AGT10: Incorporating Native Vegetation Management into Agricultural Production Systems

Report to
Native Vegetation R&D Program

5 March 2004

by

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Acknowledgments

The study team would like to acknowledge the input from Jann Williams, LWA Coordinator for the Native Vegetation Program during most of the course of this project.

In addition a range of personnel, too numerous to list, assisted with identifying policies and programs of interest, the case studies themselves and the identification of private benefits from integrating native vegetation management into agricultural systems.

Acronyms and Abbreviations

AFFA	Agriculture, Fisheries and Forestry Australia
AWI	Australian Wool Innovation
BMP	Best Management Practice
COMPASS	COMbining Profitability And Sustainability in Sugar
CRDC	Cotton Research & Development Corporation
DNRE	Department of Natural Resources and the Environment (Victoria)
DRDC	Dairy Research & Development Corporation
EA	Environment Australia
EMS	Environmental Management Systems
EPBC Act	Environmental Protection and Biodiversity Conservation Act (Commonwealth)
GA	Greening Australia
GRDC	Grains Research & Development Corporation
LFW	Land for Wildlife
LWA	Land & Water Australia
M&E	Monitoring and Evaluation
MLA	Meat & Livestock Australia
MNGWG	Mid-North Grasslands Working Group
NGO	Non-Government Organisation
NHT	Natural Heritage Trust
NRM	Natural Resource Management
NVBC	Native Vegetation and Biodiversity Conservation
PMP	Property Management Planning
QA	Quality Assurance
QDPI	Queensland Department of Primary Industries
R&D	Research and Development
RDC	Research and Development Corporation
RNV	Remnant Native Vegetation
SGS	Sustainable Grazing Systems
SRDC	Sugar Research & Development Corporation
TPSKP	Temperate Pasture Sustainability Key Program
WWF	World Wide Fund for Nature

Executive Summary

This report presents results of a study into programs and policies that have been, and are being, used to encourage the integration of native vegetation management into agricultural systems. The purpose of the study was to identify information that is important in enhancing the outcomes from future policies and identify principles to develop improved guidelines for future programs and policies.

Many past Australian programs and policies associated with protecting and enhancing native vegetation have focused on grants and/or legislation. A widening range of incentives is being trialled more recently. Most incentive programs incorporate cost-sharing arrangements between the land manager and the public to stimulate investment and management changes.

The principal outputs of this study have been:

- a description of the private benefits that accrue from improved native vegetation management;
- a description of selected case studies of policies and programs where integration of native vegetation management has been an objective and where valuable lessons may be apparent;
- a description of past and current industry initiatives associated with native vegetation and biodiversity conservation;
- a review of PMP programs and how they can be incorporated with native vegetation management policies; and
- the identification of a set of issues and associated guidelines for development of improved future policies and programs.

Private benefits

There are significant private benefits to landholders from conserving/managing native vegetation on farms. The benefits vary depending on the agricultural system itself, and the resources, values and perceptions of the individual land managers.

In many situations, the private benefits from improving native vegetation management do not cover the costs, at least in the short term. There are a range of potential private benefits, particularly long-term benefits, where understanding is lacking and that are difficult to value.

Public policies and programs that encourage landholders to improve their native vegetation management for conservation are justifiable due to the potential benefits of averting further biodiversity loss and continued deteriorating natural resource sustainability, both of which are valued by the public.

Private benefits are the cornerstone on which public policies largely rest to promote cost effective off-reserve conservation. The type and magnitude of private benefits are key considerations in developing efficient and effective policies and programs for native vegetation and biodiversity conservation.

Many private benefits are conjectural and, for some, there is no hard evidence available to support their existence and magnitude in particular situations. It is

possible that the benefits to land managers at both an individual farm and regional scale are underestimated.

Case studies
A long list of potential case studies was compiled with the assistance of a number of policy and scientific personnel with knowledge of native vegetation management policies. This allowed a long list of past (and current) policies to be formed from which a number were selected for a more detailed study. The 14 case studies ranged from devolved grant schemes to auctions for NRM services. However, there was an emphasis on devolved grants as they had been the major instrument used up to the present time.

While it is recognised that there is increasing interest in market based incentives, they received little attention in the study due to their limited history and the restricted set of lessons learnt so far.

Two factors were considered when selecting the 14 case studies. The first was to assist in the assessment of particular interventions (eg devolved grants, market based instruments, training and extension etc). The second was to consider actual programs or policies that may have used a combination of one or more of the above tools. Both factors were considered in selecting the case studies, as was a spread of geographic locations of the examples used and a range of managing agencies.

The identified factors of success and lessons learnt are diverse, but some common elements were observed and were used to support the development of the policy and program guidelines.

Property Management Planning
Particular attention was focused on reviewing the success of and role for property planning initiatives. An important finding was that Property Management Planning approaches, if appropriately conducted, offer a powerful education and planning tool to encourage the adoption of native vegetation and biodiversity conservation on farms. Key determinants to success within a Property Management Planning approach are likely to be:

- Integration of native vegetation and biodiversity conservation awareness and training within a package targeting all key aspects of the farming system and farm business.
- Native vegetation and biodiversity conservation strategies and outcomes should be designed for the specific industry and enterprises of interest to the farmer audience, and contribute to the sustainability and long-term profitability of the farm system.
- Inclusion within Property Management Planning approaches of catchment and regional targets for native vegetation and biodiversity conservation will give greater local relevance and clearer focus to the outcomes being sought.
- Incorporation of incentives funding within Property Management Planning approaches may act as a catalyst for the implementation of native vegetation and biodiversity conservation strategies.
- The need for follow-up institutional, technical and extension support for individual farming families once the planning workshops are completed in

order to allow adaptation and implementation of native vegetation and biodiversity conservation principles on individual farms.

Industry initiatives

A range of programs and policies addressing native vegetation and biodiversity have been implemented by primary industries, sometimes in conjunction with government agencies and/or Research & Development Corporations (RDCs). This brief account in the report is aimed at describing current activity rather than a detailed review or focus on success factors or lessons learnt.

The increasing involvement of primary industries with vegetation initiatives is important and deserves attention so that they are not overlooked in the design and delivery of programs aimed at public objectives. Industry institutions can provide a central focus to the spectrum of mechanisms to achieve change.

Issues and Guidelines

Nineteen guidelines for effective design and delivery of policies and programs have been developed. Most have been supported by issues identified in the case studies, although some license has been taken by the authors in their development.

A comparative analysis of different program types has not been undertaken due to the restricted range of purposeful and informative evaluations that have been conducted on programs and policies in relation to vegetation. Evaluations have often been restricted to qualitative evaluations of whether a program has met its objectives rather than its impact, or outcomes or cost effectiveness. This approach possibly reflected the limited resources devoted to evaluation, no doubt exacerbated by a lack of good information collected by monitoring initiatives (including baseline data) during the life of the program. Also, comparative reviews of different types of programs based on their characteristics are available and references to these reviews are contained in the report.

The case studies have clearly demonstrated that a principal consideration should be how the program or policy is designed and supported in the field, rather than the nature of the incentive itself and this is evident in the guidelines developed.

The guidelines developed are:

1. Thorough program preparation and pilot trialing can save resources and improve the performance of programs and policies.
2. Sound scientific advice is required in the design of policies and programs for them to be effective.
3. Policies and programs directed at the farm-scale should consider the wider conservation and biodiversity needs across catchments and bioregions.
4. Targeting policies and programs at high priority ecosystems is highly desirable and can be cost-effective but needs to be underpinned by good science.
5. The choice and design of policies and programs need to recognise differing groups of landholders and how they might respond to different mechanisms and incentives.
6. Voluntary but legally binding vegetation covenants are valuable for permanently protecting native vegetation and biodiversity on private land, and can be combined effectively with incentive programs.

7. Policies and programs should recognise that native vegetation management is only one aspect of sustainable farming systems and that a whole-farm approach should be considered in policy development.
8. Programs and policies designed to achieve *high priority* native vegetation outcomes should be funded separately to other natural resource management programs, although they may be implemented in conjunction with each other.
9. Cultural change elicited via suasive measures can be important in changing behaviour in its own right, as well as in supporting the relevance and uptake of specific policies and programs that are more highly targeted and focused.
10. Mixing programs can be effective in that a wider audience can be addressed and programs can improve each others effectiveness.
11. The private benefits to land managers from improved native vegetation management should be recognised; however, where financial incentives are involved they should be sufficient to overcome lack of interest of the land manager.
12. Programs that require a number of conditions to be met before access is available can reduce involvement in the program. Where conditionality is strongly used, care needs to be taken that other voluntary programs that focus on suasive measures are not compromised.
13. High quality technical support during the program is an essential element when the focus is on conservation and biodiversity issues; ongoing support of some kind after a program is completed may be important.
14. Individual characteristics and personalities (e.g. responsiveness, empathy and knowledge) of those delivering the program and who come into contact with land managers are important in ensuring trust and therefore an effective response and uptake.
15. The presence and support from partnership arrangements can facilitate effective programs, leadership is important where there are multiple agencies involved, and some local control and community involvement is highly desirable.
16. Delivery of programs aimed at integrating native vegetation management into agricultural systems through industry organisations should be given more prominence than hitherto, for reasons of potentially higher uptake due to greater relevance to specific agricultural systems.
17. Short-term and long-term monitoring and evaluations of programs is important for providing information on cost effectiveness, allowing adaptive management, and providing long-term accountability.
18. Public programs require longer-term commitments by governments in order to be more efficient in building experience and capacity, to be more effective at attracting participants and delivering outcomes, and sustaining greater commitment by land managers.
19. Legislative and regulatory mechanisms may be more effective when they are complemented with effective extension, education and incentive strategies.

Other findings

Some of the key findings and potential activities that are associated with the guidelines include:

- Evaluations of programs are of variable quality and should go further than reporting on whether they have achieved their objectives; they should focus on how the program could have been better designed and implemented and how

well the instrument worked. Every evaluation should incorporate a lessons learnt component that places the initiative in a wider context for the future.

- Industry training initiatives are extremely valuable and should be strongly supported by public policy. Such initiatives can provide a sound understanding of the agricultural systems in which native vegetation is embedded. This insight is important to gain the interest and confidence of participants and to promote the availability of other programs and policies.
- Ongoing ecological assessment of a sample of land under covenants is required on an Australia wide basis in order to monitor and evaluate their effectiveness and achievements.
- There is a lack of quantitative statistical information on the areas of native vegetation under covenant or that has been protected in some way through different mechanisms. This would be best assembled under a vegetation community type basis by covenant program across shires or states.
- Some of the relationships between the provision of ecosystem services and benefits to agricultural systems are not well understood and warrant further research so that the magnitude of any benefits can be estimated and promoted.
- The LWA Native Vegetation Program should further assess the need for, and form of a brochure that promotes the benefits of integration of native vegetation management into agricultural systems.
- The difficulties are recognised in developing suitable cost sharing arrangements are recognised. These difficulties arise from the variation in resources, cost structures and preferences of land managers. A solution may be to identify in general terms where the balance of benefits lie and then develop cost-effective arrangements on an individual landholder basis through market mechanisms.

1. Introduction

1.1 Objectives

The objectives of the consultancy were to:

1. Identify and analyse the wide range of programs and methods that have been developed to promote integrated management of native vegetation by land managers.
2. Consider some of these policies in more detail to identify the circumstances where policies are effective and produce guidelines that may be useful for the future.
3. Collate information that identifies the role of native vegetation, and summarises the benefits to landholders of integration of native vegetation management with their farming systems.

Some small changes to the objectives and expected outputs of the study were made as the study progressed. For example, it was originally intended that a brochure for land managers demonstrating the benefits of the integration of native vegetation into farming systems should be developed from the benefits identified. However, it was decided that the development of a general brochure may not be the most appropriate way of supplementing existing communication messages. It was decided therefore that LWA should consider further how the information presented in this report on the benefits from integrating vegetation into agricultural systems can best be communicated to individuals, groups and governments.

In addition, due to other R&D activities being undertaken, it was determined that this study should not consider native vegetation and nature conservation legislation in detail.

The full terms of reference can be found in Appendix 1.

1.2 Background

The purpose of this report is to present the findings of a study into the incorporation of native vegetation management into agricultural production systems.

Certain assumptions underlie the need for guidelines for programs and policies aimed at conservation and biodiversity outcomes being delivered on private lands.

The Australian Native Vegetation Assessment 2001 (2001) found that:

- About 67% of Australia's native vegetation in the intensively used areas (primarily the agricultural and urban zones) has been cleared or substantially modified.
- Twenty-five out of 254 basins, and 42 out of 355 subregions have less than 30% remaining native vegetation.
- The protection status of the major vegetation groups in bioregions with less than 30% native vegetation remaining is relatively low.

- Regions with relatively small areas of vegetation remaining pose many challenges in achieving a comprehensive, adequate and representative system of protected areas.
- Out of 42 subregions with less than 30% native vegetation remaining, 22 are highly fragmented. These have greater than 30% of their remaining vegetation in fragments smaller than 1000 hectares.

It follows that there is a need to improve the conservation of fauna and flora on private land in Australia and that the reserve system is not adequate. As many of the threatened species habitats are in areas where a large part of the vegetation has been cleared or highly modified, this improvement needs to be part of any wider strategy.

The State of the Environment Report 2001 (2001) identified the following key findings in relation to biodiversity:
- Many threatening processes such as salinity, changing hydrological conditions, land clearing and fragmentation of ecosystems pose major problems for protecting biodiversity.
- The rate of land clearance has accelerated during the last 50 years.
- The loss and depletion of plant species through clearance destroys the habitat for thousands of other species.
- Dryland salinity is predicted to affect two million hectares of native vegetation by 2050.
- There is still limited knowledge on many biodiversity values in Australia.

Recent developments in policy that impact on native vegetation management on farms include:
- In early 2001, the Commonwealth government declared land clearance as a key threatening process (under the EPBC Act) for biodiversity.
- In recent years State Governments have sought to tighten restrictions on land clearing.
- There has been a change to regional planning and delivery of NRM incentives and programs (e.g. National Action Plan for Salinity and Water Quality).

This report is based on the assumption that the protection and vegetative rehabilitation of land, and associated fauna, at least in some areas, is technically possible and achievable without threatening economic agricultural production. It is further assumed there is a need to maintain the traditional 'profit motive' in our farming systems, and the 'family' farming structure where it is appropriate to do so, for economic, regional, and cultural reasons.

The strategies to improve native vegetation on farms may include a mix of the following:
- reduction in clearing
- improved management to stop further deterioration
- encouraging natural restoration
- encouraging biodiversity via purposeful revegetation and agroforestry

The relationship between these strategies and the conservation outcomes, opportunities for integration and the cost-effectiveness of delivering public benefits

are shown Table 1.1. A large number of asterisks indicates that there is a highly positive relationship between the strategy and the conservation outcome. For example, a protection strategy will most likely achieve a highly positive conservation outcome, while an agroforestry strategy will most likely achieve a low conservation outcome.

Table 1.1: Relationship Between Conservation Outcomes and Vegetation Strategies

	Protection	Enhancement	Restoration	Agroforestry
Conservation outcome	****	***	**	*
Integration opportunity	*	**	***	****
Cost-effectiveness of delivering conservation and biodiversity benefits	****	***	**	*

Various policies and programs have been implemented in past years to attain the objective of protecting and managing the native vegetation resource on private land. These policies and programs have included industry and government programs (all levels of government) ranging through legislation, incentive schemes and extension and communication methods. Non-government programs have also been developed and implemented (e.g. those managed by Greening Australia).

This study considers a long list of past and current programs and policies that aim to integrate native vegetation management into agricultural systems. Some of these programs have been considered in more detail in order to identify the circumstances where policies are effective to produce guidelines that may be useful for the future. This analysis provides useful insights into future vegetation programs and policies.

It has often been stated that a significant driver for encouraging landholders to adopt conservation practices is the presence of quantifiable private benefits to that landholder. A part of this project therefore has been to collate information on the benefits to landholders of integration of native vegetation management with their farming systems.

1.3 Terminology

The role of native vegetation in Australian farming systems has changed over time with the most dramatic change occurring over the past two decades. The change has been associated with the former 'frontier' role of farming shifting to one of 'sustainability'. The change has been brought about by the realisation that many aspects of previously accepted activities of land clearing, introduced pastures and use of fertilizer and chemicals have not been healthy for the environment and indeed the future of agricultural systems as we know them. Consumer awareness and markets have shifted also in this direction, as have government programs and policies to encourage sustainable farming systems.

Much of the change has related to the role of vegetation (trees, shrubs and grasslands) in native ecosystems and landscape function. Hydrological imbalances, habitat deterioration, and poorer water quality are all related to vegetation change in some way.

Many wetlands have been changed from their original state by clearing and draining for cropping and grazing activities that may have been the mainstream activities of that landholder. Incentives have sped up this change via the profit motive in farming systems (Bennett and Whitten, 2002).

Vegetation and biodiversity

Native vegetation as defined here refers to both the vegetation itself and the biodiversity that embraces it. Benefits may well vary with the quantity, type and shape of retained vegetation (for example, individual paddock trees, retained strips or blocks, understory vegetation and shrubs, grasslands). The provision of habitats for native insects and animals through native vegetation may also influence private benefits, especially with wetlands and riparian zones that can contribute significantly to biodiversity and an improved ecological balance. Soil health and the biodiversity required for healthy plant production may also be related to the presence of native vegetation.

Protection, Enhancement and Restoration

Existing vegetation can be protected, enhanced or restored in different shapes or forms (eg retaining shelter belts, revegetation or farm forestry). Benefits can accrue to farming systems via each of these interventions. All of these options for managing native vegetation on farm are included in the scope of benefits described in this report.

Integration

What is meant by 'integration'? Landscape design for enhancement and revegetation that accounts for biodiversity aspects is a part of integration. But what about retention of large area of native vegetation, is this integration or merely conservation? Where are the interactions? Does this provide merely a bigger and more robust and diverse biodiversity set close to the farming system? Integration as defined here relies on there being some form of recognition of interaction between the activity (eg. fencing off an area) and the farming system. Whether a particular native vegetation-related activity can be said to be 'integrated' will to a large extent depend upon the management objectives of the farmer and the farming system being adopted.

Private benefits

While part of this report focuses primarily on the commercial benefits of integration of native vegetation management into farming systems, there may be additional non-commercial private landholder benefits realised from improved management of native vegetation such as personal utility from improved aesthetics, use for recreation etc.

Some of these private non-commercial benefits could be expanded and commercialised (eg eco-tourism) and hence such benefits could be shared with the community. However, these latter opportunities are likely only to be available to a minority of landholders with particular vegetation types and in particular locations.

Private benefits take on particular significance as many believe that such benefits are necessary in order for the managers of most commercial agricultural systems to consider change regarding the way they manage their native vegetation.

Rights and responsibilities

The long-term generic benefits of improved native vegetation management are almost certainly there to be captured. Clean and green/organic market preferences are becoming more prominent and are likely to persist. It is also probable that conserving and managing native vegetation and associated biodiversity will be an accepted part of managing production in a sustainable environment in the future. What is perceived to be a public benefit may change to be a private benefit if the counter factual situation develops as "if you don't manage vegetation sustainably, then you may not be able to sell products from the land".

The issue of property rights and resource management responsibilities is particularly topical at present, especially with regard to water and vegetation resources managed on private land. Resolving these issues is a key aspect of reaching effective outcomes for vegetation management on private land, including cost-sharing arrangements.

Cost sharing and incentives

Once it is recognised that both private and public benefits do exist, the reality is that in many situations there is an opportunity cost to the landholder of conserving and managing and that incentives may need to be provided to ensure appropriate on-farm activities are encouraged in order to capture net social benefits. This leads to more detailed consideration of incentive schemes.

1.4 Approach

The private benefits to land managers from integrating native vegetation into farming systems were identified. As well as identifying a wide range of benefits, this step also addressed the perceived gap between private benefits and costs. This was undertaken in order to set the scene for analysing public policies and programs that mostly attempt to build on these private benefits to achieve improved conservation outcomes through integration.

As a first step in considering lessons from existing program and policies the study attempted to set up boundaries surrounding what should be included. Literature and internet searches were carried out in order to identify relevant programs and policies that were deemed to fit into the boundaries established. Concurrently with the literature and internet search, a survey of key personnel including those from Greening Australia and Landcare, and Native Vegetation R&D committee members, was undertaken in order to identify further relevant programs and policies.

From these sources a long list of programs and policies was identified. The list was stratified and specific policies and programs were selected for more detailed case study analysis in order to determine factors of success and lessons that could be learnt that may be useful in developing future policies.

The case studies were based on some written material but most information emanated from interviews with key informants in relation to each case study.

Together these lessons were used to develop guidelines for the development of future policies and programs that have the aim of integrating native vegetation into agricultural systems.

More detailed attention was given to Property Management Planning (PMP) and its application to Native Vegetation Management and Biodiversity Conservation. The approach adopted for that part of the study was:

1. Review of National and State PMP reports, where available.
2. Interviews with a variety of former National, State and Territory PMP Coordinators and PMP facilitators.
3. Interviews with property planning facilitators/trainers currently utilising PMP-type activities with farmer groups.
4. Interviews with those who have had a PMP policy role at State or Federal level.

1.5 Structure of Report

Section 2 of the report presents information on the benefits to land managers of managing native vegetation as part of their farm system. Section 3 discusses how the long list of programs and policies to be considered was identified, and how the case studies were selected and reviewed. Section 4 presents summaries and lessons learnt from the case studies with the case studies themselves reported in Appendix 4. A summary of relevant activities within industry groups is presented in Section 5. Section 6 provides a review of the value of the Property Management Planning concept for encouraging the integration of native vegetation into the agricultural system. Finally, Section 7 develops guidelines for future programs and policies aimed at integrating native vegetation into the agricultural system. Section 8 provides a conclusion to the report.

2. Benefits of Integrating Native Vegetation into Farming Systems

2.1 Introduction

It is often stated that a significant driver for encouraging a landholder to pursue conservation practices is the anticipation of quantifiable private benefits to that landholder. As reported by Cary and Williams (2000), economic arguments and incentives are likely to be more effective at changing attitudes among rural landholders than are ecological arguments. A part of this project therefore was to review the private benefits from native vegetation within agricultural systems.

2.2 Description of Benefits of Integration

The following description provides general statements about a specific role/benefit of native vegetation and then delivers one or more examples of production system benefits or other private benefits from this vegetation role. The examples are from both actual farming systems and research/publications. The types of benefits described are:

(i) Shelter for livestock from cold and heat stress
(ii) Windbreaks /shadelines for cropping and grass growth
(iii) Provision of fire breaks
(iv) Sustainable timber production
(v) Maintaining a sustainable water balance
(vi) Providing erosion control
(vii) Benefits from maintaining native grasses
(viii) Benefits from riparian vegetation and wetlands
(ix) On-farm benefits from ecosystem services
(x) Increased property values
(xi) Private use and amenity values
(xii) Carbon credits
(xiii) Future values

(i) Shelter for livestock from cold and heat stress

The retention of native vegetation in various shapes and forms, or the establishment of shelterbelts, can reduce wind speed and therefore reduce energy loss and cold stress with subsequent liveweight gain in sheep and cattle. The most dramatic impact can be seen in reduced deaths from cold stress of sheep in the immediate period after shearing. Lambing percentages and wool production can also be boosted by having paddocks with good shelter from wind.

Shade for grazing livestock is also valuable in reducing heat stress with resulting increases in animal production. Heat stress can affect fertility, milk production, wool production, mortality in young stock, and liveweight gain.

<u>Examples of specific reported benefits include:</u>

1. Bird et al (1984) conclude that shelter can improve animal productivity. They provide an example of an increase in lamb weaning performance by 10 percentage

units, a gain of about $2000 from 1000 ewes, sufficient in 2 years (at that time) to recover the cost of the shelter.

2. Bird (1991) made estimates of expected benefits from shelterbelts for SE Australian farms as improved plant growth, reduced maintenance energy requirement of stock resulting in extra production, improved lamb survival and reduced losses of shorn sheep. He estimated that there were financial benefits from establishing shelterbelts of 5-20% of the farm depending on the discount rate used, whether the farmer can do the work himself, and the distribution of the trees.
3. NSW Ag (VegNotes, 1998) report milk production increases of up to 17% from dairy cattle where appropriate shade is provided.
4. Wakefield (1990) reports that studies in SE Australia have shown that lamb deaths can be halved by providing adequate shelter from wind in wet and cold weather during the first critical hours of life. Also, one study at Armidale showed that windbreaks increased wool production at a high stocking rate by an average of 31% over 5 years of trial (Wakefield, 1990).
5. The planting of trees has helped lift carrying capacity by an estimated 15% on a property near Hamilton. The farm forestry plot used spotted gum with grazing under trees with a density of 300 trees per ha thinned to 150 per ha (Prograzier, 2002).

(ii) Windbreaks/Shadelines for cropping and grass growth

Windbreaks, shelter belts, and shadelines can reduce windspeed and evaporation in pastures and crops and hence increase yields, although competition for moisture immediately adjacent to the trees can reduce these yield effects. Also, shading can decrease soil moisture loss in summer and retain soil temperature in winter, protect from frost, etc.

It was thought until recently that the yield increases will more than offset the effects from moisture competition from the trees. Earlier observations suggested significant productivity improvements from wind protection, for example:

1. Lynch and Donnelly (1980) studied the effects of windbreaks in an experiment with grazed sheep at three stocking rates over a five year period. At higher stocking rates, there was markedly higher productivity from the sheltered sheep that was attributed to increased pasture production. Reid and Thompson (2003) conclude that an investment in windbreak development would appear justified economically on the basis of increased wool production from New England pastures.
2. NSW Agriculture reports yield increases of 44% in lucerne, 25% in barley and 23% in winter wheat from paddocks where windbreaks and shelter belts are in place, compared with paddocks where there are none (VegNotes, 1998).
3. Radcliffe (1983) states that in New Zealand provision of shelter may improve pasture growth, especially in seasonally dry soils. He goes on to cite several estimates that support increases in pasture production /total farm production by up to 20%.
4. Bicknell (1991) cited in Bird et al (1992) reports that work at Esperance in WA has shown that lupin yields have increased by up to 30% when sheltered by Pinus radiata windbreaks. However, as pointed out by Cleugh et al (2002), the finding was based on a single data point, albeit some distance from the windbreak
5. Burke (1991) reported wheat yield gains of up to 25% in the sheltered zone with up to 47% yield gain for oats.

6. Fitzpatrick (1994, p 9) reports that the majority of trials conducted on the effect of shelter on increased pasture production, attributed the effect to reduced moisture stress.
7. Windbreaks can also increase horticultural yields by preventing mechanical damage and fruit rub in orchards (Bird et al, 1991, p76).

However, the National Windbreaks Program recently reported that the yield benefits from sheltering crops and pastures may be less than suggested in the earlier studies. Moreover, the source of the benefits appeared to shift from soil moisture conservation to the avoidance of crop damage by wind.

In WA for example, while shelter was providing some soil moisture benefits in dry years, the greatest increases in grain yield were from reductions in wind erosion and sandblasting damage (Cleugh et al, 2002, Sudmeyer et al, 2002). Cereals and pasture yields were the least responsive to the microclimatic response to wind shelter, and any responses were more likely in dry years. Lupins, canola, and mungbeans showed larger yield responses. Potatoes and peanuts, grown on the Atherton Tablelands, were found to be very sensitive to wind damage (Cleugh et al, 2002, Sudmeyer et al, 2002, Wright and Brooks, 2002).

Other evidence of benefits assembled includes:
8. Shadelines around paddocks showed that they could increase yields of wheat on a Goondiwindi property. Protection from southerly winds increased wheat yields by up to 18% in some paddock areas due to less crop damage and improved soil moisture retention (George-Jaeggli, 1998). Despite competition for moisture from the trees in their immediate vicinity, the overall increase in yield was up to 8% from southerly and easterly protection. The shadelines also provide excellent habitats for wildlife including birds (Johnson, 2000).
9. In an empirical study with data from 28 farms in the Gunnedah region of northern NSW, Walpole (1999) studied the relationship between pasture productivity and the area of remnant vegetation . Pasture output was increased by having up to 34% of pasture area under woodland vegetation, but beyond this proportion, pasture productivity declined.

(iii) Provision of fire breaks

Blocks of native vegetation and shelterbelts can lower wind speeds and so slow the spread of fires.

Austin (1978) quoted by Bird (1981) argues that shelterbelts will reduce wind speed and thus check a fire since the rate of spread of fire is proportional to the square of the wind velocity. Reid and Bird (1990, p331) see the most important secondary value of shelterbelts as protection from fire.

Also, native perennial grasses that remain greener in summer can reduce fuel load compared with introduced annuals that dry off (e.g. annual ryegrass etc.) Wetlands and wooded riparian zones can also provide firebreaks. On the other hand, native vegetation can in some situations add to the fire risk.

(iv) Sustainable timber production
Wood products (eg. sawlogs, firewood, fencing posts) may be available from sustainable harvesting of private native vegetation and from planted farm woodlots. These can provide monetary benefits in a sustainable manner provided rotation and harvesting regimes are appropriate. A significant amount of plantation forestry is actually on farms but the extent of native species and biodiversity-friendly planting designs is probably less significant.

(v) Maintaining a sustainable water balance
Trees and perennial grasses can reduce accession of water to groundwater systems so reducing the levels of watertables many of which can bring salt nearer the surface as they rise. Both high groundwater tables and salinity can reduce pasture and crop growth. Further land clearing can exacerbate such impacts and revegetation can slow or reverse the impacts in some situations. Impacts of clearing/re-vegetation can be on-farm, and/or local and regional.

(vi) Benefits by providing erosion control
Retention of native vegetation (or revegetation) in sensitive locations such as hilltops and gullies can result in less erosion and improved productivity. By minimising erosion in this way, costs of remediation can be lowered.

Shelter belts, windbreaks and paddock trees can reduce wind erosion in grazing or cropping land. Loss of topsoil can reduce subsequent crop yields significantly.

Bird et al (1992) provide an example of a clover pasture in WA that lost 18t of dust per ha in the 110 t of soil from the top 8 mm of topsoil. This reduced the yield of the next crop by 12-25%. It was also estimated that the summer grazing on the same paddock for 7 years would reduce productivity by 50%.

When water erosion impacts are minimised through contour banks, the presence of native vegetation areas act as sites to drain runoff from contour banks in Brigalow cropping systems (Queensland Parks and Wildlife Service, 1999).

(vii) Benefits from maintaining native grasses
Native grasses support biodiversity in the landscape but large areas in the high to mid rainfall zones have been replaced with exotic pasture and crop species. The replacement of perennial native grasses with annual species in many cases, particularly in the southern areas of Australia, has contributed to water table imbalances, as with tree clearing. Benefits in terms of improved hydrological balance may be gained from retaining native perennials; there also may be benefits from greater drought tolerance of natives compared with introduced perennial grasses.

It may be possible to obtain high production per ha with management of native grasses in some regions where grasses have been retained, and in other situations by the sowing of native perennial grasses. Whether high stocking rates with such native grasses can maintain biodiversity compared with protected native grass environments may depend on the management regime adopted.

In some regions where cropping may no longer be widely practiced in future (e.g. Liverpool Plains) and where land use may change to perennial plants for grazing and

other uses, there may be a role for native grasses. This exemplifies the "options" value of native grasses, that is avoiding the risks of curtailing future potential benefits by eliminating native grass areas, as circumstances can change in the future.

(viii) Benefits from riparian vegetation and wetlands

Protecting native riparian vegetation with fencing, retaining strips of native riparian vegetation or revegetating around waterways provided other water sources are available can:

- improve streambank stability due to less damage from stock;
- result in less breakouts from creeks and lower maintenance of creek crossings;
- act as nutrient filters and reduce the amount of nutrients exported from the system; this not only can contribute to water quality improvements downstream but can retain nutrients on the farm that may be reutilised;
- result in higher quality water in on-farm waterways that may have some impact on animal health through less fouling of waterways;
- result in potentially lower mustering and inspection costs; and
- provide benefits to existing farming systems and may provide as yet unknown future benefits.

Animal health improvements have been documented in Canada where weight gain comparisons were recorded in two groups of cattle. The results showed that cattle drinking from the unrestricted water holes gained 20 per cent less weight than those drinking from piped water sources (Kondinin, Farming Ahead, 1996).

Wetlands can be enhanced to provide greater amenity values such as bushwalking, bird watching, fishing and hunting. This enhancement may be purely for private benefits but can be commercially exploited as well. In a survey of wetland owners in two areas around 50% of owners indicated that their total benefits from wetlands being retained (monetary and non-monetary) would exceed the monetary benefits if their wetlands were drained. This was despite 44 and 65% of owners in the two areas perceiving that their profits would increase if the wetlands were cleared (Bennett and Whitten, 2002, p11).

Revegetation of riparian areas with native vegetation has been shown to be cost effective for reducing the impact of rodents on crops such as sugarcane and macadamias in north Queensland (Tubman, 1996, Ward et al, in press).

(ix) On-farm benefits from ecosystem services

The encouragement of biodiversity through retention and enhancement of native vegetation can contribute to a range of on-farm benefits. However, information on the understanding and magnitude of the impact of many of these benefits is scarce. Examples of an improved ecological balance impacting on the farm systems could include:

- Planted wood lots and protected native vegetation can enhance the provision of pollination for a range of pasture species and crops through strengthening native insect populations.
- The provision of core conservation areas on farms can increase biodiversity over adjoining paddocks and reduce pest incidence, with potentially less need for chemical control.

- Conservation areas can be used as a reservoir for the controlled hosting of agents for weed species being controlled on the balance of the farm through biological control supplemented by spraying.

The PMEIC reports the value of pollination to agriculture has been calculated as $1.2 billion per annum (PMEIC, 2002). Pollinators are mainly bees and native insects and such crops in horticulture and lucerne depend on them to set seeds and grow fruit. Native vegetation is important in ensuring a continuing habitat for the pollinators.

Most pollination is effected by exotic honeybees, both managed and feral. With Australia the last major beekeeping country free of the parasitic mite that has caused major declines in feral and managed honeybee populations elsewhere in the world, pollination services in future may need to rely increasingly on pollination by native insects (such as natïve bees). Preserving and enhancing native vegetation can improve the pollination activity from insects such as natïve bees (drawn from issues raised in Cunningham et al, 2002).

Martin and Green (2002) state that "in terms of pest control and pollination, the mobility of animals allows them to have beneficial effects beyond the boundary of the conservation areas. Sensitive species may not be able to survive long-term or breed in the wider landscape, but they may be able to forage or under certain conditions live beyond these protected areas, consuming pests or pollinating trees, pastures and crops"

The presence of a diversity of native vegetation types can assist biological control of non-beneficial insects by birds and other animals. For example, Davidson and Davidson (1992) stress the importance of bushland ecosystems to farming systems and warn that through reductions in habitats and biodiversity through clearing, many species are declining that feed on insects that damage pastures, crops and trees. Further, about two thirds of respondents in a survey of north-eastern Victorian and southern NSW landholders identified the provision of habitat for animals that control pests as a benefit from remnant native vegetation (Miles et al, 1998).

Some of the contributions of native fauna to pest control have been documented in fact sheets produced by some agencies (Sheahan, 1998; DNRE, 2002). Examples include:

- Ibis consuming locusts and grasshoppers,
- Magpies consuming scarab larvae,
- Insectivorous bats consuming half their body weights in a night of moths, beetles and bugs and some spiders, mosquitoes, grasshoppers and crickets,
- Sugar gliders consuming up to 18,000 scarab beetles per ha per season,
- Between 40 and 60% of the diet of crows and ravens is insects, and
- A variety of small birds (such as robins, fantails, weebills, pardalotes, honeyeaters, and butcherbirds will control thrips, scale, lerps, flies and locusts.

MLA (2002) has produced a series of "tips and tools" for making changes under the Sustainable Grazing Systems Program. The tips include, for example, encouraging biodiversity (including birds and earthworms) and describe some of the private benefits that result from specific management changes.

Additional benefits include:

1. Paddock trees can increase organic matter though leaf fall and can in fact improve soil fertility in some cases; mineralization of nitrogen can be increased (Cameron et al, 1989)
2. There is some evidence that trees can reduce acidification through trapping of nitrates and by additions of calcium through leaf drip and litter return (cited in Bird et al, 1992, p76).
3. Brigalow (*Acacia harpohylla*) is leguminous and fixes nitrogen. It has been stated that it may enhance adjacent pasture productivity (Queensland Parks and Wildlife Service, 1999).

(x) Increased property values

In theory, farming system benefits from native vegetation protection and enhancement should be captured in market values of properties. However, this may not always be the case due to lack of awareness of buyers and sellers of the benefits and the difficulty in quantifying such benefits. The private benefits may be valued differently by different landholders depending upon their personal perceptions and management objectives. The type and condition of vegetation may also be a factor.

Lockwood, Walpole and Miles (2000) and Walpole, Lockwood and Miles (1998) reported the results of a hedonic pricing study that assessed whether property values were associated with the areas of remnant native vegetation on the property. The finding was that the area of remnant native vegetation had little influence on property price except that over a particular threshold area there was a negative impact on sale values (too much remnant native vegetation).

(xi) Private use and amenity values

Private amenity and recreational values and improved aesthetics (trees, bush, grasses and fauna including bird life that many land owners enjoy) may not necessarily interact directly with farming systems, but if they contribute to lifestyle and enjoyment, they can be considered to make some indirect contribution to farming system management.

Over half of the landholders in a survey of north-eastern Victoria and southern NSW reported that they used their native vegetation for various recreational purposes including walking, riding, relaxing, nature observation etc (Miles et al, 1998). In the same study Miles et al (1998) report that aesthetics was listed as the most commonly nominated benefit of remnant native vegetation.

Fitzpatrick (1994, p20) cites Campbell (1991) regarding the importance to farmers of landscape improvement: "This has been demonstrated by three Victorian surveys of a total of 95 farmers which showed that improving the landscape was mentioned as the second most common reason for planting trees, after shade and shelter, but before replacing trees, controlling salinity, improving productivity, future benefit, increasing land values, wildlife, firewood, farm timber, erosion and lowering the water table".

(xii) Carbon credits

There is potential for receiving income from planting trees (native or otherwise) via carbon credits associated with greenhouse gas reduction; this may not accrue to areas with existing native vegetation but only where revegetation has occurred.

(xiii) Options values

There are a range of uncertain future values for a particular area of native vegetation. While these are largely unspecified, they could fall into some of the categories of medicinal resources; essential oils; new genetic material for ornamentals or for timber; or biological control organisms. Such future uses are probably more in the realm of public benefits and should not be considered capturable by the landowner and probably can not be directly integrated into the existing agricultural system. Where native vegetation is particularly diverse, values could be incorporated in the future into property prices.

2.3 Private Benefit Capture and Cost Sharing

Perceptions of uses and benefits

(i) Miles et al (1998) report results of a survey of 222 landholders regarding their perceptions of uses and benefits from remnant native vegetation (RNV). Under current management, about 53% of Victorian participants and 82% of NSW participants in surveys of landholders were gaining net economic benefits from their remnant native vegetation. Firewood extraction, stock shelter and shade and grazing were the three most common uses of RNV as part of the farming practice. Of the benefits listed, aesthetics was surprisingly the most common reported. Other benefits noted included those from enhancing the habitat for controlling pests; this benefit however, was offset by the increased harbouring of pests themselves. Other benefits listed were windbreaks, climate benefits, noise reduction, educational and conservation values and as a seed source. Some of these benefits could be allocated to both private and community benefits. However, if more conservative management was practiced (e.g. greater public benefits), then the vast majority would sustain a net loss. However, most participants indicated that they would undertake activities to conserve their RNV if incentives were available, in particular, economic incentives.

(ii) Crosthwaite and Malcolm (1998) report on a study on native grassland on the Riverine Plain of South-eastern Australia. Conservation management and development options were tested on four case study farms. Results showed that none of the actions that might improve conservation outcomes of grasslands on four case study farms was unambiguously profitable (e.g. retiring land areas via fencing, lighter stocking). Cropping of native grassland was profitable on the two properties assessed for this option.

(iii) Hussey (1995) cites the results of a survey in the wheat belt of Western Australia. The most important reasons for retaining native vegetation were shade and shelter 44%, erosion control 18%, soil salinity control 13%, preservation of flora and fauna 7%, scenic aspects 1%, preservation of natural bushland 13% and no suitable land left to clear 3%.

Cost of Improvements

The costs of improvement of native vegetation management will be different for each farm and for each farming system employed. Management costs will depend on the mix of goals set by the farmer, particularly to any weight given to biodiversity conservation goals and the associated practices that accompany such goals.

Benefit Capture and Cost Sharing

In some cases, private benefits from managing with greater conservation goals in mind may lead to higher net private benefits. This may be the exception rather than the rule and, in many cases, there may well be a need for society as a whole to support capital works (fencing) or ongoing maintenance of the protected areas such as weed control, fencing maintenance, access tracks and firebreaks.

The opportunity costs of any land on farms managed for conservation purposes will need to be considered carefully in the case of land clearing, along with property rights and duty of care.

Is it worthwhile attempting to estimate the proportion of benefits that may flow to the landholder in a private sense versus that that may be considered public benefits? What would be the major use of such estimates? Would they, for example, be useful in:

- assessing where scarce public resources could make the greatest impact on capture of some of the public benefits on offer from changing landholder practice?
- providing formulas or at least guidelines as to the support levels that may be given to particular landholders in their particular situations; or
- be used only in an informal manner to direct priorities in policy development?

An attempt has been made to attribute private-public benefits in benefit-cost analyses (Agtrans, 1997) with regard to prospective dairy industry projects associated with vegetation. The projects were related to streambank management in Gippsland and Western Victoria (fencing off plus revegetation), and the second on riparian management on dairy farms in Coastal Queensland and northern New South Wales.

From an overall societal viewpoint the economics were dependent on the improvement in water quality and the associated public benefits. Estimates were that the community would need to provide 21-22% of the capital costs associated with the implementation of the management changes in order for the farmer to gain a positive net present value. Risky variables for the farmer included the extent of any drop off in milk production. Also, as the private benefits included an increase in property value, and this benefit may not be realised for many years, a proportion of capital costs much higher than 21-22% may need to be made to encourage adoption (Agtrans, 1997).

Two other studies (Barker, 1997 and Carlson et al, 1997) also investigated benefits from riparian area restoration with regard to North Queensland dairy farming systems. Benefits included increased milk production from shade, reduced cow losses and higher water quality for cows. Private returns were estimated at from 2-12% from the investment from the Barker study, probably insufficient to encourage investment by dairy farmers. The Carlson et al study estimated similar returns but reported that the returns were highly dependent on assumptions linking water quality to productivity changes.

Two studies also were made on cost sharing of revegetation in the North Queensland sugar industry. The sugar industry project was associated with establishment of riparian vegetation to control rats and improve sediment/nutrient trapping. This resulted in less rat damage to the cane, a reduction in use of rat poison, suppressed development of aquatic weeds and increases in biological activity in the rivers; together with reduced sediment and nutrient export. The environmental benefits were

measured through assumptions on increased fisheries productivity in estuaries and coastal waters. However, in this case it was shown that the sugar industry benefits more than outweighed the costs of revegetation for those regions and farms where rats were significant (Chudleigh et al, 1997). Tubman (1996) also concluded that the private benefits outweighed the costs in this instance.

Ward et al (in press) studying the restoration of riparian vegetation to control rats with regard to macadamias, reported that over a 3 year period, orchard trees in North Queensland adjacent to the restored habitats received 50% less rat damage compared to trees adjacent to habitats that had not been restored. They estimated a private break-even period of 3.4 years, after which the benefits were estimated at $4,500 per km of orchard frontage.

Sillar Associates (2001) provide some key statistics from a series of case studies investigating the extent of private benefits and costs for improved riparian land management. They reported that for only 19% of sites the private benefit-cost ratio was greater than 1. Even then there were questions over some of the benefits such as timber harvesting from the riparian land (this may have compromised environmental benefits) and the attribution of benefits arising from adjacent land to any riparian enhancement.

On the other hand these analyses did not include private benefits the land managers may have derived from improved aesthetics on farm and other interactions between the productivity and long-term health of the agricultural system and a healthy riparian area.

These examples illustrate the difficulties of attempting to develop generic cost sharing formulas, due to:

(i) Difficulties in quantifying values of environmental benefits, not only due to the absence of market, but also due to the inadequate knowledge about the relationships between a supposed best practice and the environmental or downstream impact
(ii) Different resource situations of farmers so that the share of costs appropriately paid by the public will differ from farm to farm
(iii) Different financial situations between farmers so the level of costs paid by the public may need to differ between farmers in order to encourage adoption
(iv) Different risk attitudes of farmers to the specified investment or practice and the uncertainty of reaping private benefits

Perhaps the best that can be achieved given current knowledge of physical relationships, and the traditional "hands-off" approach to policy initiatives, is to use such benefit valuation and attribution studies to identify in general terms where the balance of benefits lie and develop instruments that are the most cost-effective to achieve a given outcome of sustainable resource use and protection. Auction systems such as used recently in Bush Tender (Victoria) and the Liverpool Plain (NSW) are based on a cost effective cost sharing arrangement that accounts for the different valuations that land managers place on the both private and public benefits relevant to their particular situation.

2.4 Conclusion

There are significant private benefits to landholders from conserving/managing native vegetation on farms. The benefits will vary depending on the agricultural system itself, and the resources, values and perceptions of the individual land managers.

In many situations, costs of change do not cover the private benefits, at least in the short term. There are a range of potential private benefits, particularly long-term benefits, where understanding is lacking and that are difficult to value.

Public policies and programs that encourage landholders to manage native vegetation better are justifiable due to the potential public benefits of averting further biodiversity loss.

3. Programs and Policies

3.1 Scope of programs and policies considered

The scope of programs and policies considered was largely influenced by the guiding principle of the policy or program being broadly directed at the 'integration of native vegetation into agricultural systems'. Section 2.2 provides some discussion of how the terms integration and native vegetation have been interpreted. Using these interpretations, the first task was to place boundaries around the scope of programs and policies that could be considered in terms of eligibility for case studies.

The following diagrams were developed to assist in interpreting the boundaries. Diagram 1 shows that there are several dimensions to consider including the purpose of the program or policy, the definitions of 'native vegetation', 'management' and 'integration', as well as land ownership and land uses.

As can be seen, the interpretation is such that there is a wide variety of programs and policies eligible for inclusion in the study. A key aspect is the exclusion of policies and programs that focus on the catchment or landscape scale. This aspect is discussed later in the study.

Legislation was considered broadly but was excluded from the case studies on the grounds that legislative approaches to native vegetation are being addressed in other current studies.

Diagram 1: Dimensions in Considering Integration of Native Vegetation Management into Agricultural Systems

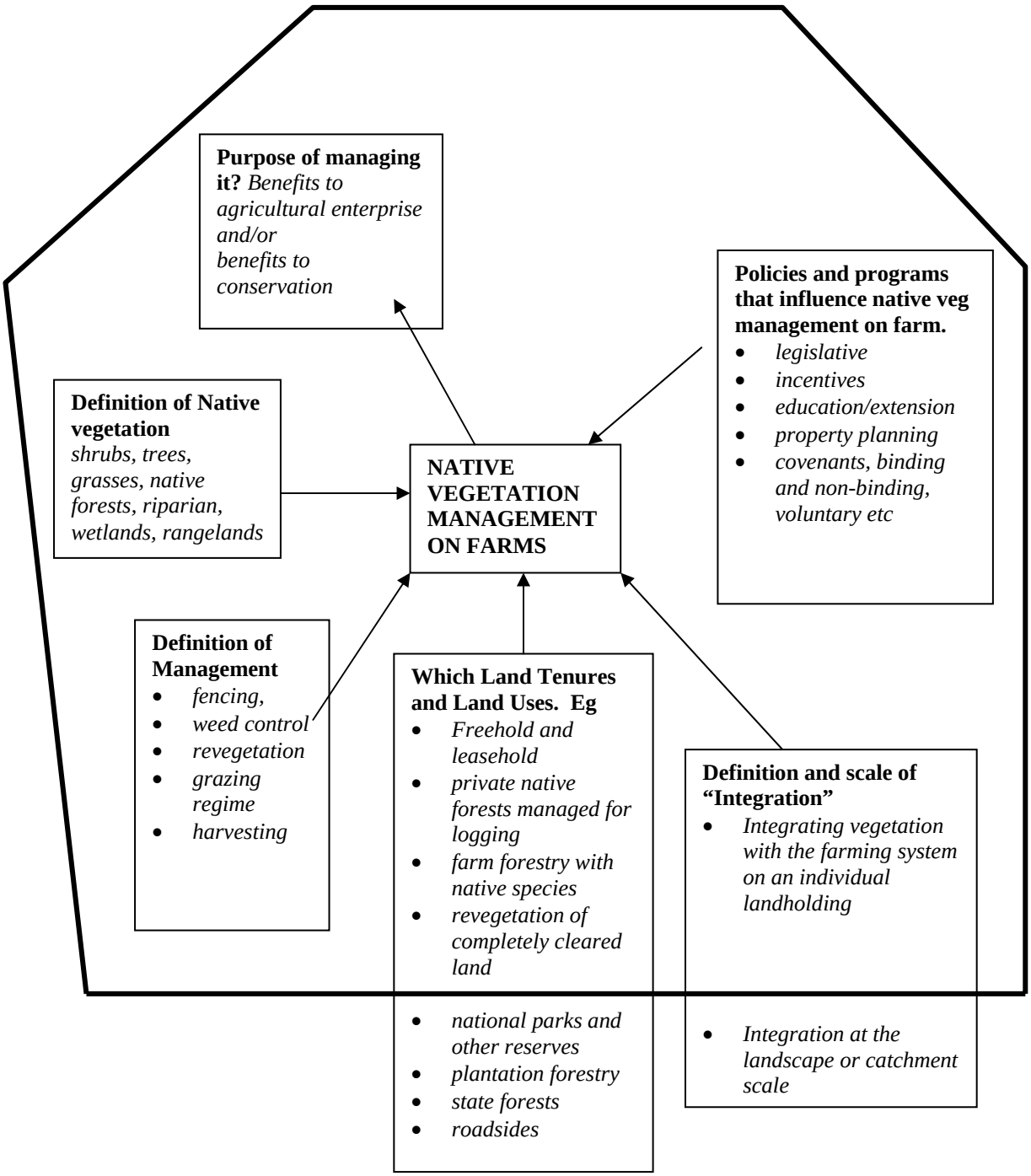
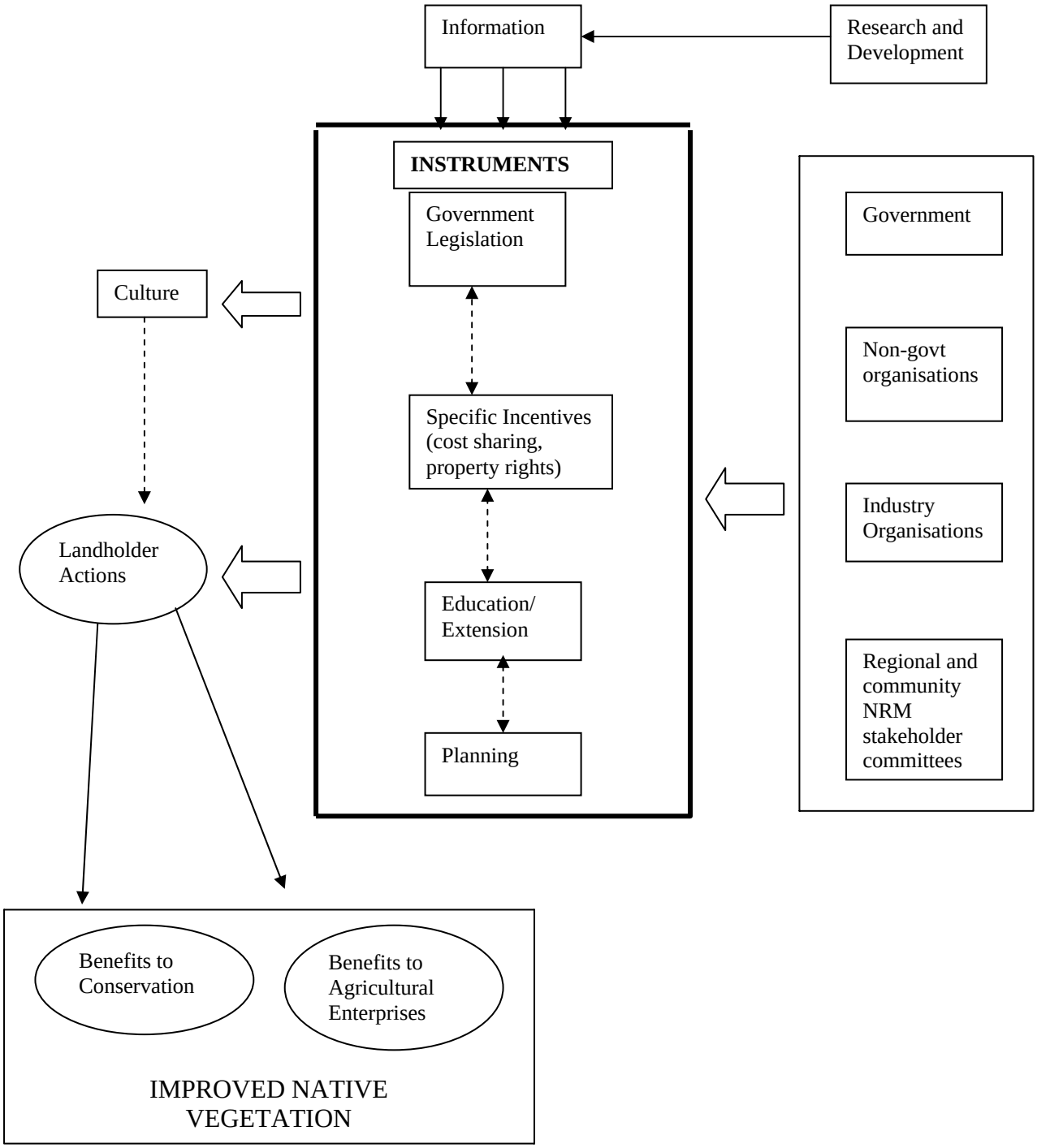


Diagram 2 focuses on the variety of instruments and organisations involved in the delivery of relevant programs and policies and features the central role of decision making by land managers. Elements of this diagram were used to assist in classifying programs and policies when selecting case studies.

Diagram 2: Scope of Approaches and Institutions Involved in Improving Native Vegetation Management



3.2 Selection of case studies

A wide range of programs and policies were identified from the existing knowledge of study team members, from literature, and from the world wide web.

In order to identify an even broader range of relevant policies and programs, a short questionnaire was developed and distributed to over 20 personnel versed in vegetation management science, policy or extension (public and NGO) activities. Also sent the questionnaire were Landcare Coordinators, Greening Australia CEO's in each State and members of the Native Vegetation Program Advisory Committee. Some other NGOs and researchers were also contacted. All together 45 questionnaires were distributed, and responses were received from 26 people. The questionnaire can be found in Appendix 2.

A short report on the results of this survey was prepared and submitted to the Project Manager. For further details please see Appendix 2.

From these sources a long list of relevant programs and policies was developed from which the case studies could be selected. This long list is included at Appendix 3.

Two purposes were considered when selecting the case studies. One was to assist in the assessment of particular intervention types (eg covenants, extension, education, financial incentive). The second was to consider actual programs or policies that may have used a combination of one or more of the above tools. Both purposes were considered in selecting the case studies.

The geographic location of the program or policy and the managing agency were also considered to ensure an appropriate spread of case studies.

The fourteen case studies selected were:

1. Field Fresh Nature Conservation Project
2. Murray Darling Basin Commission Vegetation Bank
3. Murray Catchment Fencing Incentives Program
4. Bushcare Program of NHT
5. Woodland Watch
6. Treecare Program
7. Protected Areas on Private Land
8. SAND Farmscapes Project
9. Land for Wildlife (Victoria)
10. Trust for Nature (Victoria)
11. Mid North Grasslands Working Group
12. Local Government Native Vegetation Protection Program, Gippsland
13. BushTender
14. Advancing On Farm Nature Conservation

3.3 Method for assembling case study material

For each of the selected case studies, a brief review of any available information was undertaken, and one or more 'key informants' in relation to each program or policy was contacted to obtain further information. When undertaking the case studies, it was important to keep in mind that the purpose for considering the specific programs and policies was to seek 'lessons learnt' and for characteristics that may have led to the success of these programs or policies. The case studies are therefore not intended to be a 'review' or 'assessment' of the performance of each program or policy, but of course the performance of the program or policy was inherently important in identifying lessons learnt.

4. Case Studies

4.1 Summary of case studies

The following table summarises the key objectives of each of the 14 case study programs and policies. The case studies are each presented in detail in Appendix 4. In addition to the following case studies, a brief review of the role of Local Government in influencing native vegetation management was undertaken and this is presented in Appendix 5.

Table 4.1: Summary Description of Case Studies

Name	Location/ organisation	Objectives
1. Field Fresh Nature Conservation Project	Greening Australia in conjunction with Field Fresh, a Tasmanian Production and exporting company in NW Tasmania. Had NHT funding.	Encouragement of onion and carrot growers to develop a conservation program as part of their compliance with Natures Choice Quality Assurance Program (Tesco Supermarket Chain in the UK).
2. Murray Darling Basin Commission: Vegetation Bank	The Murrary Darling Basin with varying structures and functions for the statutory backed Vegetation Bank postulated. Has not yet been implemented.	The objective was for public funds to be used to "buy" conservation areas on farms whereby private sector interests would bid a price they are willing to accept to take areas out of agricultural production through revegetation/reforestation, as well as pay for the costs of managing the areas.
3. Murray Catchment Fencing Incentives Program	Murray Catchment involving Greening Australia (Riverina) and the Murray Catchment Management Committee. Had NHT funding.	The program was aimed at facilitating significant capital and management improvements for protecting remnant vegetation in the Murray Catchment through fencing incentives where landholders contributed time and labour to gain access to the incentive.
4. Bushcare Program of NHT	An Australia wide major NHT program managed by Environment Australia	The Bushcare Program was aimed at conserving and better managing native vegetation through a community grants process including extension and support to engage communities and all levels of government in partnerships.
5. Woodland Watch	A project in the wheat lands of Western Australia managed by World Wildlife Fund.	The aim of the Woodland Watch project was to raise awareness and secure long-term conservation protection of privately owned woodlands and was specifically targeted at those woodland species that are underrepresented in the nature reserve system.
6. Treecare Program (QLD)	Many areas of Queensland over the period 1990-2000	The objective of the Treecare Program was to educate the public (including other agencies, educational institutions, specialist groups,

	and managed firstly by the Department of Forestry, then by the Queensland Forest Service, Department of Primary Industries and finally from 1996 by the Department of Natural Resources.	businesses, private individuals) on all aspects of forestry (including timber production, conservation, plantation and native stands) and the use of trees and shrubs in remediation of land degradation. It aimed to develop a community understanding of the role of trees in their local landscape and assist and participate in the Landcare movement in an attempt to make forestry part of the community culture.
7. Protected Areas on Private Land	Operates in Tasmania and is funded by the Natural Heritage Trust through the National Reserve System.	The program aimed to complement the National Reserve System on public land in Tasmania by protecting land in voluntary conservation agreements including conservation covenants, private reserves and management agreements, under the Tasmanian *Nature Conservation Act 2002*.
8. SAND Farmscapes project	The SAND Farmscapes group (NSW, southern Riverina) received an NHT grant through Bushcare to conduct a research and planning project with Greening Australia and CSIRO Sustainable Ecosystems.	The project was established to address the concerns that the role of remnant woodlands in agricultural landscapes was not sufficiently understood. The research project was developed to enable the local community to gain awareness of the diverse wildlife in the region and to develop ways to conserve this wildlife within a sustainable farming system. The three questions the project sought to answer were: How to best manage these woodlands for wildlife without compromising productivity? What wildlife other than the Superb Parrot existed in the area? and What role do the woodlands play in maintaining a healthy and productive landscape?
9. Land for Wildlife (Victoria)	The Victorian Department of Sustainability and the Environment administers the Land for Wildlife program in Victoria.	The general concept is to support landholders or managers who provide habitat for native wildlife on their land. This support includes fact sheets and other information, a sign for display, extension advice and opportunities to participate in field days and other activities.
10. Trust for Nature (Victoria)	A non-profit organisation established by the Victorian Conservation Trust Act.	The organisation seeks to enable people to bequeath land or money for conservation and for the purchase of Victoria's threatened, privately owned bush. It also allows landowners to voluntarily place conservation covenants on their land.
11. Mid North Grassland Working Group	South Australia. Representatives on the Group include PIRSA, Rural Solutions, NHT, National Parks and Wildlife, WWF, DEH, Soil Conservation Boards.	The Group undertakes a project titled 'Conservation and Sustainable Management of Native Grasslands in the Mid-North'. The project involves the initiation and promotion of best management practices for native grasslands for biodiversity, conservation and production purposes.

12. Local Government Native Vegetation Protection Program, Gippsland	Managed by the Gippsland Coastal Board and funded through the NHT with matching contributions by six Gippsland Shires.	The purpose of the Program was to strengthen the role of Local Government in protecting remnant bush by encouraging landowners to permanently conserve native vegetation through a financial incentive scheme, the development of whole farm plans and weed control.
13. BushTender	Managed and funded by Department of Sustainability and Environment (DSE) of the Victorian government.	It offers landholders the opportunity to receive payment for entering into agreements to provide management services that improve the quality or extent of native vegetation on their land. These services are based on management commitments over and above those required by current obligations and legislation.
14. Advancing On Farm Nature Conservation	Managed by Greening Australia Queensland and partially funded by NHT.	A devolved grant project that was developed and administered by Greening Australia. It provided a financial incentive, together with professional extension officer assistance, to landholders who agreed to fence and manage areas of remnant native vegetation on their property.

4.2 Lessons learnt from case studies

Table 4.2 below presents a summary of the key lessons learnt out of each of the case study programs and policies.

Table 4.2: Summary of Key Lessons Learnt from Case Studies

Name	**Key lessons learnt**
1. Field Fresh Nature Conservation Project	• Growers need a substantial amount of technical support and information if they are to be successful in gaining and retaining QA with environmental outcomes; the amount of support required is generally underestimated and this would apply to EMS as well as QA. • Having knowledgeable and skilled personnel on-ground and available to assist farmers was instrumental to the success of the project. • When there was a financial incentive apparent, there was a high level of interest and a large uptake; when the financial incentive lessened, there was a significant drop out rate from the QA accreditation system, but many still persevered with the conservation plans to some extent. • A major issue was the short period of the project. Many farmers prefer to see how matters are proceeding "over the fence" before committing themselves. The project was just gaining momentum when it had to cease.
2. Murray Darling Basin Commission - Vegetation Bank	• Availability of biophysical data is essential to underpin such a venture; science underpinning is essential, to define the link between the intervention action being promoted and the environmental outcome. • A range of scales (eg. property, landscape, State) will often need to be considered and targets set appropriately, since at one scale the best solution may be different to another scale. • Associated with scale was how to measure the potential of the bids coming forward. For example, NSW priorities for salinity amelioration

	in NSW itself may be different to planting trees in NSW to lower salinity in Victoria and SA. • Institutional funding arrangements appeared to have some part in slowing the development of the Bank. Conflict between bilateral and multilateral funding arrangements with the announcement of the NAP also may have contributed in this regard. The difficulty of setting priorities and targets and where they may be multiple objectives should not be underestimated where there are multiple funding bodies. • Initiatives that require agreement across five jurisdictions for multilateral funding can prove difficult to implement. While it may be easier to implement a Vegetation Bank at a catchment or regional level, with funding targeted at the priorities within the region, there still may be difficulties with building in interactions and optimising investment where there are interactions with other regions. • Some of the thinking that had gone into the Bank concept has been used in the Bush Tender trial in Victoria.
3. Murray Catchment Fencing Incentives Program	• Thorough preparation including scoping and priority setting is a good investment • Simplicity worked by making it easy for landholders to access incentives and technical advice • Such programs to be most effective have to be on-going • Committed and experienced extension staff can make a difference • Governments are not significantly committed to extension investment • Establishing intensive monitoring frameworks may not be worthwhile if they are not going to be utilised in the longer term • The strong focus on adaptive management and extension, the former facilitated by establishing vegetation benchmarks that enabled purposeful monitoring and evaluation • Good rapport with individuals through individual personalities and their knowledge base; this helped to build trust which, through learning, led to attitude shifts • The effort spent on early promotion linked to sponsorship; this then later evolved more into information/knowledge transfer linked to individuals and sites of interest • Effective leadership initially by key stakeholders and then by the project/ management staff and then further by some key landholders
4. Bushcare Program of NHT	• A stronger focus on integration between projects was required with more effort placed on regional and catchment planning, while still empowering community groups. • There was a need to develop more effective instruments to stimulate added private investment. • There was considerable difficulty in monitoring outputs and outcomes from the investment due to the nature of the investment structure and because conservation outcomes take many years to become apparent. • There needed to be more emphasis on technical support via R&D, training and extension. • Devolved grants are effective ways of maintaining community interest and commitment while at the same time addressing regional environmental problems where a critical mass is required. • The variation in incentive mechanisms and instruments used in the Bushcare Program was insufficiently broad from which to glean much

	knowledge. • More can be done to stress the integration aspect of sustainable NRM and vegetation management, and production/vegetation complementarities and tradeoffs, and arrangements. • The clarification of property rights may be a key factor in developing effective instruments and arrangements. • The tenet that NRM is a long-term issue with continuous efforts required is recognised, but governments have not made a commitment in terms of long term secured funding desirable from the viewpoint of: o Maintaining momentum in successful projects o Employment security for those supporting initiatives, o Giving confidence to landholders and sustaining their commitment o There may be a danger of too many obligations and requirements leading to less uptake but higher quality of uptake if incentives are developed in a highly targeted fashion • Although potentially of high cost, there is a need for selective and strategic long term monitoring of past initiatives
5. Woodland Watch (WA)	• An NGO such as WWF can be more easily accepted than government representatives in some situations • Face-to-face contact is the key to facilitating conservation outcomes. Meeting landholders (and any other stakeholders) on the site, and speaking to them in person led to more effective communication of the conservation point of view • Being able to offer landholders a range of options and incentives is essential, as they like choice and the ability to exercise their own choice • Having a local identity in the region is a big bonus. Landholders can see field officers as community members as well, and develop working relationships as a result of social interactions • A collaborative, partnership approach with other organisations is essential • The strong communications focus was critical to raising the profile and outreach of the project • A project such as Woodland Watch that basically operates at the site level can open up a range of strategic opportunities for conservation at the farm, catchment, shire and regional levels.
6. Treecare Program (QLD)	• It is possible for programs to continue for long periods under the auspices of different government agencies • Property management planning is a useful tool to ensure that the tree plantings are in accord with the particular NRM and production issues associated with a particular landholding • Programs involved in long-term processes such as forestry and degradation remediation need long-term support • It is easy to “preach to the converted” but difficult to change the community ethos quickly • While information tools such as web sites and advice leaflets are helpful, in most situations the trained operator is still required to give advice for the best outcomes.

7. Protected Areas on Private Land	• The development of conservation covenants takes time (generally around six months) and this must be explained to the landowner at the first opportunity • Communication between the program and landowners must be timely or agreements will fall through. • All people are different and desire different outcomes from the covenants they enter into. • Information on flora and fauna and advice on management are generally very important to the landowner. • A monitoring regime and ongoing support and communication are seen as important for most landowners. • The dedication and commitment of staff and management to conservation outcomes is crucial to the success of the program.
8. SAND Farmscapes project	• Community involvement and local ownership are essential. This was a community based initiative, where the Savernake and Native Dog Landcare Groups, in collaboration with Greening Australia, contracted CSE to undertake the research. The contract was handled through the Berrigan Shire and there was therefore local ownership of the project. CSE was merely a service provider to the community, rather than driving the project from the outside. Local ownership and participation were further emphasised through a farmer driven steering committee and local research support staff hired by and managed by the community. • The involvement of CSIRO and GA type agencies may be less threatening to the community, unlike some State Agencies that have legislative enforcement responsibilities.
9. Land for Wildlife (Victoria)	• It is important to respond to the needs of individual landholders. • There is a need to link the biodiversity message to what people really value. • There is a need to supply consistent service and high-quality technical information. • Success is fostered by building trust, being coordinated, and developing a positive team spirit. • There is a need for the provision of extension advice and support by government to private landholders, concerning biodiversity conservation of private land, including how to integrate nature conservation with other land management practices. • Land for Wildlife can play an important role in conserving habitats and species on private land that are not well represented on public land. • A program such as LFW can enthuse landholders to conserve and restore habitats on private land and has the right combination of characteristics that foster this enthusiasm (voluntary, free, one-on-one visits, specific local info on flora and fauna etc, recognition in the form of a sign for display, free newsletters, opportunities for interaction at field days etc, network of likeminded people, opportunities to share experiences). • Influencing the value systems, attitudes, aspirations and beliefs of landholders is fundamentally important to biodiversity conservation in rural landscapes.

10. Trust for Nature (Victoria)	• Voluntary binding covenants have become increasingly acceptable to landholders who own properties of a size range between 5 and 100 hectares. • Financial incentives, including rate rebates and small direct payments for conservation management of up to $5,000 help encourage other landholders to covenant, particularly farmers with larger areas of habitat including highly endangered communities such as temperate grasslands. • There is good correspondence between high priority vegetation communities and the types of 'bush blocks' where landholders ask for covenants. • The Revolving Fund is an effective mechanism for purchasing high priority vegetation communities and there is now an established market for covenanted bush blocks especially within a two hour drive from Melbourne. • Publicity and public profile is important. For example, an article in The Age (October 2002) on Trust for Nature's purchase of Ned's Corner Station attracted a lot of attention from readers excited by large scale conservation on private land. • Committed covenanters (approaching 500) become effective ambassadors and are the traditional means by which the organisation spreads its message. • Effective leadership by Board of Trustees and Directors over many years has encouraged staff and covenanters to regard themselves as pioneers of a new style of conservation ie. an inclusive approach has been very important • Institutional support – philanthropic trusts very supportive; Natural Heritage Trust maintains extension program; Victorian Department of Sustainability and Environment provides vegetation mapping and policy framework.
11. Mid North Grasslands Working Group	• A farmer driven group with a combination of local knowledge and facilitators with access to technical knowledge and skills is an advantage. • The integration of an incentives scheme with research and demonstration is a vital contribution to the success of the project. • The publicity and public profile of the project has been raised through regular newsletters, the media, field days and by word of mouth. • The leadership role provided by a local farmer and member of the MNGWG who liaises with the farmers for both the grazing and conservation programs has contributed largely to the success of the program
12. Local Government Native Vegetation Protection Program, Gippsland	• Difficulties were experienced in achieving expenditure within the allocated NHT timeframes and in meeting NHT reporting milestones due to the long timeframes required for assessing and establishing Trust for Nature covenants. • The Program ran across six Shire Councils and involved several state government agencies, an NGO and a large number of land owners. Having a local but wider organisation such as the Gippsland Coastal Board manage the project was valuable when so many organisations were involved. • Flexibility in redirecting funds to other purposes was important in this case, so that funds were not wasted.

	• The importance of monitoring vegetation types is important, as it is difficult to assess the ecological value of the outcomes of this program without knowledge on the vegetation types protected in the covenants. • Kick starting such schemes can stimulate interest by local government who may continue on with such rebates on their own. • There is not always interest in developing Whole Farm Plans even when financial support is available; the level of financial support may be available.
13. BushTender	• The mix of skills needed to deliver the program is important (eg economics, ecology, field delivery, project management). • Contemporary economics highlights the role of information. • Using sound well founded ideas saves time, money and lowers risks. • Early exposure / testing of ideas is important to ensure minimal problems when a program is widely used. The trial approach of BushTender demonstrates this, rather than introducing such a concept across Victoria in the first instance. • Explicit approaches such as this may expose shortcomings in existing processes but also provide the basis for improvement. • Evaluation is important - must be able to measure and explain process and results. • Design the opportunity for "adaptive learning" directly into the program. • A well-designed communications strategy was important to generate interest but not too much so that demand could not be met. Newspaper, radio, TV stories helped but newspaper articles/adverts appear to have been the most effective. • The most valuable vegetation conservation outcomes can be targeted at least cost. • There was a wide range of bids reflecting the variation in costs willing to be borne by different landholders, partly reflecting differing values of "private benefits".
14. Advancing On Farm Nature Conservation	• The establishment of landholder monitoring programs was critical in building community capacity and promoting higher awareness of conservation issues. • The time spent by the extension officers assessing, shortlisting and processing projects was efficient, however it left limited time for conducting meaningful monitoring of the large number of projects throughout the area. Given the size of the project area, it would have been more efficient to have a separate officer dedicated solely to monitoring projects across a region. • It has been observed that many landholders who have undertaken conservation works as a result of this project have since either encouraged their neighbours to become actively involved in similar works or have been instrumental in forming their own sub-catchment groups. • Landholders involved with the project have been introduced to the Land for Wildlife Scheme to allow access to ongoing specialist advice. • Landholders still prefer seeing other 'works' and having a personal face on extension. They value very highly the personal visits by the GA officers. • There is still a huge demand for natural resource and native vegetation

	management by landholders and there is a perception that field based government officers have been withdrawn, placing huge challenges to GA and private consultancies to service landholders with NRM information.

5. Summary of Relevant Industry Initiatives

5.1 Introduction

The following is a description of some programs and policies that have been implemented by industry, sometimes in conjunction with government agencies and/or Research & Development Corporations (RDCs). This brief account is aimed at describing current activity rather than a detailed review or focus on success factors or lessons learnt.

It is important to recognise industry activities in the overall context of this report as industry programs can provide a supporting or even a central focus to the spectrum of mechanisms to achieve change. They are described only briefly here and the coverage is selective rather than comprehensive.

Many of these industry initiatives are supported by the commodity RDCs including research, education, extension, and planning. The industries covered include meat and livestock, wool, grains, dairy, sugar, rice, and cotton.

One implication of this increasing involvement of the commodity RDCs in native vegetation and biodiversity conservation is that future policies and programs run by all organisations will have improved technology and knowledge as a basis. In addition, the RDCs have contributed to the definition of Best Management Practices (BMPs). Also, through baseline surveys they are undertaking in relation to BMPs and other farm practices, they will provide a valuable source of data for more rigorous program and policy evaluation in the future.

5.2 Meat and livestock industry

The sustainable grazing systems project (SGS) was an MLA initiative together with partners (principally LWA, MDBC, State agencies and several universities) that addressed declining pasture productivity and sustainability in grazing systems of high rainfall sheep and cattle producers in southern Australia. It commenced in 1996 and evolved from the MLA's (MRC) former Temperate Pasture Sustainability Key Program (TPSKP) in which LWA (LWRRDC) was also a partner.

With regard to promoting sustainable management practices in relation to native vegetation, the most prominent output for producers was a special edition of SGS Prograzier that focused on maintaining biodiversity. Its contents include management tips, benefits, farm forestry, earthworms, soil microbes etc. (Prograzier, 2002). SGS activities relating to biodiversity was reviewed by a team (producers and researchers) that identified a range of products for producers relating to biodiversity and issues requiring attention to assist land managers understand biodiversity in a production system.

From this review the Progazier special edition was progressed as well as a series of educational leaflets, "tips and tools", which was published by MLA from the SGS Program and included:

- Encouraging birds onto your farm
- Encouraging biodiversity benefits
- Increasing earthworms in pastures
- Assessing the condition of remnant vegetation
- Improving the value of remnant vegetation
- Revegetating the farm

These focused on a theme of managing biodiversity in a production system.

MLA's EDGE Network (the industry's training program) has an NRM module. One of the components of the module is called "Biodiversity for Multiple Benefits". It is currently under development, but has been piloted and is expected to be completed by September 2003.

The other components of the module are directed at other resource management issues (weed management, soil health, and salinity). Linkages between the components are expected to be emphasised with the biodiversity component aiming at integrating the production and conservation aspects within a whole farm planning context. The NRM module itself is integrated with the other modules in the EDGE Network.

Whole farm planning is a fundamental component of the biodiversity component (Williams, pers comm, 2003). Participants develop plans for their property during the two days of the Biodiversity workshop which encourages graziers to identify multiple benefits from managing native vegetation and biodiversity as an integral part of their properties.

MLA’s major initiatives for Natural Resource Management (NRM) throughout Queensland, Northern Territory and the Kimberley and Pilbara regions of WA are contained within its Northern Beef Program (NBP). As the majority of northern Australia is still under native vegetation, the majority of resource management projects within the NBP have interactions with native vegetation and biodiversity. This program proposes eight NRM themes of importance (e.g. grazing management, water quality) to the northern beef industry and has developed projects that address critical gaps in scientific knowledge and promote awareness and adoption of sustainable resource management practices.

Many aspects of these themes are inter-related (e.g. grazing management and water quality) and it is expected that projects will often address more than one theme.

The key outcomes from this work will be incorporated into MLA’s Grazing Land Management training package. This will be delivered within the EDGE Network program. An added advantage of delivering this product will be to build the capacity of the extension service in the area of resource management.

5.3 Wool industry

The major sustainability program currently operating for the wool industry is the Land Water and Wool program funded by AWI and administered by LWA. One subprogram is entitled "Managing Native Vegetation and Biodiversity". Elements of this subprogram include:

(i) Fact Sheets such as "Managing Native Vegetation and Biodiversity" and "Native Vegetation Management for Wool Producers: Incentives and Guides".
(ii) Identifying current recommended practices for native vegetation management in the high rainfall and sheep-wheat belt with a particular focus on integrating native vegetation into wool production systems.
(iii) Identifying incentive mechanisms and packages for woolgrowers that will enhance the management of native vegetation.

The following is an excerpt from EA Bush Magazine, January 2003 that describes the sub-program further:

> "Four regional projects will trial and demonstrate good management practices in native vegetation management based on producer experience and scientific expertise. Three are under way in NSW, Victoria and Tasmania – with a fourth being developed in South Australia.
>
> Information on good management practices and the incentives available to assist wool producers to manage native vegetation is also being drawn together. This project has drawn on wool producer experience, as well as Greening Australia and other relevant groups. This information will feed into the Land, Water & Wool Natural Resource Management Toolkit, which will be released during 2003.
>
> While the Native Vegetation and Biodiversity sub-program is still in its early days, some important results are already emerging. Case studies confirm that many wool producers are already combining profitable wool production with managing native vegetation. Many producers also have a strong interest in the management and restoration of native pastures, with the need for further research and development in this area identified by them.
>
> The Native Vegetation and Biodiversity sub-program of Land, Water & Wool is closely aligned with the Land & Water Australia Native Vegetation R&D Program. This Program has been running since 1994 and has produced a number of publications and guidelines on the management of native vegetation and biodiversity in rural Australia (see www.lwa.gov.au/nativevegetation). By building on the knowledge gained through this Program and working closely with wool producers, Land, Water & Wool will be able to identify, demonstrate and promote approaches that sustain profitability and biodiversity in commercial wool-producing enterprises".

A key component of the regional programs is that they will all be undertaking some sort of financial audit (as well as biodiversity surveys) to examine more explicitly the links between native vegetation/biodiversity and production (Willliams, pers comm, 2003).

Also, the NRM Toolkit being developed by the Land Water and Wool Program will include material on native vegetation and biodiversity as well as riparian lands, climate variability, productive use of saline lands and future woolscapes. This will include case studies and will have a focus on links to production and profitability. The

Toolkit also contains a module on native pasture management, and one on soil acidity may be developed (Williams, pers comm, 2003).

The AWI initiative entitled the National Revegetation Advisory Service (formerly the Woodlot Advisory Scheme) was terminated by the new AWI Board over the past year.

5.4 Grains industry

GRDC have been funding some scoping studies to assist them decide on strategies and define projects to support in the native vegetation area. Also GRDC support several EMS projects that presumably have a native vegetation and biodiversity component.

There has been a national survey of growers' perceptions of the value of native vegetation, their willingness, understanding, and capacity to undertake appropriate management and their perception of the role of GRDC in supporting research and extension on native vegetation management

A second part of the survey involves detailed profiles of six to eight grain growers from each of the GRDC regions examining their views and activities in the area of native vegetation management and their perception of the major issues and the role of the GRDC.

Also, a review of legislation, programs and values of native vegetation is proceeding to (Williams, pers comm, 2003):

- Identify all relevant state and national legislation and their importance for vegetation management in grain growing areas
- Identify state, federal and non-government programs directed at native vegetation management in grain growing regions and provide an assessment of the scope, cost (and for those that have been subjected to independent review or audit) an assessment of their effectiveness;
- Provide an assessment of the values of native vegetation to the grain industry by reviewing qualitative and quantitative studies of the impact of native vegetation on paddock scale productivity, farm scale profitability, catchment scale environmental management and national scale issues such as market access and compliance with existing or proposed environmental legislation and international treaties.

A workshop was held in May 2003 and the future directions regarding biodiversity and native vegetation R&D in respect of the grains industry are currently being considered.

5.5 Dairy industry

Information on sustainable management of natural resources in dairy systems has been well reported in the industry's "Dairying for Tomorrow" Program (DRDC, 2001) including information on fencing remnant vegetation and on revegetation.

There are codes of practice for aspects of dairy management (eg effluent ponds), and there are regional action plans and a national strategy for natural resource management. For example in the subtropical dairy region there is a program that provides information on best practices for sustainably managing natural resources of soil, water and vegetation in order to benefit both the enterprise and the environment.

The dairy industry in the Gippsland region is determining the effect of key natural resource elements such as soil biota, flora and fauna on productivity and measuring the impact of different parts of the dairy farming system on the natural resource base. The region is also running a riparian management project in conjunction with LWA.

A similar riparian project is being planned for Queensland and new catchment research projects are being developed in western Victoria, Tasmania and Western Australia. The catchment projects will be encouraged to adopt a standard set of protocols (now in draft format) that include biodiversity and riparian modules.

A high proportion of industry attention regarding vegetation on dairy farms has been focused on riparian vegetation due to its biodiversity significance. As of 2000, a survey (DRDC, 2001) showed that 57% of dairy farmer with waterways have all or most of them fenced off from livestock. Also DRDC is currently funding a project to get more dairy farmers into PMP programs that integrate both financial and environmental management. There are also EMS initiatives underway associated with the dairy industry built around a “Self Assessment Tool” that includes a module on native plants and animals.

The dairy industry is also seeking to better understand any relationships between farmer attitudes and behaviour - to better segment farmers and target programs promoting a change in management practice. Recent work in Western Victoria has developed four classifications (based on attitude) and shown a correlation between them and some farm management and production features; including biodiversity management.

5.6 Sugar industry

The sugar industry commissioned an independent audit of the industry in 1995 to determine the impact of cane growing practices on the environment. This led to the development of guidelines for sustainable production and the development of a code of practice that was endorsed by the Queensland government. An industry extension program called COMPASS (COMbining Profitability And Sustainability in Sugar) followed to benchmark awareness and provide a self assessment tool (Azzopardi et al, undated). The code of practice is now being revised including strengthening of the section on vegetation.

The sugar industry through SRDC has worked with Land and Water Australia to produce guidelines for management of riparian lands in the sugar industry.

5.7 Rice industry

A Biodiversity Strategy and Plan for the rice industry has been completed (Freudenberger and Stol, 2002) and is beginning to be implemented within the industry. The initiative is part of a broader rice environment policy developed by the industry. The strategy promotes biodiversity improvement through the development of guidelines and practical activities on farm, and will fit within a five level achievement program giving recognition to farmers demonstrating environmental responsibility and innovation (the "Environmental Champions" program – the platform of delivery for rice environmental initiatives).

The strategy is focused on habitat enhancement as an outcome and is integrated and coordinated with other planning and initiatives in NRM in ricegrowing regions (for example, vegetation strategies within Land and Water Management Plans). Its development and implementation is intended to be a model for other irrigation industries in Australia.

5.8 Cotton industry

The Cotton R&D Corporation (CRDC) has funded a range of surveys and audits associated with vegetation and biodiversity (for example in Moree Shire and in the Emerald Irrigation area). There is a joint program with LWA that developed guidelines for managing riparian lands for the cotton industry and extension work in this area is planned. The role of native vegetation on cotton farms in harbouring beneficial insects and bats is also being investigated as a means of showing positive outcomes of natural resource management for production purposes. Cotton Australia is the peak grower body and has adopted a vegetation management policy that includes regional planning and self-regulation.

CRDC fund several projects in the area of biodiveristy and vegetation. For further information on CRDC projects refer to the integrated natural resources program at www.crdc.com.au . A few of these projects are:

- Project CRDC189C “Biodiversity in the Australian Cotton Industry: A Literature review.”
- Project 4C “Sustainable Resource Management for the Australian cotton industry using the Best Management Practices Manual” (in conjunction with the Murray-Darling Basin Commission) is investigating the requirements for expanding the BMP Program to cover the full range of natural resource management issues, including native vegetation and biodiversity. The project, which is trialling the implementation of a broad environmental management system on 12 cotton farms across the major cotton growing areas, has:
    - detailed all the current legislative requirements (state and federal) dealing with native vegetation that affect cotton farmers
    - listed the requirements (as detailed in catchment management plans, blueprints etc.) for native vegetation management in every catchment in which cotton is grown
    - Interpreted those requirements for each of the project farms
    - Started to implement those requirements on the project farms.

The Best Management Practices manual (BMP) is the cornerstone of the cotton industry's environmental program. Each cotton grower receives a BMP Manual that is worked through to identify areas of risk and to develop action plans to address those risks. Development of the best management practice (BMP) manual commenced in 1997, and the manual has continued to evolve since then with over 95% of cotton growers introduced to BMP.

The CRDC has trained 16 environmental auditors to conduct voluntary BMP audits, of which 12 are registered at present, the training course being recognized by the Quality Society of Australia and the International Environmental Auditors Association (Holloway and Roth, 2003). The audits are designed to verify that farming operations comply with best management practices, and to provide advice on areas where improvement is desirable.

As at October 2002 a total of 267 growers had completed the initial audit, representing 20% of growers and 45% of the area of cotton grown in Australia in 2001-2002 (Holloway and Roth, 2003). The Cotton Australia web site (www.cottonaustralia.com.au) has information on statistics regarding BMP use, % audited, and promotes the benefit of BMPs etc

The Cotton BMP Manual has a draft Land and Water Module that will include guidelines and information on vegetation, riparian lands and soil management.

6. Property Management Planning and its Application to Native Vegetation and Biodiversity Conservation

6.1 Overview of Property Management Planning

Property Management Planning (PMP)[1] was a federally funded farmer education and training program conducted over two phases. Phase 1 extended from 1993 - 1996, while Phase 2 extended from 1996 - 2000. During Phase 2 the Commonwealth and States invested $87 million, (approximately $34 million of which were Commonwealth funds). It was estimated that collectively within Phases 1 and 2, around 32% of rural primary producers were exposed to the PMP process (see Table 6.1). When all costs were taken into account, the estimated national average cost per workshop was $8,567 or $890 per business; while the actual costs of delivery were $263/person/workshop (Cock 2001, see Table 6.2)

Table 6.1: PMP Participation Rates by State and Territory (from Cock 2001)

	No of Farming Establishments	**% of Farming Establishments Participated in PMP**		**Total**
		Stage 1	**Stage 2**	
QLD	29,955	21.0%	28.3 %	49.3%
NSW	40,852	25.2%	7.1 %	32.3%
VIC	35,152	22.7%	12.6 %	35.3%
SA	15,101	12.0%	9.1 %	21.1%
WA	13,372	-	**6.0 %	6.0%
TAS	4,205	22.7%	12.3 %	34.0%
NT	356	38.6%	26.0 %	64.6%
Total	**138,657**	**19.4%**	**13.4%**	**32.8%**

**This does not include participants of the Rural Leadership Program.

Table 6. 2: Cost of PMP Workshop Series Delivery (from Cock 2001)

State	Total $	$ per workshop	$ per business	Total $ / workshop/ business[2]	Cost of Workshop Delivery/ participant.[3]
QLD.	17,995,718	8,736	3,089	716	179
NSW	23,226,957	9,500	5,538	931	232
VIC.	15,089,195	10,406	3,394	1,426	356
SA	7,908,958	7,385	5,731	690	172
WA	6,605,345	5,749	8,246	668	167
TAS.	1,373,648	4,306	3,286	513	128
NT	1,131,650	17,146	14,697	2,449	612
Total	73,331,471	8,567	4,278	890	263

Defining elements of PMP were:

[1] PMP was called by different names in different jurisdictions: Qld- Future*profit*; NSW-Farming for the Future; Victoria-Farm$mart; South Australia-Property Management Planning; NT-Property Management Planning; WA-Better Business

[2] The cost of that participation per business to the program

[3] Estimate of actual cost of delivering the workshop to an individual

- A whole of farm system focus
- Target audience were farm families/businesses
- Delivery mechanism involved group-based adult learning
- A strategic planning approach was taken

Phase 1 normally involved one or two workshops. An integrated workshop series was introduced within Phase 2. The workshop series (usually an 8 part/8 day series) established some rigour and consistent quality of the information that was being offered within a PMP package.[4]

6.2 Methodology adopted for this study

The methodology adopted by this study utilised the following strategies:

1. Review of National and State PMP reports, where available.
2. Interviews with a variety of former National, State and Territory PMP Coordinators and PMP facilitators.
3. Interviews with property planning facilitators/trainers currently utilising PMP-type activities with farmer groups.
4. Interviews with those who have had a PMP policy role at State or Federal level.

Those interviewed included Malcolm Letts (National and Queensland perspective), Leath Stewart (Queensland), Kay Bodman (Western Australia and Queensland), David Heinjus (National and South Australia), Stuart McPherson (NSW), Ian Voigt (Victoria), Craig Wood (NSW and Queensland), Bruce Thompson (NSW), Warwick Browne (NSW) and Bruce Gardiner (NSW).

Respondents were asked to identify:

- What they believed were the strengths and weaknesses of the former PMP in relation to Native Vegetation and Biodiversity Conservation (NVBC).
- The lessons learnt from the former PMP in relation to NVBC.
- What recommendations they would make for future PMP-type programs in relation to achieving NVBC outcomes.
- Their views on including within the PMP process:
    - Financial incentives for NVBC
    - Catchment and regional targets for NVBC
    - Group or sub-catchment level plans that attempt to achieve NVBC outcomes at a landscape level.

6.3 Difficulties encountered in assessing the NVBC impacts of the PMP Program

A number of difficulties were encountered in attempting to make generalisations regarding the impact of the national PMP program upon NVBC. These difficulties relate to the following characteristics of the program.

[4] PMP was defined and implemented differently in different jurisdictions. South Australia, NSW, Queensland and Victoria tended to follow a more structured multiple workshop series often beginning with a family goal setting exercise.

1. The fact that the national program constituted 7 subprograms in the various states and territories that all varied in particular ways from each other.
2. The quality and quantity of Monitoring and Evaluation (performance) data was highly variable. The issue of what parameters should be measured or described was a matter of some debate throughout the program. In general it was felt that the program suffered from a lack of quantitative data demonstrating the achievement of NVBC outcomes. This creates difficulty in drawing general conclusions regarding the broader impact of PMP upon NVBC. NSW did undertake a series of surveys of former PMP participants from which native vegetation impacts were extrapolated. These data are presented in Table 6.3
3. In certain landscapes and certain agricultural production systems that incorporate native vegetation as part of that system (eg. temperate and semi-arid rangelands), PMP found it easier to gain farmer interest in NVBC outcomes than in other systems that do not directly rely upon native vegetation (e.g. horticultural and broadacre cropping areas).
4. The variability in the skills, knowledge and background of PMP staff in relation to NVBC resulted in variations in NVBC outcomes between districts.
5. At times there was apparent tension between a focus upon the financial and shorter term production aspects of the farm business, to the detriment of the achievement of NVBC outcomes. PMP seemed to function best when all these aspects were presented in an integrated fashion.

Table 6.3: Native Vegetation/Habitat Statistics for PMP NSW (from NSW Government 2002)[5]

Activity	Project Outputs
1) Total area of native vegetation works (should equal 2) + 3) + 4)	**213 000 ha**
2) Remnant protection works	**102 000 ha**
3) Remnant rehabilitation works	**74 600 ha**
4) Revegetation works	**36 700 ha**
5) Number of plants to be established.	**2 190 000**
6) Length of direct seeding lines	**480 km**
7) Length of protective fencing	**4 400 km**
8) Area of voluntary management agreements established	**43 100 ha**
9) Covenanted areas established to protect remnant native vegetation	**9 000 ha**
10) Area of works that protect/enhance threatened species/community habitat	**53 500 ha**
11) Area of 10) protected by agreements as in 8) or 9)	**20 900 ha**

6.4 Assessment of the NVBC Impacts of the PMP Program

"The experience was that the integrated approach of PMP was a vital tool to initiating engagement in natural resources management, rather than the previous attempts at raising interest as a single topic….. There was a need to ensure people

[5] These data were extrapolated from 3 surveys conducted with former PMP participants. The first was a pilot survey conducted on the NSW North Coast. This was then used as the basis of a later state-wide survey of former participants. The third survey was a telephone survey of another sample of former participants and was focussed on the NRM outcomes of PMP. Each of these surveys used a different stratified sample of former participants. It is claimed (NSW Government 2001) that each survey was designed to yield statistically reliable results.

identified the link between profitable long-term business management and natural resources. When that link was made, change in actions occurred. " (Cock 2001 pp. 20).

"It was found that, the natural resources outcomes 'begin to happen' once the communication, succession and other issues have been resolved, as per the philosophy of the program. Greater benefits for natural resources have arisen from the holistic approach, rather than programs singly focussed on environmental issues. It was found that prior membership of Landcare amongst Farming For the Future clients, for example, had no effect on either natural resources or bio-diversity outcomes, suggesting that the program had 'started from scratch' and built these areas into the overall picture of planning for the future of farming businesses." (NSW Government 2002 pp. 71)

The above quotations, the first from the final report on the National PMP program, and the second from the final report from the NSW PMP program, to a large extent mirror the views of respondents consulted for this project. Where respondents differed however, was in their assessments of the overall impacts achieved by the PMP program upon NVBC outcomes. Some spoke positively about these impacts, while others were much more cautious in their appraisals. The lack of comprehensive Monitoring and Evaluation data in relation to NVBC means that we can only make qualitative assessments based upon the respondent's views of where the PMP program might and might not have achieved NVBC outcomes.

All respondents interviewed for this project viewed the Phase 2 introduction of the integrated workshop series as a very constructive step. However some expressed the following qualifications:

- The workshop series as an 8 day package was difficult to market and attract participants (this constraint was later addressed in some States by the development of targeted marketing strategies)
- Sometimes the workshop series was implemented inflexibly so that farmer groups were unable to pursue needs that fell outside the series curriculum.
- In some jurisdictions the natural resource management (NRM) component of the workshop series was attributed less emphasis than the business planning component.
- Sometimes the delivery of the NRM module primarily addressed soil-related issues to the detriment of NVBC-related issues.
- Some respondents in some jurisdictions believed that NVBC outcomes were not well addressed within the PMP workshops; while in other jurisdictions respondents felt that much had been achieved.
- There was a tendency towards (as one informant put it) a "touch and vanish" approach whereby workshop participants were not supported in an ongoing fashion with the development of their PMP. This was one of the structural and design shortcomings of the program. The primary goal and the key performance indicator was to process as many farmers as possible through the workshop series. Ongoing support for participants was not included within the program's performance indicators, despite the importance it has for helping participants adapt and implement the principles to their farms. Several states attempted to address this concern by "signposting" key needs for ongoing support and providing participants with the contact details of organisations or

staff who would be able to provide this support. At least one State (Victoria) encouraged the setting up of co-learning farmer groups that would provide ongoing support for their members.

In the absence of quantitative data, and based upon the qualitative assessments of the majority of respondents interviewed for this project, it seems highly likely that NVBC impacts varied widely both between and within States and territories. Case studies of selected farmers were developed in a number of areas (e.g. Queensland, Western Australia and Victoria) that qualitatively demonstrated what could be achieved in terms of NVBC outcomes. On the other hand it was felt that a number of other variables influenced the NVBC outcomes that were achieved. The more important of these variables were:

- The emphasis attributed to NVBC within the integrated workshop series relative to other modules.
- The skills, knowledge and charisma of the staff delivering the NVBC-related modules, and the extent to which these outcomes were demonstrably integrated with the rest of the farming system and the farm business.
- The types of farm enterprises that were being dealt with and the extent of remnant vegetation.
- The level of ongoing technical and extension support given to participants following the completion of the PMP workshop series.

Nevertheless, despite the lack of quantitative data, there is substantial qualitative evidence that the PMP program in some areas encouraged strong positive attitudinal changes by farmers towards NVBC. Within their evaluation reports a number of states and territories used farmer quotations to illustrate these attitudinal changes. A selection of the more illustrative are cited below:

> "We decided to erect owl boxes as a way of encouraging owls to our cane. We want to re-establish vegetation in riparian zones, put in subsurface drains, checked (sic) out the most water efficient methods for irrigation and now use a moisture probe. We are keeping the swampland in low-lying areas as it acts as a sediment trap and also habitat. Future*profit* made us conscious of our upper catchment location and our interaction with the overall environment" (QDPI 2000, pp. 11).

> "I must admit that before the course we hadn't given the natural resources any thought at all….now they are right up there …For instance we've organised a whole farm plan. We're now revegetating part of the place we wouldn't have thought of if we hadn't done the course" (DNRE 2000, pp. 12).

> "I hadn't thought of natural resources at all …and now we've made a decision to sacrifice a bit of land to revegetate a swamp area…To have the confidence to forsake a few orchard trees was a big step…we would definitely not have done that without being made aware of that and the support from the other members of the group" (DNRE 2000, pp. 12).

> "On dairy farms, because of the land use is so intense, there's not a lot of room for natural resources. Now we are now thinking of planting trees for shelter belts and planting trees with an understanding of why we need to" (DNRE pp. 12).

In recognising the attitudinal changes of farmers towards biodiversity, the National Report on the Impact of the PMP Campaign concluded:

"PMP workshops have been a powerful instrument to educate farmers about biodiversity, and to make a link to their business and in many cases their 'values' and to begin to factor biodiversity issues into their planning. This has overcome many of the perceived barriers, and significant steps forward have been made. However even with the success in this area, further investment will be needed to capture the gains that have been made through the campaign" (Cock 2001, pp. 23).

The above quotes illustrate the potential strengths of utilising a PMP type of approach in seeking to achieve NVBC outcomes. These are:

- The fact that an adult education and goal setting approach is taken that integrates NVBC with other aspects of the farm business. This requires that NVBC is not afforded merely a peripheral or token emphasis but rather is clearly regarded as an integral component of a sustainable farm business.
- Learning is undertaken within farmer groups of common interest. This approach allows farmers to learn from each other and provides the opportunity for group members to support one another in implementing their plans.
- There is evidence that, over the longer term, farmers who are poor natural resource managers are also poor farm business managers. As farmers learn about their farm business and farm enterprises they also have the opportunity to learn about the natural resources that underpin their production systems.
- Learning in groups offers the opportunity not only to learn from one another but also to look beyond the individual farm boundary in identifying broader processes, opportunities and responsibilities.

While it is difficult to quantify the NVBC outcomes achieved by the various PMP Programs, some very useful outputs were produced. Several PMP programs developed NVBC tools and education kits that are of a high quality and which could be used in a range of extension contexts. Two examples of these tools are the Victorian *Living Systems* Kit (DNRE, 2002) and the excellent series of farmer case studies presented with the Queensland Future Profit publications (QDPI, 2000b).

6.5 Lessons learnt from the PMP process of relevance to NVBC outcomes

The following lessons of relevance to achieving NVBC outcomes can be distilled from the PMP experience:

1. The need to embed NVBC outcomes within a holistic farming system/farm business approach.
2. The need to define the NVBC outcomes in terms that are farmer-relevant and which contribute to the sustainability and long term profitability of the farm system.
3. The need for clarity and consistency regarding the NVBC outcomes that are being sought.
4. The need for the use of skilled, empathetic and trusted trainer/facilitators with whom the program participants can identify. Such trainer/facilitators must not only be knowledgeable about NVBC, but also be familiar with the farm management system that is being dealt with.
5. The need to adopt NVBC strategies and outcomes that are relevant to the specific farming system being targeted e.g. strategies and outcomes may vary

between extensive grazing systems, extensive cropping systems, and intensive cropping and horticultural systems. Those systems that can utilise native vegetation as part of their production system (e.g. extensive grazing) are naturally more inclined to consider NVBC outcomes.

6. Often farmer interest in NVBC is garnered through a discussion of the future landscape legacy that farmers wish to leave for their offspring or future generations.
7. There is a strong need for ongoing institutional and extension support for PMP participants. This support was provided to greater or lesser degrees within various jurisdictions.
8. There is a need for greater precision and clear internal logic in program design. Monitoring and Evaluation (M&E) indicators should be determined at the design stage and appropriate M&E systems put in place for collecting this data.

6.6 Financial incentives, catchment and regional NVBC targets and group plans

Respondents were asked their opinions on the worth of including within a PMP process:

- Financial incentives for NVBC
- Catchment and regional targets for NVBC
- Aggregating the individual planning process into group, sub-catchment, or landscape level plans

The aggregated responses are given below.

Inclusion within a PMP process of financial incentives for NVBC
Of the respondents interviewed, all were generally in favour of including financial incentives for NVBC within any PMP process.

The advantages of this strategy were seen by respondents as being:

- It would provide a clear marketing advantage to encourage participants to undertake a PMP program.
- Such an approach would need to meet multiple NRM purposes. For example the Queensland Land and Water Management Plans are very comprehensive.
- Landholders will be made more accountable for the NVBC outcomes they plan to achieve with incentives funding.
- It would provide a bridge between planning and action.

The following qualifications were also offered:

- Caution must be exercised not to create unrealistic expectations as to the level of incentive.
- Such an approach should not involve compliance requirements as this would detract from the voluntary nature of the PMP approach.
- If there is any compliance component the program should be clearly separated and distinguishable from the PMP approach.
- Eligibility for incentives should not be means tested.

- If the work required to attract financial incentives is seen as too onerous relative to the amount of funding being offered, there is a potential for participants to be discouraged from being involved.

Examples of the inclusion of financial incentives (or the allocation of natural resource access rights) within PMP-type programs are progressively being explored by some states. Queensland, for example requires that farmers undertake Land and Water Management Plans to gain resource access. Within the recently instituted NSW Environmental Services Program, farmers are invited to tender to receive funding to achieve NRM (and NVBC) outcomes. Each successful tenderer must complete a PMP in conjunction with the Department of Infrastructure Planning and Natural Resources.

On balance it is the assessment of this Report that the inclusion of financial incentives for NVBC within a PMP process is a worthwhile strategy. To be effective, planned NVBC outcomes should be clearly stated (and audited) and eligibility criteria rigorously defined.

Inclusion of catchment and regional targets for NVBC within a PMP process
Respondents were all generally in favour of including within any PMP process catchment and regional targets for NVBC.

Respondents cited the following perceived advantages of this strategy:

- It was felt that this approach would be the way of the future and should be supported. The former PMP program suffered from not including within it the political, institutional and statutory needs of NRM.
- It would give a broader context to an individual plan, and with respect to NVBC, would help explain to farmers in particular what 'biodiversity' means.

The following qualifications were also offered by respondents:

- Adoption of broader targets should be voluntary, not compulsory.
- The success will depend upon the relationship between the program provider and the client. There needs to be very good relationship. The provider must challenge the client and the client must have the confidence in the relationship to be challenged.
- Management change is what is being sought but this is very difficult to measure.

It is the assessment of this Report that the inclusion within PMP programs of catchment and regional targets for NVBC is highly desirable. The benefits of incorporating catchment and regional targets for NVBC are many. With such targets embedded within PMP activities, farmer participants will have a clear view of NVBC outcomes that are more broadly defined by the community, and that the farmers should thus be seeking to achieve on their own properties.

Aggregating the individual PMP planning process into group, sub-catchment, or landscape level plans
Respondents were all generally in favour of attempting to build a higher level planning process into a PMP process in order to facilitate landscape level change. It was however believed that this would only be possible in particular circumstances

where individual farms had an adequate degree of contiguity and common interests and needs. The individual farmers must be at a stage of conceptual development that they are prepared to look beyond the farm boundary in developing their plan.

This approach would need to involve two parallel, interlinked and iterative processes whereby the individual planning process would be informed by catchment/landscape level issues. As individual plans progressed they could then begin to be drawn together in order to seek group level collaborative opportunities. One example of this approach was taken with Landcare group level revegetation and remnant protection plans on the NSW Northern Tablelands (Harnham, Furracabad and Dangarsleigh Landcare Groups), and in Queensland with the Jimboomba Floodplain Project in the Darling Downs.

Existing Landcare and catchment groups are likely to include some degree of geographical contiguity of farms and can provide an immediate target for group plans. Where such groups do not exist, it may be necessary to offer financial incentives for neighbours to undertake cooperative group-level planning.

6.7 Future trends in PMP-type programs

While the National PMP program terminated in 2001, a number of divergent PMP-type programs are gradually emerging in order to deliver particular natural resource policy outcomes or in response to specific industry needs. These trends can be categorised into three PMP models

1. **Traditional PMP Approach Targeted within Specific Industries**
   There has been a recent development of third generation PMP or farm business planning approaches often focussing upon particular industries or landscapes (e.g. rangelands) and sometimes sponsored and wholly or partly funded by industry. (e.g. wool, sugar and dairy industries) e.g. Dairying for Tomorrow (Dairy RDC) and Bestprac (Aust. Wool Innovation). Often the industry-sponsored programs are incorporating sustainability and NRM objectives. An example of this strategy is the Queensland Profit with Nature Program that has developed an excellent series of case study materials and extension pamphlets targeted specifically at the dairy and the banana industries. To be most effective, this approach should incorporate specific NVBC strategies relevant to the particular industries and farming systems being targeted.

2. **Voluntary PMP incorporating Financial Incentives and NVBC targets**
   There is a trend towards utilising the traditional PMP approach but with financial incentives offered as part of the process. For example, several Catchment Blueprints developed by NSW Catchment Management Boards have identified PMP approaches as a key strategy for delivering NRM outcomes. A number of Victorian Catchment Authorities are exploring PMPs as a mechanism for delivering incentives payments. Within the pilot NSW Environmental Services Program, ecosystem service outcomes are being delivered utilising PMP approaches and incentives funding. To be effective such an approach would require that the amount of incentive offered is a sliding scale linked to the progress towards the achievement of property, catchment or regional NVBC

targets or ecosystem services. Given that there may be a degree of perceived conflict between the property-level targets (e.g. planting of 4 row tree windbreak for livestock protection) and catchment/regional targets (e.g. the conservation, management and protection of a 500 metre wide regional vegetation corridor passing through the property) it is likely the latter targets may require a higher level of incentive payment.

3. **Compliance PMP in order to gain Natural Resource access rights**
   There is a trend towards utilising PMP-type approaches as a regulatory compliance activity in order to allow farmers to gain predefined natural resource access or use rights. Examples of this type of approach include the Queensland Land and Water Management Plans; current efforts in NSW to implement the property planning recommendations of the Report of the Wentworth Group of Scientists (Wentworth Group Report, 2002); and PMPs are required to make application under the South Australian Native Vegetation Act 1991. Resource access or regulation plans may not necessarily involve a whole of farming system approach within the planning process. For example the right to clear native vegetation may only require a limited vegetation management plan based on certain conditions and assessment criteria. To truly incorporate a PMP approach, such compliance plans should involve an integrated whole of farm approach, and not just planning for the resource whose access is being sought (e.g. native vegetation or water for irrigation). If the planning approach is solely a natural resource access plan, it would be misleading to use the PMP terminology.

Each approach may offer certain advantages within a variety of NVBC policy contexts and appeal to a certain type of farmer-participant.

6.8 Guidelines relevant to NVBC for future PMP-type programs

Given the experience of the National PMP program, and incorporating the comments made by respondents interviewed for this study, a number of guidelines can be proposed for the development of future PMP-type programs intending NVBC outcomes.

1. NVBC should be defined as a distinct training curriculum with clear learning, management and NVBC outcomes.
2. The NVBC curriculum should be integrated within a whole of farming system approach which is of relevance to the landscape and specific to the farming enterprises being targeted. Based upon previous experience, three strategies appear to have merit in helping change farmer's thinking about NVBC.
   - Incorporating NVBC outcomes within longer-term goal setting processes for the farm business.
   - Developing simple implementable tools and targets for NVBC outcomes.
   - Utilising exemplar farmers and testimonial farmers who are accepted by the local farming community. Case studies may be developed highlighting such farmers and the NVBC strategies they have utilised.
3. Define the NVBC outcomes in terms that are farmer-relevant and which contribute to the sustainability and long term profitability of the farm system.

4. Include follow-up institutional, technical and extension support for individual farming families once the planning workshops are completed in order to allow adaptation and implementation of NVBC principles on individual farms.
5. Utilise financial incentives linked to clear NVBC criteria and prioritised to achieve desirable NVBC outcomes (e.g. regional and catchment targets).
6. Attempt landscape-level change through embedding appropriate regional and catchment targets within the PMP process and encouraging parallel group-level planning processes.
7. Utilise skilled, empathetic and trusted trainer/facilitators with whom the program participants can identify. Such trainer/facilitators must not only be knowledgeable about NVBC, but must also be familiar with the farm management system with which they are dealing.
8. Encourage inter-agency cooperation (including both government and non-government agencies) within the program in order to promote strong and consistent NVBC messages and outcomes.
9. Adopt greater precision in program design with clear internal logic. Monitoring and Evaluation (M&E) indicators (both quantitative and qualitative) and the *criteria for judging program success* should be determined at the design stage and appropriate M&E systems put in place for collecting these data.
10. A clear distinction should be made to the public between property planning exercises which solely seek to achieve natural resource access or natural resource regulation, and those which seek to undertake integrated whole of farming system planning.

7. Development of Guidelines

7.1 Introduction

The following chapter distils the findings in the previous three chapters including the case studies (Section 4), the industry initiatives (Section 5), and the more detailed PMP review (Section 6). These findings have been integrated into a set of issues and guidelines that may be useful in designing future policies and programs for improved integration of native vegetation into agricultural systems.

The guidelines are intended to be general in nature in terms of audience. They are aimed at the spectrum of organisations involved in the delivery of native vegetation and biodiversity conservation programs and policies on farms. These include Commonwealth and State Government agencies as well as non-government organisations and regional NRM bodies.

The focus of the guidelines is on the 'farm-level' integration of vegetation into farming systems. However, the implications for landscape scale management and integration of native vegetation were acknowledged and considered when developing the guidelines.

7.2 Program and Policy Typology

A starting point for identifying relevant issues and guidelines is the type of programs and policies that have been used in the past and those currently being used. However, if this path is followed, it would need to be kept in mind that learning is not restricted to that from assessing different groups of programs and policies per se. The context and manner in which the policy or program is applied, particularly the institutional arrangements that lend support to the program, are also key determinants of success.

In terms of typology there have been several general reviews of instruments used in natural resource management policies [for example, IC (1997), James et al (1997), and ABARE (2001)]. These reviews vary in scope and most traverse various issues associated with different instruments. This sub-section does not cover this typology aspect in any detail and the reader is referred to a recent review by Comerford and Binney that is part of a report by Agtrans to LWA (Agtrans, 2003).

Other studies that are relevant to typologies and frameworks for considering native vegetation policies include NRMMC (2001) and Young and Cunningham (1997).

There has not been a wide range of public policy instruments used in Australia for integrating native vegetation management into agricultural systems. The most common policy has been legislation, with grants and devolved grants, the provision of covenanting arrangements, rate rebates and taxation policies that have some relevance to vegetation management. Other relevant public programs include those in the education and training arena such as support for property management planning and environmental management systems. More recently there has been increasing interest in market based instruments for use in natural resource management and a series of

pilot trials has been recently established, some of which are relevant to native vegetation and biodiversity.

As mentioned earlier, legislation and taxation have not been addressed in the case studies as they are large topics and have been the subject of several reviews conducted or being conducted and reported elsewhere (See Table 7.1). These include a current inquiry into the impacts of Native Vegetation and Biodiversity Regulations.

Table 7.1: Coverage of Typologies in the Present Study

Policy/program type	**Coverage in this report**	**Other sources**
Legislation	Not addressed in the case studies	Productivity Commission (2003); GRDC (Williams, pers comm 2003)
Grants (including devolved)	Covered in the case studies	
Covenanting	Covered in the case studies	
Rate rebates	Covered in the case studies	
Taxation policies	Not addressed specifically in the case studies	Douglas (2002)
Education and training	Covered in the case studies	
Market based instruments	Covered partly in the case studies	Stoneham et al, 2002, NAP (2002)
Environmental Management Systems	Covered partly in the case studies	Ridley et al (2003) Seymour et al (2002)

There are several other studies recently completed or ongoing that have some similarities to this study, in that they also consider policies and programs for managing native vegetation on farms. These R&D activities include:

- Current recommended practices for native vegetation management in the high rainfall and sheep-wheat belt (the Native Vegetation and Biodiversity Sub-program of Land, Water & Wool)
- Incentives packages for wool producers that will enhance the management of native vegetation (the Native Vegetation and Biodiversity Sub-program of Land, Water & Wool)
- Natural Resources Materials Kit, Biodiversity in EMS (Environment Australia, Landscape Conservation Section)
- An assessment of the biodiversity benefits of revegetation, and vegetation rehabilitation and protection programs, and an analysis of the most effective program interventions (Environment Australia, for the Biodiversity Benefits Task Group)
- Native Vegetation Management in Cereal Production Areas (Grains R&D Corporation

7.3 Principal Issues and Guidelines

The following reports a set of issues that have been distilled from the case studies and other material assembled in this study. In some cases the issues and guidelines refer specifically to native vegetation management, but in other cases they may also be relevant to other natural resource management policies and programs.

1. Preparation before implementation

Some of the experience from the case studies illustrates the importance of thorough program preparation, including surveys, promotion, and pilot testing before a program is fully launched. For example the BushTender project, in justifying the pilot approach, claims that using sound well-founded ideas saves time, money and lowers the risks. As well, the early exposure of ideas and their testing can expose flaws and minimise problems. The cautious approach by the MDBC in relation to the Vegetation Bank also illustrates a valid approach.

A complementary approach to this is the emphasis on continuous monitoring and evaluation once the program is in place.

Guideline 1: Thorough program preparation and pilot trialing can save resources and improve the performance of programs and policies.

2. Science underpinning

Programs and policies aimed at integrating native vegetation into agricultural systems require credible science to not only underpin program objectives but also to enable incentives to be designed to deliver required outcomes. For example, the Vegetation Bank concept developed by MDBC demonstrates that unless the impacts of placing more trees (native or otherwise) in the landscape to mitigate salinity can be well anticipated, that the program could be counterproductive.

Guideline 2: Sound scientific advice is required in the design of policies and programs for them to be effective.

3. On farm versus region/landscape scale

While the objective of meeting wider landscape objectives is not covered directly in the scope of this study, it needs to be addressed as it interacts significantly with policies and programs that are directed towards integration of native vegetation management on farm. Meeting the objectives of policies and programs at one scale may require different approaches and may be in conflict with requirements to meet objectives at other scales. This is illustrated by the issues identified by the Vegetation Bank of MDBC. Specifying clear objectives and thinking through the set of likely outcomes at a range of scales may prevent perverse or undesired outcomes becoming manifest later down the track.

A corollary is that where there are multiple objectives and multiple funding bodies, difficulties may arise in setting priorities and targets and developing appropriate policies. Moving to a more localised or regional approach may not necessarily solve such issues as the scale issues will still be apparent at a different level (local, subcatchment, catchment etc). Within each region, engagement between those with interests at different scales will be very important.

Where farms in a catchment or region have a high level of contiguity and common interests and needs, the larger scale outcomes may be easier to accommodate in policies (for example, in PMP). Some instruments (e.g. auctions) may be able to formally accommodate both on-farm and regional priorities in their objective and weighting structure, but in the main other instruments may need to tradeoff carefully any conflicting objectives to accommodate the desired regional and wider catchment outcomes in their design.

Guideline 3: Policies and programs directed at the farm-scale should consider the wider conservation and biodiversity needs across catchments and bioregions.

4. Targeting high priority ecosystems

It makes considerable sense in terms of resource allocation to target policies and programs to the more threatened vegetation types and ecosystems. Lack of targeting was one of the major criticisms of NHT1 programs. Since that time increased targeting has occurred. For example, the revolving fund of land purchase and sale has proven to be an effective mechanism for targeting high priority vegetation communities (Trust for Nature Victoria). The BushTender auction process has developed a method for scoring high value vegetation and giving such areas priority in its decision making process.

Targeting applies to both on-farm self-contained targeting as well as assembling thresholds of vegetation resources in particular catchments or localities.

Guideline 4: Targeting policies and programs at high priority ecosystems is highly desirable and can be cost-effective but needs to be underpinned by good science.

5. Targeting specific groups of landholders

While targeting all landholders in a region due to the presence of native vegetation of high conservation value is acceptable through voluntary mechanisms such as grants and auctions, privacy and equity considerations need to be considered in targeting specific landholders on the basis that they hold high conservation value vegetation.

On the other hand, targeting different groups of landholders through different mechanisms (eg covenants, training courses) is more acceptable. For example, bush blocks in Victoria are popular for covenanting and many of them are high conservation priority vegetation communities so that this works in favour of conservation outcomes (Trust for Nature Victoria).

Groups of landholders can be differentiated through a number of criteria. Some groups may be at different stages of thought and activity regarding the native vegetation and its integration. Some may already be involved or advanced, others may welcome guidance, and other groups have interest but can not justify the time and money or are not confident how to implement such practices effectively. Other landholders are not aware of the issue or cannot be convinced of the science that might underpin either production or societal benefits. Curtis & Robertson (2003) identify some of the more important social factors that need to be considered when engaging land managers and concludes that the heterogeneity of landowners needs to

be taken into account when developing the mix of policies and programs that are presented.

There is the potential for policies and programs to be more targeted at different groups of landholders and it follows that a mix of policies is more likely to be successful across a landscape than a single policy. However, the cost-effectiveness of such an approach, particularly at a regional scale, requires further exploration.

Guideline 5: The choice and design of policies and programs need to recognise differing groups of landholders and how they might respond to different mechanisms and incentives.

6. Ensuring permanency of protection and long-term outcomes

Many grant programs (for example in the early part of the Bushcare program) did not have serious management agreements in place for recipients to continue to manage native vegetation appropriately, for example, if the property was sold.

Voluntary binding covenants have become increasingly acceptable to landholders in Victoria as reported by the Trust for Nature. Covenants that are attached to the land title appear an effective solution to achieve more permanent protection. Also, it needs to be recognised that:

- Because of the realistic legal nature of covenants, they can take time to prepare and put in place
- Different land managers desire different outcomes from their covenants
- Covenants are well suited to be combined with cost sharing arrangements and incentives such as rate rebates
- Those with covenants are themselves effective promoters of the covenanting concept

Guideline 6: Voluntary but legally binding vegetation covenants are valuable for permanently protecting native vegetation and biodiversity on private land, and can be combined effectively with incentive programs.

7. Whole farm approach

"Conservation programs generally focus at the scale of the site of interest - the patch of bush, critical habitat, reach of river or area of grassland - without considering the social and economic context of the whole farm(s) in which the conservation asset is situated. In some cases, it may well be appropriate to simply provide funding assistance for a fence to protect a patch of bush or a stream. But in many other cases, it may be more effective to assist a farmer to make changes at the scale of the whole farm business to make the conservation option more viable in the long term" (from the foreword of Crosthwaite and Malcolm, LWRRDC Research Report 5/00).

The above is supported by anecdotal evidence from MLA's whole farm planning courses and the qualitative evaluation of the National PMP Programs. An example is that after issues such as farm and family succession are discussed and resolved, attitudes start to change and planning for the future, including the management of native vegetation becomes important. In addition, within PMP an adult education and goal setting approach is taken that integrates NVBC with other aspects of the farm business. This requires that native vegetation management is not afforded merely a

peripheral emphasis but rather is clearly regarded as an integral component of a sustainable farm business.

Vegetation outcomes need to be embedded within holistic farming system approaches. Native vegetation management is linked in a number of ways to managing a farm for traditional 'productivity' objectives, as well as to numerous other 'environmental' outcomes. Different farms have different resources and farmers have different perceptions and values

Policies and programs often need to integrate several incentives, and address several issues. For example, a program need not be confined to just tree planting, but also needs to cover fencing, grazing control, weed control etc. Some programs have been achieving multiple outcomes, others are more focused on single aspects.

PMP was found to be a useful tool to ensure that tree plantings were in accord with the particular NRM issue needing addressing on a particular piece of land (Treecare Program). However, there is not always interest in developing whole farm plans even when financial support is available (LGNVPP)

The Bushcare Mid term Review found that more can be done to stress the integration and interactions between conservation and production objectives and their outcomes. Farm business and farm family goal setting that includes the identification of NVBC outcomes alongside social, financial and production outcomes is likely to be an effective approach (National PMP Program).

Guideline 7: Policies and programs should recognise that native vegetation management is only one aspect of sustainable farming systems and that a whole-farm approach should be considered in policy development.

8. Consideration of other NRM Issues

As discussed within section 2.3, native vegetation management is intimately linked to other natural resource issues such as soil stability (erosion and soil structural decline) and soil water balance (salinity). While it is critical that *integrated* natural resource management perspectives be promoted, it should not be assumed that programs directed at other NRM issues, and incorporating native vegetation components, will necessarily also deliver high priority NVBC outcomes.

For example, the protection of high conservation value native vegetation communities or the identification, protection and enhancement of important regional vegetation corridors may be omitted from policies and programs focusing upon other natural resource issues such as salinity. In some instances, strategies designed to address a particular natural resource issue may also conflict with those required to address high priority native vegetation outcomes. For example, tree planting in salinity recharge areas may compete for funds to protect an important vegetation community. Consequently native vegetation programs specifically designed to achieve high priority outcomes should, in general, be funded independently of other program areas. BushTender is trialing an auction with multiple objectives that may require tradeoffs in the different environmental outcomes being pursued. This may well be acceptable provided the native vegetation outcomes are not overshadowed by other outcomes in the process.

Guideline 8: Programs and policies designed to achieve *high priority* native vegetation outcomes should be funded separately to other natural resource management programs, although they may be implemented in conjunction with each other.

9. Cultural and Mindset Changes

Most programs have an educational or suasive element, some more so than others. It was reported in the case studies that Land for Wildlife can enthuse landholders to conserve and restore vegetation as it is voluntary, free, includes one-on-one visits to farms, and offers a network of like-minded people and opportunities to share experiences. It has influenced value systems, attitudes and aspirations, and therefor can change behaviour. However, the changing behaviour outcome may be restricted to a particular target group.

The PMP review found that farmers can be influenced by the landscape legacy that they mould and leave for future generations.

It may be concluded that cultural and mindset changes can be effected, albeit slowly, by educational measures delivered in isolation of other programs and policies. However, educational measures can play an important role in encouraging participation in other policies and programs directly associated with native vegetation. They can also provide explanations of:

- the private and public benefits of managing native vegetation,
- the availability of publicly supported incentives, and
- technical information and support (see later).

Guideline 9: Cultural change elicited via suasive measures can be important in changing behaviour in its own right, as well as in supporting the relevance and uptake of specific policies and programs that are more highly targeted and focused.

10. Mix of incentives

As mentioned earlier, one approach will not address all situations, due to the variations in farm resource type and extent, the particular farming systems used, and land manager characteristics and preferences. The mix of incentives in the Bushcare Program was insufficiently broad so that lessons learnt were limited to grants and devolved grants in the latter stages.

However, the successful Woodland Watch program reported that being able to offer landholders a range of incentives and options is essential, as they like choice and the ability to exercise the choice. The Trust for Nature in Victoria found that financial incentives, including rate rebates and small management payments, help encourage landholders to covenant, illustrating the value and acceptability of some conditional arrangements. Also, the integration of an incentive scheme with R&D and demonstration can be a highly successful model (MNGWG). However, there can be problems in integrating different mechanisms such as with the LGNVPP in Gippsland where NHT expenditure milestones were difficult to achieve due to the long time period required to arrange covenants under Trust for Nature.

Guideline 10: Mixing programs can be effective in that a wider audience can be addressed and programs can improve each others effectiveness.

11. Cost effectiveness and cost sharing

An ongoing dilemma is that policies associated with higher costs (e.g. where there is a high level of face to face contact with land managers) are perceived to be more effective. It is expected that some programs are more cost effective than others but little comparative information is available. This is mainly due to the often neglected effort in measuring and recording outputs and outcomes and the lack of development of standardised measures. This theme is further developed under monitoring and evaluation (see later).

The higher the incentive available to the land manager, the more interest there is in the program as demonstrated by the Field Fresh example. Setting an incentive at an optimal level is difficult, as earlier described in Section 2. To reiterate, not only are the environmental benefits difficult to quantify in dollar terms, but also the costs of change, the financial situations, risk attitudes and the perceived level of private benefits for land managers vary considerably.

Auction systems and other market based instruments would appear to take advantage of different levels of private benefits and can maximise potential effectiveness of public resources delivered. For example, the Bush Tender pilots demonstrated cost effectiveness at obtaining the most valuable conservation outcomes due to the different costs and private values of individual landholders. Other examples of market based instruments are currently being trialed (See National Action Plan for Salinity and Water Quality at www.napswq.gov.au/about/mbi/index.html)

Guideline 11: The private benefits to land managers from improved native vegetation management should be recognised; however, where financial incentives are involved they should be sufficient to overcome lack of interest of the land manager.

12. Eligibility and Conditionality

If too many obligations and requirements are built into a policy, they may lead to low uptake. However, the uptake that does occur under these conditions may be of higher quality. Hence it is necessary to take into account what target audiences and target outcomes are being addressed.

A property management plan, for example, can form a framework for accessing other incentives and ensuring that all is in accord with local/regional planning. Also, it needs to be recognised that, in future, external auditing under an EMS may be required by the public.

Means testing for access to incentives is generally not favoured. Means testing implies that financial resources are the only impediment to action by high income or high wealth land managers and if they can afford to do it, they should do it.

The appropriateness of using conditionality in developing policies and programs may also interact with the clarification of property rights and duty of care. Another lesser

dimension in conditionality is abiding by the terms of the program after support is forthcoming (eg monitoring and evaluation, management agreements). These are lesser issues in that the land manager should be made aware of these when entering the program and should be recognised as their responsibility.

Guideline 12: Programs that require a number of conditions to be met before access is available can reduce involvement in the program. Where conditionality is strongly used, care needs to be taken that other voluntary programs that focus on suasive measures are not compromised.

13. Technical knowledge and support

When conservation outcomes are being considered, a high level of technical information must be conveyed and understood by land managers. This means that personnel with knowledge and skill in such matters are required to conduct or support programs and policies. This was demonstrated by the experience in many of the case studies (for example, Field Fresh, the Murray Catchment Fencing Incentives Scheme, the Bushcare Program, Treecare, MNGWG, Advancing On Farm Nature Conservation).

The LFW found that this technical support had to be consistent and of high quality and that the linkage of biodiversity messages to what the landholders really value was important as was how to integrate conservation with other land management practices. LFW also found that it was important to link and promote best practice and education and extension.

PAPL found that information on flora and flora and advice on management are very important to the landowner, as was ongoing support and communication.

The PMP review highlighted that ongoing technical and institutional support after course completion was extremely important to encourage implementation, but was often unavailable.

Guideline 13: High quality technical support during the program is an essential element when the focus is on conservation and biodiversity issues; ongoing support of some kind after a program is completed may be important.

14. Institutional Arrangements for Program Delivery

Individual and agency characteristics

The interaction of the agency and particularly characteristics of individuals delivering the program is a key element in ensuring effectiveness.

An agency such as WWF or GA can sometimes be more easily accepted or less threatening than are government representatives (for example, this was stated in the Woodland Watch and SAND case studies). Certainly the case studies highlighted the increasing presence and importance of agencies such as GA and WWF.

Findings from the case studies were that:

- The trust of individuals by land managers was a key factor in success (Murray Catchment)

- The dedication and commitment of staff and management to conservation outcomes were crucial (PAPL)
- Face to face contact was key to effective conservation (Woodland Watch)
- Personal qualities, for example, of empathy and trust, as well as and skills and knowledge of local farm management systems, of those delivering the program were very important (PMP review)
- A wide mix of skills is required to deliver the program including economics, ecology, project management etc (Bush Tender)
- There is a need to be able to respond to the needs of individual land managers (Land for Wildlife)
- Good rapport with individuals through individual personalities and their knowledge base helped to build trust which, through learning, leads to attitude shifts
- Leadership was reported as being important and that it can take a number of forms and can change in time and type.

Institutional Cooperation

Specific programs can benefit greatly from strong institutional cooperation between agencies, for example in assisting with specialist support activities (e.g. mapping). A partnership approach is healthy but some form of regional control is advisable. For example, where a program involves a range of participants, including a range of local shire councils (such as in the LGNVPP), there is value in a local but wider organisation managing the program to provide the appropriate cohesion. One of the benefits from a partnership approach is that interest may be stimulated in one of the partners (eg local government) to continue on with part of the scheme (such as rate rebates) on their own.

Community involvement

SAND found that community involvement and local ownership were critical. Community based initiatives are likely to find ownership more quickly, even though other external agencies may be doing much of the work. Management through the local shire council in that example was found to be most effective. Also, local ownership of the program and involvement with good local knowledge was found to be an advantage in the MNGWG in South Australia.

Communication

Communication and promotion through newsletters, media, field days etc was important for the MNGWG, but a warning was sounded by the BushTender experience that it was important to get the balance right so that a response is elicited that can be accommodated by the resources of the program.

Adaptive learning

The opportunity for adaptive learning needs to be built into the design of the program (BushTender). A contrast can be made between the formal PMP program which was usually not participative or adaptive compared with for example, the MLA's PROGRAZE course within its Sustainable Grazing Systems Program. PROGRAZE provided technical information and assessment skills, used discussion groups, visits and revisits to grazing properties, and provided takeaway manuals and guidelines for use after the course. The course was based on learning from others, solution seeking and active learning with emphasis on building the capacity to make changes. It

consisted of eight half-day segments each 2-4 weeks apart with about 15 producers in each course.

Industry delivery
Industry organisations are becoming more involved with biodiversity and native vegetation management and integration into their production systems. Most are involved with training and extension programs associated with best practice and could play an extended role in delivery of public policy associated with integration. They usually have a high degree of trust among land managers, identify with specific farming systems, and are in a good position to understand the likely responses to different programs and incentives.

Guideline 14: Individual characteristics and personalities (e.g. responsiveness, empathy and knowledge) of those delivering the program and who come into contact with land managers are important in ensuring trust and therefore an effective response and uptake.

Guideline 15: The presence and support from partnership arrangements can facilitate effective programs, leadership is important where there are multiple agencies involved, and some local control and community involvement is highly desirable.

Guideline 16: Delivery of programs aimed at integrating native vegetation management into agricultural systems through industry organisations should be given more prominence than hitherto, for reasons of potentially higher uptake due to greater relevance to specific agricultural systems.

15. Monitoring and Evaluation

The need for effective monitoring and evaluation systems has emerged from a number of case studies. For example, the lack of an effective monitoring and evaluation system was identified by respondents as one reason why the national PMP program was unable to maintain Federal funding support. Where funding is limited, monitoring and evaluation becomes particularly important in order to determine that it has been expended most effectively.

An important first step in setting up a monitoring and evaluation system for NVBC programs and policies is to establish its purpose from the outset. The purpose will help define the data requirements. The four purposes listed below are likely to be of relevance to a variety of NVBC programs and policies.

- *Impact assessment*: a comparison between program or policy objectives and what has been achieved as a result of project implementation. Unplanned impacts, as well as negative impacts, should also be noted and monitored.
- *Project or program improvement*: to identify what is or is not going well and thus what changes are necessary to project or program design and implementation.
- *To provide an action learning tool and an empowerment process* for participating communities and other stakeholders. The monitoring process can provide a powerful learning opportunity for participating communities (e.g. Regional groups). For many communities and other stakeholders, this purpose may also provide institutional learning and organisational strengthening benefits.

- *Provide policy feedback*: to provide performance based accountability and policy feedback to funding bodies and policy makers. This purpose of monitoring is less likely to be of direct benefit at the project level, but may be very important for helping to maintain higher level policy support.

A distinction also needs to be made between short-term and long-term monitoring of programs. The Bushcare program mid-term review recognised the considerable difficulty in monitoring outcomes in particular due to the long time frames involved in change becoming apparent. However, there is a need for selective and strategic long-term monitoring of past initiatives and regions. While there may well be some such monitoring ongoing (it was not the objective of this study to pursue such an area), it may not be geared to allow assessment of past programs per se.

Establishing intensive baselines and monitoring frameworks (as has been effected in some programs) may not be worthwhile if the framework or data is not going to be used in the future. Data may be expensive and time consuming to collect and may be difficult to justify when funding is not ongoing.

The BushTender trial is a good example where useful short-term monitoring and evaluation occurred. While this evaluation was geared to gaining further support, it also provides significant experience from which others can learn. The good cost effectiveness data produced can be traced to the objective measures of vegetation significance used in the tender process.

The Advancing On Farm Nature Conservation project found that it would have been more efficient to have a separate officer dedicated solely to monitoring projects across a region. This would have allowed data to be evaluated concisely and allowed the production of documented evidence of the benefits of nature conservation activities. It also would free up the extension officers to spend more time on landholder recruitment.

Adaptive management of a program can be an important benefit of short-term monitoring and evaluation as exemplified in the Murray Catchment Fencing Incentive Project.

The increasing involvement of the RDCs and industry groups in conducting baseline surveys of their industry participants in relation to BMPs and other practices should assist more effective monitoring and evaluation in the future.

Guideline 17: Short-term and long-term monitoring and evaluations of programs is important for providing information on cost effectiveness, allowing adaptive management, and providing long-term accountability.

16. Continuity of programs

One of the more commonly cited constraints reported in many of the case studies was the restricted timeframe of programs with the impacts being accordingly constrained. This issue may be well recognised by policy makers as a constraint in terms of the lack of employment security and career development experienced by many employed in short-term programs.

The loss of efficiency and effectiveness could also be considerable in terms of a program building momentum and then ceasing at the stage where participation is still increasing rapidly. One of the issues here is whether those responsible for continuing programs have effective comparative evaluation processes. (e.g. Field Fresh, Murray Catchment Fencing Incentives Scheme)

It is likely that a lack of continuity of programs is interpreted as a lack of commitment by governments; this can then be easily translated into a weaker commitment by land managers to subsequent arrangements and policies, exacerbating the difficulty of changing culture and ethos in a rapid fashion. It is possible for programs to continue over long periods under the auspices of different government agencies, as exemplified by the Treecare program in Queensland.

Guideline 18: Public programs require longer-term commitments by governments in order to be more efficient in building experience and capacity, to be more effective at attracting participants and delivering outcomes, and sustaining greater commitment by land managers.

17. Legislation, regulation, property rights and compensation

Over the past decade in particular, the Commonwealth and States and Territories have developed a number of legislative and regulatory frameworks designed to address NVBC[6]. Central to these legislative mechanisms has been the strategy of defining and delimiting access and use rights to native vegetation in order to achieve identified outcomes. The delimitation of access and use rights to native vegetation resources has also been a catalyst for a rise in organised, articulate and politically astute conservation and farmer groups, each putting their case to government. Farmer groups have increasingly mounted arguments that traditional freehold property rights have been violated by regulatory mechanisms.

As the policy debate has evolved, in some areas there has been a convergence between the policy positions of both farmer and conservation groups. For example, in NSW both the NSW Nature Conservation Council and NSW Farmers Association have called for compensation payments to recompense farmers for restrictions on their rights to clear native vegetation. As a result, the debate has now shifted to include a discussion of what might be regarded as farmers "duty of care" responsibilities to the land and to native vegetation conservation on one hand, and their right to manage the land as they wish and their rights to financial compensation on the other.

The South Australian experience, at least, has demonstrated that regulatory mechanisms are likely to be more effective where they are integrated with extension, education and incentives schemes for NVBC. In NSW, where the regulatory mechanism has been judged to be ineffective by many observers, there is recent

[6] Examples of key legislation include the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; in NSW the *Native Vegetation Conservation Act* 1997 and the *Threatened Species Conservation Act 1995*; in Victoria the *Catchment and Land Protection Act 1994*; in Queensland the *Vegetation Management Act 1999*; in South Australia the *Native Vegetation Act 1991*; in Western Australia recent amendments to the *Conservation and Land Management Act 1984* and the proposed Biodiversity Conservation Act; in Tasmania the Tasmanian Natural Resource Management Framework 2002 and the proposed enabling legislation; in the Northern Territory the *Environmental Assessment Act 1994* and the *Heritage Conservation Act 2000*

increasing interest by government in developing complementary extension and incentive strategies.

Guideline 19: Legislative and regulatory mechanisms may be more effective when they are complemented with effective extension, education and incentive strategies.

8. Conclusions

The principal outputs of this study have been:

- A description of the private benefits that accrue from improved native vegetation management. It was concluded that there are significant private benefits to landholders from conserving/managing native vegetation on farms. The benefits will vary depending on the agricultural system itself, and the resources, values and perceptions of the individual land managers. In many situations, costs of change do not cover the private benefits, at least in the short term. Public policies and programs that encourage landholders to manage native vegetation better are justifiable due to the potential public benefits of averting further biodiversity loss.
- A description of selected case studies of policies and programs where integration of native vegetation management has been an objective and where valuable lessons are apparent. These case study descriptions identified issues in program development and delivery constraints to program effectiveness, and led to the construction of guidelines for use in future program development.
- A description of past and current industry initiatives associated with native vegetation and biodiversity conservation. Many industry initiatives are supported by the commodity RDCs including research, education, extension, and planning. The industries covered include meat and livestock, wool, grains, dairy, sugar, rice, and cotton. One implication of this increasing involvement of the commodity RDCs in native vegetation and biodiversity conservation is that future policies and programs run by all organisations will have improved technology as a basis. In addition, the RDCs have contributed to the definition of Best Management Practices (BMPs). Also, through baseline surveys they are undertaking in relation to BMPs and other farm practices, they will provide a valuable source of data for more rigorous program and policy evaluation in the future.
- A review of PMP programs and how they can be incorporated with native vegetation management policies. Given the experience of the National PMP program, and other sources, some conclusions were reached regarding the value and use of PMP approaches. These conclusions were incorporated into the wider guidelines.
- The identification of a set of issues and 19 associated guidelines for development of improved future policies and programs. The guidelines are intended to be general in nature in terms of audience. They are aimed at the spectrum of organisations involved in the delivery of native vegetation and biodiversity conservation programs and policies on farms. These include Commonwealth and State Government agencies as well as non-government organisations and regional NRM bodies. The focus of the guidelines is on the 'farm-level' integration of vegetation into farming systems. However, the implications for landscape scale management and integration of native vegetation were acknowledged and considered when developing the guidelines.

Some of the key findings and potential future activities that are associated with the guidelines include:

- Evaluations of programs are of variable quality and should go further than reporting on whether they have achieved their objectives; they should focus on how the program could have been better designed and implemented and how

well the instrument worked. Every evaluation should incorporate a lessons learnt component that places the initiative in a wider context for the future.

- Industry training initiatives are extremely valuable and should be strongly supported by public policy. Such initiatives can provide a sound understanding of the agricultural systems in which native vegetation is embedded. This insight is important to gain the interest and confidence of participants and to promote the availability of other programs and policies.
- Ongoing ecological assessment of a sample of land under covenants is required on an Australia wide basis in order to monitor and evaluate their effectiveness and achievements.
- There is a lack of quantitative statistical information on the areas of native vegetation under covenant or that has been protected in some way through different mechanisms. This would be best assembled under a vegetation community type basis by covenant program across shires or states.
- Some of the relationships between the provision of ecosystem services and benefits to agricultural systems are not well understood and warrant further research so that the magnitude of any benefits can be estimated and promoted.
- The LWA Native Vegetation Program should further assess the need for, and form of a brochure that promotes the benefits of integration of native vegetation management into agricultural systems.
- The difficulties are recognised in developing suitable cost sharing arrangements are recognised. These difficulties arise from the variation in resources, cost structures and preferences of land managers. A solution may be to identify in general terms where the balance of benefits lie and then develop cost-effective arrangements on an individual landholder basis through market mechanisms.

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