evaluation considered sustainable agricultural initiatives that had occurred through the regional NRM bodies, cross-regional or Strategic Reserve projects and at a state level via the Sustainable Agriculture State-level Investment Program (AgSIP).

Regional initiatives

With the regional NRM bodies, sustainable agriculture objectives are generally identified in the regional NRM plans within a sustainable production section (Land, Soils and Agriculture; Sustainable Use; Sustainable Landscapes; Land Use and Management; Use and Management of Natural Resources; Productive Landscapes; Productive Sustainable Use; Improving Land Management; Land). Over $23 million of NHT2 and NAPSWQ funding was identified in the sustainable production section of the three-year (2005-2007) regional investment strategies of the regional NRM bodies.

It must also be noted that sustainable agriculture is woven through other asset sections of the regional NRM plans, for example, coastal, waterways and biodiversity. The way sustainable agriculture is addressed through various sections of the regional NRM plans also applies to the regional investment strategies, and illustrates that sustainable agriculture is an important factor in the achievement of many Resource Condition Targets.

Strategic Reserve initiatives

The cross-regional investment in sustainable agriculture examined for this review comprised four Strategic Reserve (NHT2 funded) projects that have a focus on improving agricultural management practices and industry capacity to contribute to NRM targets.

The total NHT2 funding allocated to these four projects was $6.984m.

Reef Extension: Implementation of a pilot comprehensive extension service delivery program in high priority Great Barrier Reef Catchments (SW DPI01).

The Reef Extension project was developed to address an action of the Reef Water Quality Plan which aimed to improve land management practices within the cane, horticulture and grazing sectors of the Far North Queensland and Burdekin Dry Tropics regions and hence water quality entering the Great Barrier Reef through reduced nutrient and pesticide exports from priority catchments. The project was delivered by DPI&F with collaboration from the two regional NRM groups, agricultural industry bodies, farmers and graziers. NHT2 funding of $1.3m was allocated to the three year project (2005-2007).

The project has trialed and demonstrated best management practices for ground cover management, pesticide use, nitrogen and phosphorus use and soil management.

Reef Link: Implementation of Sustainable Coastal Agricultural Systems in the Great Barrier Reef Region (MW SR01).

This project provided on-ground extension activities to facilitate the adoption of sustainable coastal cropping and grazing management systems. The project was strongly aligned with the objectives of the Reef Plan. Regions involved were Mackay Whitsunday, Wet Tropics, Burdekin Dry Tropics, Fitzroy Basin and Burnett Mary. NHT2 funding of $763,000 was allocated to the project.

The project comprises various regional and industry participants, with Mackay Whitsunday NRM group as the lead proponent. The participants were: Terrain NRM, Burdekin Dry Tropics NRM, Fitzroy Basin Association, Burnett Mary Regional Group, BSES Limited, AgForce, Growcom, Private Forestry SEQ and DPI&F. The project supports a number of project officers based within the participant organisations.

Sustainable Management and Conservation of Grazing Lands (DC IFA03) (formerly Sustainable Grazing DCQ IFA03)

This project aims to facilitate the adoption of sustainable practices in the extensive grazing areas of Queensland by land managers, community groups and other natural resource managers by providing the networks, understanding, skills and technical support required, thereby contributing to natural resource management and biodiversity conservation outcomes. NHT2 funding of $3.521m was allocated to the three-year project.

Desert Channels Qld Inc is the lead proponent on behalf of the Northern Gulf, Southern Gulf and South West regions. The project aims to develop customised Grazing Land Management and StockTake monitoring training packages for the landscapes in each of the five regions and deliver training to at least 300 properties.

Systematic Sustainable Agriculture Strategic Reserve NHT2 and NAP funds (FB SR01).

This project seeks to develop the capacity of industry and regional bodies to plan and implement sustainable agricultural programs that address industry and regional bodies priorities and NRM targets. The project aims to support industry to bring on line a range of specific programs and services to a level of readiness that will assist regional NRM bodies through their planning processes to implement priority sustainable agricultural production practices at a property, catchment and regional level as identified in the regional NRM plans

and regional investment strategies and which deliver outcomes for priorities like Reef targets.

The project intends to have a partnership approach with joint design, development and trial of programs by the various industry sectors and regional NRM bodies. NHT2 and NAP funding of $1.4m was allocated to the project.

The project comprises the following industry-based programs:

- Growcom FMS program – Development and delivery of five Farm Management Systems modules for coastal horticultural industries using a risk management process.
- Dairying Better 'n' Better for Tomorrow program – Coordinated delivery arrangements and support services which address priority gaps in regional delivery of the program across the Condamine, Burdekin Dry Tropics, Burnett/Mary, Fitzroy and Far North Queensland regions.
- Cotton BMP programs – Cotton Australia will revise and update the cotton industry Best Management Practices program incorporating information on local and regional NRM issues.
- Nursery Production FMS program – Awareness training conducted across Queensland at a group level using existing Environmental Management Systems and other tools, plus one-to-one business support services.
- AgForward Grazing program – report and analysis of priority strategic gaps in regional delivery of grazing programs.
- AgForward Grains program – scope and demonstrate needs and benefits of a grains program in conjunction with AgForce, AgForward, Cotton Australia, Grains Council, Grains Research and Development Corporation and regional groups. Recommend program design, delivery and funding arrangements.

In addition the project will develop a coordinated framework for linking property level management programs and a framework for coordinating the planning, implementation and analysis of sustainable agricultural production programs across stakeholders (industry, R&D corporations, regional bodies and government).

Sustainable Agricultural State-level Investment Program

The Sustainable Agricultural State-level Investment Program (AgSIP) was funded by the National Action Plan for Salinity and Water Quality and led by the Queensland Department of Primary Industries and Fisheries (DPI&F). The program attracted $7.8m NAPSWQ funds.

The Program had three objectives:

a) At a state wide level: To guide the implementation of strategic sustainable agriculture coordination mechanisms, oversee the preparation of new or emerging investment strategies, and provide policy and high-level operational advice that may assist in the transition towards new national funding arrangements.

b) At an institutional level: To development and trial of collaborative partnerships (and co-investment models) which promoted multi-disciplinary and multi-sectoral approaches to identification, design and analysis of agricultural initiatives.

c) At a regional agency or industry level: Provide all stakeholders with the capacity to effectively engage in, and support, processes that target, maintain and achieve profitable agricultural practices which provide good NRM outcomes.

The Program commenced in March 2004 and concluded in June 2007 (final report on AgSIP is available at http://www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/4789_6647_ENA_HTML.htm)

The program comprised 18 AgSIP projects under four themes:

- **Grazing lands management** – developing best practice grazing management guidelines with stakeholders and supporting land managers in the transition to more sustainable grazing practice.
- **Industry natural resource management** – developing the capacity of industries (horticulture, cotton, grain and cane) to engage and be involved in the regional natural resource management process
- **Landscape management** – developing innovative ways to support communities in monitoring and actioning natural resource management issues
- **Coordination and process support** – economic, biophysical and social work to develop new decision support tools and processes. Overall coordination and communication.

The projects worked across the six NAPSWQ regions (Fitzroy Basin, SEQ Western Catchments, Queensland Murray Darling Basin, Condamine, Burdekin and Mary-Burnett) however they were intended to deliver outcomes that all regions can use.

Projects were contracted to Queensland Farmers' Federation, Cotton Catchment Communities CRC, CSIRO, University of Central Queensland, Canegrowers Burdekin Limited, Department of Natural Resources and Mines and DPI&F. The program was administered by DPI&F via AG03 and a multi-organisational Board.

1.4 Methodology

This evaluation has been overseen by an evaluation steering committee comprising representatives from the Department of Natural Resources and Water, the Department of Primary Industries and Fisheries, Queensland Farmers Federation, Canegrowers and Burdekin Dry Tropics Natural Resource Management.

The approach to this evaluation comprised two stages. The first stage involved a desktop review of relevant documents and interviews with regional NRM bodies and other stakeholders (to address objective 1 of the evaluation) to:

- assess the level of investment in sustainable agriculture;
- identify the approaches taken to achieve sustainable agriculture outcomes; and
- identify any gaps and overlaps in sustainable agriculture investment.

The review involved an analysis of the following documentation:

- Regional NRM plans (published 2004 and 2005)
- Regional Investment Strategies 2004-2007

- Regional NRM group annual reports (2005/06)
- Strategic Reserve project proposals
- Strategic Reserve performance reports (JSC Summary Analysis, 6 monthly reports)
- AgSIP detailed project work plans and evaluation documentation
- AgSIP Final Report
- Other performance reports, project proposals and evaluation reports (where applicable)

The second stage involved the development of case studies as the primary mechanism to address objectives 2, 3, 4 and 5 of the evaluation.

The case studies were developed through a combination of data collection via interviews and document analysis. In general, information on the regions or topics was collected and examined, prior to more detailed data gathering via interviews with selected personnel involved in the case study topics. Many of the interviews were conducted in person in the various regional centres in which the case studies were based, e.g. Longreach, Roma, Cairns, Townsville, Mackay. Other interviews were conducted by phone or with stakeholders in Brisbane. Additional stakeholders were identified by interviewees and some of these were subsequently included in the consultation process.

Information available on websites and in the public domain at regional, state and national levels relating to the regional NHT2 and NAP investment programs was also reviewed.

The four case studies are presented in full in the Appendices. The case studies are:

a) Approaches to Developing and Implementing Sustainable Agriculture Best Management Practices

b) Partnerships for Sustainable Agriculture between Industry, Government and NRM Groups

c) Grazing Land Management: Attitudinal Change among Sustainable Agricultural Stakeholders

d) Monitoring, Evaluation and Reporting on Sustainable Agriculture

1.5 Limitations and Assumptions

One of the objectives of the evaluation was to determine the level of investment directly related to sustainable agricultural outcomes. It became apparent during the stakeholder interviews and desktop review of regional NRM plans and regional investment strategies that distinguishing investment related to sustainable agricultural outcomes from other outcomes, such as water quality and biodiversity was complicated by the lack of a common reporting framework for regional NRM bodies that required them to identify and report specifically on investment in ‘sustainable agriculture’.

Secondly, the integrated nature of many regional projects sees projects constructed from a range of funding sources and meeting multiple outcomes. Consequently, for these integrated initiatives, it is difficult to determine with confidence the level of investment related to sustainable agriculture outcomes of the NHT2 and NAPSWQ programs.

2 Findings

2.1 Investment in Sustainable Agriculture

The general intent of sustainable agriculture initiatives at regional, cross-regional and state levels is to contribute towards the achievement of agricultural practices and systems that are economically viable for producers and that minimise or avoid detrimental impacts on the natural resource base and related ecosystems.

It is evident that this broad objective for sustainable agriculture initiative applies throughout the state and to all agricultural industries.

Investment from NHT2 and NAPSWQ has provided important resources for industry, state agencies and regional NRM bodies to initiate or to continue the development of best management practices (BMPs) for agriculture and their adoption by land managers. This investment has been complemented by funding from industry research and development corporations (RDC) and grower representative organisations covering the Queensland agricultural sectors, e.g. sugar, cotton, horticulture, meat, dairy, grains, etc.

Landholder contributions also occur throughout the different sustainable agriculture initiatives in the form of cash, time, knowledge and expertise.

Best management practices are well defined for relatively few industries and regions. The Condamine benefits from a long history of local research based out of Toowoomba. This research provides a strong evidence base for BMPs especially in cropping systems. However, there are still issues requiring research such as the effect on groundcover from fencing off waterways.

BMPs for grazing systems have been defined for some areas to address issues such as ground cover and water quality. Management practices will vary greatly between and within regions and from season to season. The intensive mixed systems near the coast for example, are based on very different and generally more resilient assets than the extensive grazing and rangelands systems to the west. They require very different management systems.

BMPs for integrated pest management and for water, nutrient and herbicide/pesticide management in horticulture and cane farming are partially defined. For some industries, for example cotton and cane, there are relatively well established BMP packages.

Most of the Queensland regions are engaged more or less in development of BMPs for their major industries. In seeking to develop best management practices and to gain adoption, investment has been sought by regional NRM bodies to address the high priority impacts of agricultural management practices on resource condition as identified in regional NRM plans. Where there have been strategic reserve projects and AgSIP projects in regions, it is apparent that the regional NRM bodies have managed their funds so that the strategic reserve and AgSIP projects have complemented regional initiatives rather than overlapping them. This principle has been applied to other funds such as National Landcare Program (NLP), for example, NLP funding has been used as incentive payments to land managers for practice change to complement NHT2 funded extension projects.

2.2 Approaches to Sustainable Agriculture

This review has identified what is generally perceived as the conventional approach to addressing sustainable agriculture issues through changing on-farm management practices.

This approach encompasses:

- Undertaking research to identify the relationship between agriculture and the condition of natural resources;
- Undertaking research to understand attitudes, drivers, constraints, etc, of land managers towards management practices and to understand awareness of agriculture / natural resources relationship;
- Building awareness and understanding among land managers of sustainable agricultural objectives;
- Assessing a range of range of options and identifying the most appropriate approach or suite of interventions;
- Developing recommended land management practices (Much of the approach to working towards sustainable agriculture is underpinned by the development of Best Management Practices which can be applied at the paddock or property scale.);
- Developing property management plans;
- Supporting land managers to implement plans and change their land management practices through extension activities (group and one to one), training, financial support, e.g. MBIs, grants, incentives.
- Monitoring, evaluation and reporting on sustainable agriculture activities.

The approach can be thought of as occurring via four stages which can overlap and inform each other as part of a continuous improvement cycle. The stages are:

- Problem identification
- BMP development
- BMP implementation
- Monitoring and Adaptation

Engagement with a range of stakeholders in sustainable agriculture generally occurs for each stage. The approach to engagement for the stages may vary according to the purpose but it is evident that there is widespread recognition that good quality engagement contributes to more successful outcomes from each stage (see Table 3-1).

Table 2-1: Sustainable Agriculture Activities

Stage	Purpose	Typical Activities	Engagement Processes
1. 'Problem' Identification	To identify what aspect of agricultural production needs to be changed to improve sustainability	Research; Consultation; Strategic Planning; Risk Assessment	Engagement with land managers, industry organisations, community groups, regional NRM groups, state agencies, scientists and other stakeholders
2. BMP Development	To develop solutions to the 'problem', e.g. BMPs, that are workable and effective	Partnerships and co-investment approaches to collaboratively develop projects.	
3. Implementation	To develop and implement projects to apply solutions, e.g. BMP uptake	Use of different mechanisms and tools to support landholder adoption, e.g. education, training, extension, incentives	
4. Monitoring and Adaptation	To assess effectiveness of projects and adaptively manage (short-term); To assess efficiency, suitability and effectiveness of approaches, tools used, BMPS and achievement of targets. To assess changes in adoption rates (BMP uptake), attitudes and resource condition (long-term)	Project evaluation. Landholder surveys (BMP adoption), resource condition monitoring such as water quality indicators	

It is evident that agencies and regional NRM bodies involved in sustainable agriculture initiatives recognise the need to engage with and understand the motivations and concerns of land managers as a critical early step in projects. There was some acknowledgement that the importance of this step was not widely appreciated in some of the earlier sustainable agriculture initiatives which led to less than ideal outcomes. This understanding has been developed through experience but also, in some regions, through Sustainable Agriculture SIP and Social and Economic SIP projects.

Having developed both a better understanding of, and relationship with, land managers, agencies and regional NRM bodies are then better equipped to introduce their issues and objectives for land management.

The planning processes for sustainable agriculture initiatives are generally characterised by an inclusive approach that brings together the relevant stakeholders from industry, state agencies, the regional NRM bodies and community. According to stakeholders interviewed for this evaluation, the extent to which the stakeholders are involved varied considerably however and with varying degrees of success. Factors which contributed to this variability include;

- differing expectations of how engagement should occur;

- the availability of personnel to represent stakeholder views;
- the extent of existing networks and relationships;
- organisational culture that encourages collaborative approaches;
- the rate of staff turnover in organisations; and
- the timeframes of projects.

In some regions, there are industry and community representative groups that advise the regional NRM bodies for example the Industry Advisory Group of Terrain NRM. These groups can provide important linkages to industry and advice on issues affecting producers.

The delivery of sustainable agriculture initiatives generally occurs in two ways. The first way involves industry-based staff (e.g. Growcom, Queensland Dairyfarmers Organisation, BSES Limited) having the primary role in working with land managers. A strength of this approach is that the credibility of industry staff enables a point of entry for other stakeholders such as regional NRM bodies and DPI&F. The second approach involved projects being delivered directly by DPI&F, regional NRM bodies or the private sector. Both approaches can be effective, however it is important that delivery needs to be done with the knowledge of what the other stakeholders are doing. Delivery in isolation from other stakeholders is a source of frustration for all stakeholders in sustainable agriculture because it can lead to projects being delivered without awareness of relevant research, previous extension activities, appreciation of industry issues and so on.

Incentives to promote adoption of BMPs are a cornerstone of the regional investment strategies. Most regions report that these schemes are well, if not, over-subscribed. Most regions also employ some form of property management planning to promote holistic adoption of BMP systems.

The incentives and other actions to promote adoption are limited in their reach by the amount of resources available for investment by both the regional groups and the producers

The Sustainable Landscapes Program of Mackay Whitsunday NRM is an example of how the planning and delivery of a sustainable agriculture initiative has taken an inclusive approach and used the most appropriate organisations to deliver the various components of the initiative (refer Case Study B in Appendix 3).

MW NRM Sustainable Landscapes Program – a partnership approach

The Sustainable Landscapes Program was developed by MWNRM and stakeholders as an incentive scheme to accelerate the adoption of the most sustainable and innovative practices by land managers throughout the Mackay Whitsunday region. The sugar cane component of the program has been supported by numerous sustainable agriculture stakeholders - local catchment management groups, BSES Limited, Mackay Area Productivity Service, DPI&F, Canegrowers and the cane producers themselves. In particular, MWNRM, BSES Limited, DPI&F and selected producers have worked in a partnership to continually develop and refine the sugar cane component of the Sustainable Landscapes Program with each stakeholder providing a view that is respected amongst the partnership.

MWNRM devolved funds to BSES Limited to provide for the delivery of services of a Sugarcane Industry Sustainable Landscapes Extension Officer. The position established to provide a direct link between cane growers and the Sustainable Landscapes Program. The local BSES Limited office in Mackay is respected by cane growers in the region and so for MWNRM it was an easy decision to make - why not capitalize on the credibility of BSES and support a position within BSES, rather than creating a position within MWNRM which would then need to establish a relationship with growers. The approach adopted by MWNRM reflected the organisation's maturity and commitment to tailoring solutions to fit the purpose.

2.3 Partnerships between Sustainable Agriculture Providers

In general, all the stakeholders involved in sustainable agriculture consulted for this evaluation acknowledged the critical importance of building sound relationships with industry, government and NRM groups that are genuine and inclusive in order to achieve their sustainable agriculture objectives.

This was reflected in the AgSIP Final Report[1] which stated:

> As so much of the work and issues in sustainable agriculture are inter-linked across intent, funding, delivery and outcomes, a partnership approach involving the major participants (Regional Bodies, Peak Bodies and Agencies) is essential for a major strategic / state-level program. Excluding membership or input for various stages affects trust and the reciprocating linkage between operational implementation and policy issues.

There are a number of different approaches employed to develop and maintain effective working partnerships such as formal advisory groups, project working groups, technical expert panels, co-funding of personnel, steering committees and consultation mechanisms, plus informal relationships.

These partnerships have been effective (i.e. contributed to a successful project outcome) where there has been commitment from all parties to collaboratively seek solutions that provide both economic and environmental benefits. For example, partnerships have been constructive in enabling regional bodies to engage with land managers via their industry

[1] Sustainable Agriculture State-Level Investment Programme, Final Report, 2007
http://www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/4789_6647_ENA_HTML.htm

partners who have stronger links with growers. Industry development officers have been seen as important conduits for regional bodies in this regard.

Partnerships between industry, DPI&F and regional NRM bodies have helped to develop a much better appreciation of the financial pressures on land managers. Industry groups have brought a strong appreciation of the economic circumstances facing growers and consequently, regional projects are being developed and implemented to overcome this barrier, for example using incentives. Equally, regional NRM bodies have brought a conservation perspective to the partnership with industry and DPI&F.

The evaluation found evidence of very successful partnerships in sustainable agriculture occurring throughout the state particularly at a local project or regional project scale (this is not to imply that there are not effective partnerships at a state scale). It seems apparent however that local and regional partnerships are primarily influenced by individuals rather than as a cultural norm. This observation is based on the examples where there were both effective and ineffective partnerships occurring in the same region.

This presents an opportunity for the regional NRM bodies to continue to promote and facilitate partnerships in sustainable agriculture, which is a role for which they are well-placed to lead

The evaluation has also identified that some partnerships at a project level are not as effective as implied in project submissions, where partners are required to sign off on their involvement in a project. Some stakeholders noted that they had been asked to be involved in a project in order to enable the project to be funded, where in reality they did not have a meaningful involvement in the project once it was approved.

Fostering strong working relationships and cooperation at the individual and organisational level is crucial to the development of the knowledge and actions that are needed to further sustainable agriculture.

Partnerships of the Grazing Land Management initiative

The institutional partnerships involved in the Grazing Land Management (GLM) initiative were examined as part of Case Study C (Appendix 4). GLM is founded on institutional partnerships and such partnerships are also a key outcome of the program. Their importance is practical and symbolic, political and personal. Not only have organisations become linked through formal funding relationships, enabling the program to run, but they have become linked by relationships between personnel, by their shared relationship with participants, and through the collaborative multi-disciplinary development of the course content and tools.

Consequently, healthy working relationships between individuals in different agencies are fundamental to the existence and ongoing success of the program. Only by people working across the boundaries of their discipline or organisation has the integration of knowledge key to GLM and sustainable agriculture more generally been able to develop.

Each organisation involved in sustainable agriculture brings a partial perspective of land managers and the issues involved. The integration of these perspectives in programs such as GLM offers land managers – and thus sustainable agriculture efforts – the two key advantages of a more efficient and effective extension approach.

This approach can be more efficient because it combines the messages being delivered to land managers by multiple organizations into one message, reducing competition for land managers' attention. It can be more effective because tensions between organisations' different perspectives are ironed out before delivery rather than leaving land managers to work out how to reconcile them. The decisions land managers make constantly demand them to integrate diverse factors. Thus, extension that aims to be as close to this integrated decision-making process as possible is more likely to be of use to land managers.

GLM represents a program where people from diverse corners of the sustainable agriculture world have come together to develop a shared vision of what sustainable agriculture on the ground looks like. Joined by the shared goal of extending sustainable agriculture to land managers, they have created a program that relies on the complementary contributions and goodwill of those involved. Not only does this demonstrate that such a collaborative approach to sustainable agriculture is possible, but it highlights the vulnerability of such programs to issues such as staff turnover, short funding cycles, or divergence in the direction of individual organizations.

2.4 Sustainable Agriculture Awareness and Attitudes

The change in attitude of NRM personnel toward, and awareness of, sustainable agricultural practices and outcomes from investment was explored in the case study on the Grazing Lands Management initiative (refer Appendix 4 Case Study C).

Attitudinal change has occurred due to the interaction between personnel with different perspectives within the GLM initiative.

Staff from different disciplinary backgrounds – and, most notably, from production and conservation perspectives – have been able to converge on a shared understanding of sustainable agriculture. By bringing their own knowledge, concerns and values to the table, production and conservation oriented individuals have been able to construct an integrated and effective sustainable agriculture product through a shared understanding.

Developing a shared understanding through this multi-disciplinary interaction has helped overcome a common hurdle faced by previous initiatives where there has been competition for dominance between the production and conservation perspectives. One of the most notable things about GLM is that it seems all involved – the 'green' and the 'brown' – have altered their attitude through involvement in the course, highlighting GLM as a real convergence of views.

Another of GLM's main achievements is that it has not only brought together diverse research, but it has packaged it together into a simple and practical product that reflects the holistic way in which land managers make complex decisions about their properties.

It may be that the focus on one particular aspect of sustainable agriculture – grazing – and on producing something practical – an effective extension product – broke the massive institutional task of agreeing on how to promote sustainable agriculture into an achievable and motivating project for the agency and industry personnel involved.

The understanding of the production and conservation concerns of colleagues in the various organisations that contributed to GLM is important for two reasons. The first is the role that such communication and respect has had in the success of GLM and, in turn, its attitudinal change and action among land managers. The second reason attitudinal change among personnel is significant goes beyond GLM to sustainable agriculture more generally. By seeing that sustainable agriculture is possible, personnel are motivated to continue working towards it. The ongoing improvement of GLM course content illustrates the motivation those involved have for this important task.

The design and delivery of a truly integrated sustainable agriculture extension product requires and encourages attitudinal change not only among land managers but among the agency and industry personnel involved as they seek a common understanding of sustainable agriculture.

2.5 Monitoring, Evaluation and Reporting Strategies

The regional NRM bodies are reporting on their investments across their various programs but they not able to systematically report on the sustainable agricultural outcomes yet because:

1. The NRM bodies are not responsible for monitoring resource base condition but rely on negotiated agreements with state and other data custodians. From these agencies, they inherit and access a lot of data about many elements of resource base interactions but with the exception of native vegetation there is very little consistent monitoring that shows trends in resource condition.
2. Sustainable production systems are not defined for all industries in all regions. Where they are defined, the linkages between the management practices and resource base condition are not always sufficiently described to provide confidence that adoption will lead to the desired outcomes for the resource base.
3. Adoption is not yet sufficiently widespread or consistent enough to enable regional trends detected or modelled in resource base condition to be linked to the management practices invested in by the regions.
4. The assets approach to planning and investment makes it difficult to report against the resource base outcomes of investment in sustainable agriculture because these need to be integrated across a number of themes and programs (eg water, land, biodiversity etc).
5. The logic of setting the intermediate management action targets (MATs) and the longer term resource condition targets (RCTs) is not always closely linked therefore reporting against outcomes of investment in sustainable agriculture is not a simple matter of aggregating related MATs.

In their regional plans, most of the regions undertake to develop a formal monitoring, evaluation and reporting system (MER). The plans generally include a fairly comprehensive chapter setting out operating principles for MER and a basic framework. These vary considerably but in broad terms they adopt the logic of the Queensland and national policy guides for reporting against national indicators.

The regions report regularly on performance against their regional plan targets. At this stage, they are primarily reporting on progress towards MATs. Reporting on RCTs is still very patchy, generally qualitative and mostly at low confidence levels. The focus is on monitoring and reporting and there is still comparatively little evaluation taking place - although several regions have successfully integrated their progress reporting into catchment condition reports, state of the region reports, thematic snapshots, etc. There would be significant benefits for most regions from rationalising the targets to achieve fewer, more meaningful targets that tell more about what they are getting for their investment.

The new Monitoring, Evaluation, Reporting and Improvement (MERI) approach, that increases the emphasis on program logic, is proving useful for setting and testing the logic of target setting and for articulating the linkages between different investment streams and different timeframes. It helps to identify intermediate targets that are better linked to the longer term RCTs. Once the logic is established, it will be easier to aggregate results in time and spatially. The Most Significant Change (MSC) approach, which is utilised in some regions, provides an evaluation process that is easy to relate to and is engaging. The

performance stories which incorporate MSC can help to provide evidence of change and trends linked to investments and behaviour. However, statistics such as those collected by the Australian Bureau of Statistics and industry on adoption and practices are needed along with better, more consistent resource condition trends monitoring (targeting specific investment streams) or stronger science-based linkages between practices and resource base condition coupled with good monitoring of adoption.

The MERI approach is one part of the solution to the problems encountered in the regions in trying to move from monitoring to evaluation and from performance assessments to assessing likely outcomes and returns on investments. Most regions will also find it necessary to carry out monitoring of surrogates and intermediate targets that are easily measured and closely linked to longer term RCTs.

Sustainable agriculture

Sustainable agriculture features prominently in the goals and objectives of all of the Queensland agricultural regions. In these regions, much of the investment in NRM is directed to programs to encourage development and adoption of sustainable management practices. These investments in the east coast agricultural regions are driven by dual objectives relating to:

- Sustaining the agriculture production resource base
- Protecting the Great Barrier Reef including from agricultural runoff

The regional NRM bodies do report on milestones and MATs in programs and projects aiming to achieve sustainable agriculture in relation to the resource base and the Reef. These reports can tell us a lot about progress but they don't give a comprehensive picture of impacts and benefits for the resource base.

There are significant capacity barriers and methodological bottlenecks in the system of MER, which requires the regional NRM groups to report against RCTs:

- The regional NRM groups rely on other agencies for the data and have no control over how or what is collected
- The scale of regional investment in sustainable agriculture, while significant, is not sufficient to produce a signal in the condition of the resource base unless measurements are made at the points of investment and extrapolated. There is no signal at a landscape scale and will not be for some time to come.

If we were to report and evaluate progress in achieving sustainable agriculture, key questions we would want to answer include:

- Are BMPs defined for the main industry/enterprise mixes in the region?
- If they are not defined, is research underway to define them?
- Are the links between BMPs and resource condition understood or being defined?
- Are the drivers and constraints to adoption of BMPs in the region well understood?
- Are extension programs in place to promote adoption of BMPs?
- What proportion of producers in the region are adopting BMPs and is this changing over time?

- Will our investments in sustainable agriculture result in positive outcomes for the resource base over time?
- How will we know when we have achieved sustainable agriculture?

A way forward

The simplest and most logical way for regional NRM bodies to monitor, evaluate and report on the outcomes of investments in sustainable agriculture is to:

- Help establish quantified scientific linkages between best practice and resource base condition in the region and then,
- Encourage and monitor adoption.

The rate of adoption will indicate outcomes for the resource base. As an intermediate surrogate, the rate of adoption will signal progress towards achieving RCTs while direct monitoring of resource condition takes place over a longer term

Under the Bilateral Agreements between the Australian and Queensland Governments for NHT2 and NAPSWQ, the Queensland regional NRM groups are not responsible for or resourced to independently monitor the condition of assets other than at a very local scale. To obtain these data, they are required to negotiate data sharing agreements with the state agencies and other custodians. Many of the data sharing agreements are not yet in place.

In their own MAT and RCT monitoring, the regional NRM groups are focussing on point of investment records, project level monitoring of milestones in contracts, commissioned surveys of the condition of and risks to local assets (e.g. waterways) and surveys of behaviour change as a result of investments.

The Queensland regional NRM groups are dealing with significant gaps in the data and monitoring they need to adequately and comprehensively report on outcomes of investment in sustainable agriculture for RCTs from a resource condition focus.

The regions are dealing with the gaps by conducting program specific assessments and asset or catchment condition reports based on largely qualitative assessments. For the most part they are still establishing baselines and will need to be highly strategic in monitoring beyond this. Some data sets (such as groundcover) can be provided from excellent state-wide monitoring programs but these are difficult to relate directly to investments on-ground. The regions will need to do some local and regional monitoring of resource condition linked to their investments.

Moving from monitoring to evaluation

Most of the reporting to date is performance level reporting against MATs. The regions, state and national governments also require evaluations of likely impacts and longer term outcomes in order to review and adapt the NRM program designs and plans. They will also require evaluations of returns on investment to prioritise future investment in NRM.

Current MER systems are not well geared for evaluations of the outcomes of investments in sustainable agriculture within regions, across a state or nationally. For example, the national Resource Condition Matters for Targets (RCMfTs) relate to the resource base assets which are impacted by sustainable agriculture outcomes in the long term. However, monitoring is

not sufficient or consistent enough in most places to enable trends in these RCMfTs to be related directly to investments in sustainable agriculture at regional level.

As is the case in all NRM monitoring, intermediate indicators that link investments with longer term resource condition trends will be needed. Some of these will be MATs, others may be surrogates of research condition measures. In particular, strong evidence-based links between BMPs and resource condition can mean that adoption rates are an intermediate indicator of resource condition trends and are much easier to monitor - they can be checked through strategic monitoring of site specific resource condition trends where adoption takes place.

The important thing is that the intermediate targets are directly linked along the path towards achieving the longer term RCTs. Program logic needs to be developed in every region to set up this causal chain.

3 Key constraints, gaps, risks and opportunities

3.1 Overarching Direction for Sustainable Agriculture

Agriculture is important to the economic prosperity, social well-being and environmental health of Queensland. Consequently, the changing nature of agricultural industries, the evolving settlement patterns and the drive to sustain the health of the state's natural assets mean that there is an array of public and private stakeholders interested in the future of agriculture.

From a natural resource management perspective, agriculture is a significantly influential manager and user of natural resources. It is generally accepted that there is scope for agricultural industries to become more sustainable, which is expected to have a positive impact on the industries' sustainability objectives, as well as the state and regional NRM objectives.

However, throughout the evaluation, it has been raised repeatedly that there would be benefit in the development of a statewide NRM policy that incorporates sustainable agriculture as an asset. This policy would help to coordinate and/or align the effort of the multitude of stakeholders by providing an agreed strategic framework, e.g. assets / threats / responses / targets / monitoring, evaluation and reporting framework.

The process of developing a statewide policy would also be expected to strengthen relationships between the stakeholders and enable a stronger voice for agriculture to be heard. There are different definitions or views on agriculture from the stakeholders and bringing these together in a constructive way would assist in developing commonly agreed expectations on what outcomes will be sought from government investment.

Finally, a statewide direction for sustainable agriculture will help to determine when it is appropriate to address issues through state, cross-regional and regional level initiatives.

3.2 Sustainable Agriculture and NRM Regional Planning

Within the NRM regional planning framework, sustainable agriculture can be viewed as an asset or service with a range of values and threats to those values that warrant management responses, eg. salinity control. On the other hand, some agricultural practices are identified as threats to the condition of assets such as waterways, native vegetation and soil, and the practices need to be modified in some way.

As a result, agriculture is embedded throughout the NRM plans and drawing out a clear picture of what the objectives are for sustainable agriculture at a regional scale can be challenging. This challenge also applies to the regional investment strategies.

Some level of consistency across plans would be useful to enable an aggregated picture of the sustainable agriculture issues and objectives across regions, especially for industry which does not operate with the same regional boundaries.

3.3 Reporting on Investment in Sustainable Agriculture

Through the document analysis and interviews with state agencies, industry and the regional NRM bodies conducted for this evaluation, it has become apparent that there is a significant degree of complexity associated with determining what constitutes sustainable agriculture investment within a region.

This finding is primarily attributed to a lack of a formal reporting framework for regional bodies that requires them to specifically report on investment in 'sustainable agriculture'. Consequently, the picture of sustainable agricultural investment developed for Objective 1 of this evaluation proved to be a complicated, time-consuming process that failed to establish an accurate and reliable investment summary, and also in all likelihood under-represented what the real situation is. This also meant that the impact of investment in activities that address sustainable agriculture is likely to be underestimated

Related issues to this were:

- there are different levels of understanding of what the Strategic Reserve and AgSIP initiatives are. Some interviewees were uncertain if and where those initiatives have occurred in their region.
- interviewees have often been unable to clearly distinguish between NHT2/NAPSWQ funded investments in sustainable agriculture and other sustainable agriculture funding sources such as National Landcare Program and industry funded programs.

Another important insight from the interviews and case studies has been that regional NRM bodies, DPI&F and industry are increasingly seeking ways of addressing land, water and biodiversity objectives through integrated projects. This is considered to be a more effective means of both achieving MATs and working with land managers, industry and catchment groups. This has meant that distinguishing between sustainable agricultural investment and other investments, e.g. water quality improvement, native vegetation protection, is again not necessarily straightforward.

3.4 Communication and Learning

The range of sustainable agricultural investments in the State across different industries, at different scales and involving numerous stakeholders is contributing to an increasing base of knowledge about sustainable agriculture.

The evaluation has identified that there appears to be a serious need for improved communication and capacity building at various levels to better capitalise on the past and current investment in sustainable agriculture.

In addition, many stakeholders observed that projects had been initiated with limited appreciation of previous related work, consequently leading to projects that did not capitalise on existing knowledge.

Project managers commented on the challenge of communicating results from projects to other relevant projects, industries and regions. This may be attributed to various factors:

- short term nature of investment cycles does not encourage a culture of learning;

- there appears to be relatively low investment in building the institutional capacity to enable effective communication and learning;
- lack of effective formalised mechanisms or structures for making communication relatively easy;
- staff turnover throughout the stakeholder organisations and therefore loss of networks through which communication commonly occurs;
- insufficient scope within projects to enable communication to occur as part of the project outputs;
- the pressure, perceived or real, on people to keep pursuing new projects and funding; and
- reporting requirements focus on projects being accountable to funding agencies however there is not a requirement for reporting to other audiences that could benefit from the projects, e.g. neighbouring regional NRM bodies.

The nature of the sustainable agriculture sector is that it involves many different players such as individual land managers, local catchment or industry groups, industry associations, regional bodies, extension providers, researchers and the science community, and so on. Each of these stakeholders invariably is able to access funding to tackle issues of interest to them, and so it is not feasible to expect that they can all be influenced to improve communication of projects. However consideration needs to be given to whether there should be a requirement for a communication component for all sustainable agriculture projects funded from future national funding programs.

3.5 Economic Assessment of Land Management Practices

This review has identified that there is a gap in the capacity to understand the implications of new management practices on farm business profitability. This has occurred particularly where the driver for the development of management practices has been an environmental objective such as water quality.

In such cases, there has been investment in developing practices to reduce impacts on natural resource condition, but limited, if any, investment to understand what the practices mean from a business profitability perspective. Landholder confidence in new practices invariably is influenced by an understanding of the financial costs and benefits of the practices, and without such evidence, new practices can lack credibility with landholders.

Generally, unless management practices are workable from both a practical and financial perspective, they are less likely to be adopted.

3.6 Achieving Sustainable Agriculture Outcomes

The case studies and stakeholder consultation has highlighted that there is real progress being made in sustainable agriculture, and that a sound platform of knowledge for achieving more significant outcomes is being continually improved.

The rate of change to best management practices is of concern to a number of stakeholders and they have noted a need for additional tools to encourage change such as stewardship-based payment schemes, as well as longer term funding to enable more lengthy projects to be implemented that reflect the time needed for projects to make a meaningful impact.

A challenge identified by some interviewees is the need for a duty of care standard that can be defined in order to clarify what is a baseline level of land management. This will then allow a more consistent approach or principles to guide application of stewardship-based payment schemes across the state.

There is a concern raised by many people interviewed for this evaluation that market-based instruments (MBIs) are in conflict with landcare ethos, and will create conflict between land managers and negatively impact on efforts to achieve widespread practice change. They believe that MBIs are counter to the voluntary change approach that underpins many current sustainable agriculture programs.

However the actual rate of management practice change that is occurring (which we believe is poorly understood) is considered to be too slow, for example with respect to Reef water quality targets, so the extension models used may be insufficient under current funding and this warrants new responses, e.g. increase investment in extension and/or use of alternative models to achieve change.

Therefore there is a need to explore the impacts, both positive and negative, of MBIs where they have been applied elsewhere to address sustainable agriculture.

4 Conclusions

In conclusion, this evaluation has found that there is a strong commitment and willingness to develop agricultural practices and systems that are more resilient and profitable and can contribute to improving the condition of the natural resource base. There is a lot of activity occurring within regions and within different industries but there is ample scope to improve the overall understanding of how that range of activities fits within a statewide picture.

There is also a huge opportunity for the knowledge being generated through sustainable agriculture initiatives to be more widely communicated and utilised throughout the state.

The maturing of the regional NRM bodies and consequent strengthening of their knowledge and networks will place them in good stead to firstly collaborate more between themselves but also to work more closely with industry, state agencies and communities with an interest in sustainable agriculture in their respective regions.

Recommendations to help improve on the current approach to sustainable agriculture in the state are provided in relation to the findings, gaps, risk and opportunities presented earlier in this report:

Need for an overarching direction for Sustainable Agriculture (refer 3.1)

i. Consideration be given to the development of a state NRM policy that provides strategic direction for the development of sustainable agriculture.

Reporting on Investment in Sustainable Agriculture (refer 3.2)

ii. If the reporting on sustainable agriculture investments and outcomes will be required in future, an agreed reporting framework for investment in sustainable agriculture will need to be developed.

Monitoring, Evaluation and Reporting (refer 2.3)

iii. Sustainable agriculture project proponents should provide a clear rationale for their projects based on a consistent project logic framework with evidence that the project considers both production and conservation objectives.

Partnerships in Sustainable Agriculture (refer 2.2)

iv. Regional NRM bodies strengthen their role in promoting and facilitating partnerships between stakeholders in sustainable agriculture.

v. Sustainable agriculture project proponents should provide evidence in project proposals of the partnerships to be utilised in projects, and that the partner's commitment to the project is independently verified.

Communication and Learning (refer 3.4)

vi. Improved communication and capacity building outcomes are sought from current investment in sustainable agriculture.

vii. Sustainable agriculture projects funded from future national and state funding programs require a communication plan to disseminate project findings.

viii. New sustainable agriculture projects are developed with a demonstrated, sound understanding of previous and current relevant studies and projects.

Economic Assessment of Land Management Practices (refer 3.5)

ix. Development of new management practices requires an assessment of the financial costs and benefits of those practices to land managers.

Achieving Sustainable Agriculture Outcomes (refer 3.6)

x. Research is conducted to assess the costs and benefits of market-based instruments and their potential application to complement existing extension approaches for BMP adoption.

xi. Further investigation is required to determine if the statewide agricultural research and extension capability is limiting the rate of development and adoption of BMPs (and if so, can it be bolstered?)