A review of policy options to enhance the management of dryland salinity

Jacinta MacKay, Michael Lockwood and Allan Curtis

September 2000

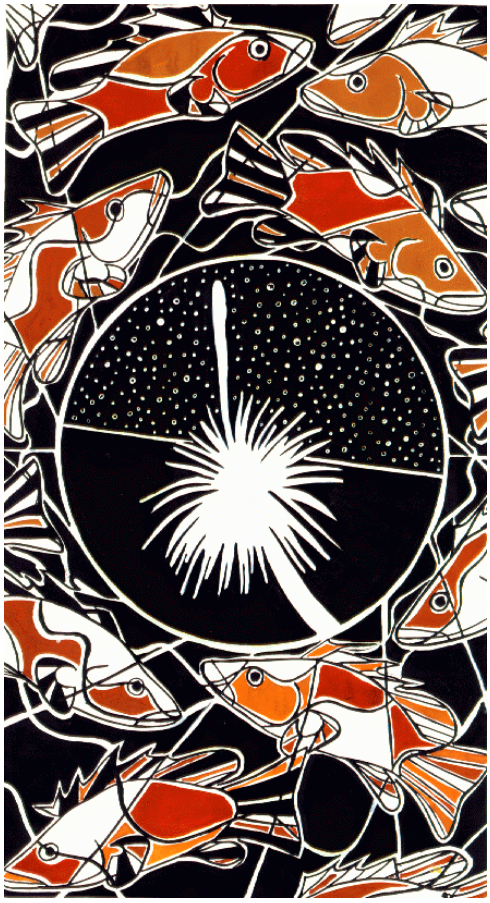
Albury, NSW

JOHNSTONE CENTRE

Report No. 146

A review of policy options to enhance the management of dryland salinity

Jacinta MacKay, Michael Lockwood and Allan Curtis



September 2000
Albury, NSW

Research commissioned by:
Murray-Darling Basin Commission
Department of Natural Resources and Environment
Goulburn Broken Catchment Management Authority

Johnstone Centre, Albury, NSW

Cataloguing in Publication provided by Johnstone Centre, Charles Sturt University

MacKay, Jacinta., Lockwood, Michael and Curtis, Allan
A project in conjunction with the Murray-Darling Basin Commission, Department of Natural Resources and Environment and the Goulburn Broken Catchment Management Authority / by J. MacKay, M. Lockwood and A. Curtis / Johnstone Centre, Charles Sturt University, Albury, NSW 2000.
1v., - (Report / Johnstone Centre, No. 146)

ISBN

1.Australia. 2.Policy instruments. 3.Natural resource management. 4.Dryland salinity. 5.Adoption.
I. Johnstone Centre, Charles Sturt University II. Murray - Darling Basin Commission III. Department of Natural Resources and Environment IV. Goulburn Broken Catchment Management Authority.

ACKNOWLEDGEMENTS

This review was conducted as part of a larger project exploring the willingness and capacity of landholders to implement best practices for dryland salinity management in the Goulburn Broken Catchment of Victoria. This research was funded by the Murray-Darling Basin Commission and the Department of Natural Resources and Environment (DNRE).

Mark Cotter from DNRE provided valuable comments on an earlier draft of this report.

We thank staff from a number of local councils for the information that they provided regarding the programs operating in their area. Particular thanks to Marten Bouma (Cooloola Shire Council), Eric Braslis (City of Greater Shepparton), Linda Brownstein (Shire of Strathbogie), Andrew Del Marco (Shire of Serpentine-Jarrahdale), Mark Gordon (Johnstone Shire Council) and Anthony Sheenan (City of Greater Bendigo).

Thanks also to Marike Van Nouhuys (Johnstone Centre) for her contribution to the production of this report.

CONTENTS

			Page No.
1.	**Introduction**		**1**
2.	**Roles of governments and landholders**		**1**
3.	**Policy instruments**		**4**
	3.1	**Regulatory instruments**	**4**
	3.1.1	Clearing regulations for remnant native vegetation	**4**
	3.1.2	Zoning	**7**
	3.1.3	Sub-division	**7**
	3.1.4	Self-regulation	**7**
	3.2	**Economic instruments**	**8**
	3.2.1	Grants	**9**
	3.2.2	Taxation incentives	**12**
	3.2.3	Local government rate relief and rebates	**13**
	3.2.4	Environmental levies	**14**
	3.2.5	Acquisition of key sites	**15**
	3.2.6	Re-configuration of land use	**15**
	3.2.7	Revolving funds	**15**
	3.2.8	Market creation	**15**
	3.3	**Management agreements**	**17**
	3.3.1	Non-binding agreements	**17**
	3.3.2	Binding management agreements	**18**
	3.3.3	Farm forestry joint ventures	**19**
	3.3.4	Other agreements	**20**
	3.4	**Education**	**21**
4.	**Conclusion**		**22**
5.	**References**		**23**

TABLES

Table 1	**Salt Action Irrigation Incentives**	**10**
Table 2	**Summary of projects funded by the Replanting Victoria 2020 initiative**	**11**
Table 3	**Outline of farm forestry marketing links**	**19**

.

1. Introduction

A wide range of policy instruments can be applied to the management of natural resources on privately owned land in Australia. The various instruments have their individual strengths and weaknesses and a mix of instruments is needed to provide a flexible approach that can be adapted to individual needs (Young *et al.* 1996; Norgaard 1997; VCG 2000).

This report provides an overview of policy instruments used in Australia to enhance sustainable natural resource management on private property. It is by no means an exhaustive inventory, but instead attempts to highlight the main instruments currently used by the three levels of government – federal, state and local.

This review was conducted as part of a larger research project exploring landholder willingness and capacity to implement best practices for dryland salinity management in the Goulburn Broken Catchment. We therefore focus on policies that might enhance the adoption of best practices for dryland salinity management. These best practices include farm forestry; replacing annual pastures with introduced perennial pastures; better management of native grasslands; retention and management of remnant native vegetation (RNV); and revegetation of cleared areas with native species. Policy in relation to these practices has been dominated by measures designed to address RNV conservation.

We first discuss the role of government in addressing natural resource management issues on private land. Policy instruments are then presented under the following headings: regulatory instruments; economic instruments; management agreements; and education.

2. Roles of governments and landholders

Historically, landholders have enjoyed extensive rights, and had few responsibilities, with respect to natural resource management on their properties. Over the past few decades, in some Australian jurisdictions (notably Victoria and South Australia), there has been a dramatic restriction of landholders' rights, especially with respect to the clearing of native vegetation. More recently, there has also been an increasing emphasis on cost sharing and providing landholders with incentives to adopt best practice land management.

The justification for government intervention with respect to landholders' property rights rests on two foundations. First, land management practices on one property can impose external costs on other properties and infrastructure (damage to buildings, roads, pipelines and so on). These costs arise from the effects land clearing and other activities have on down-catchment salinisation, and on water quality and quantity. Second, clearing native vegetation gives rise to a direct loss of public benefits associated with biodiversity and amenity values. Salinisation and changes in water quality and quantity can indirectly affect both terrestrial and aquatic ecosystems. Governments have a role in protecting the public interest with respect to biodiversity and amenity values. They can also represent the interests of down-catchment communities where these communities do not already have the institutional structures in place to represent themselves.

A clear, widely accepted definition of landholders' property rights, including the ensuing entitlements and obligations, is essential for addressing natural resource management issues. Such a definition has yet to be agreed upon. An emerging concept that is assisting policy development in this regard is the notion of a duty of care. Those aspects of land management that come under a duty of care are obligations that limit landholders' property rights. In such cases, economic incentives or compensation are not justified, and the duty of care can be supported by either self-regulation or regulations developed by governments.

> Duty of care is not a static concept because scientific knowledge and community expectations will shift through time. For example, the provision of incentives for

> vegetation clearance, maintained into the 1970s provides a pertinent case study of Australia 's evolving understanding of sustainable land management as public policy is now directed strongly at the conservation of vegetation. The challenge is to develop mechanisms that allow duty of care to be revised and adapted through time. A 'duty of care ' with regard to native vegetation management could reasonably be expected to include protection of endangered species and/or ecosystems, protection of vegetation on land at risk of land degradation, e.g. from salinity or erosion, protection of riparian vegetation, protection of vegetation on lands of low agricultural capability and protection of vegetation on acid sulphate soils. Depending on regional circumstances, duty of care may invoke other management actions or priorities. ... Practical lessons can be learnt from other natural resource industries that have developed Codes of Practice to resolve these issues by institutionalising adaptive management (ANZECC 2000. p. 17).

Best practices that fall outside a duty of care can be regarded as contributing to the supply of a non-marketable public benefit. Where the supply of such benefits imposes costs on landholders, they are unlikely to provide them at the level desired by the community. Furthermore, an expectation that landholders should supply such benefits would be unfair and inequitable, since landholders would bear all the costs, and the community gains most of the benefits. Providing publicly funded economic incentives to landholders can be an appropriate method for securing the supply of non-marketable public benefits.

Determining where duty of care stops and a public conservation service begins is a difficult issue (ANZECC 2000). Binning & Young (1997) suggested that a duty of care should apply to those management practices that are required to achieve land use objectives at a regional or landscape scale. A public conservation service, on the other hand, is the active and ongoing management of a particular site. Lockwood & Walpole (1999a) adopted these definitions with respect to remnant native vegetation (RNV) and argued that a duty of care applies to a requirement that landholders retain existing RNV, whereas improving RNV management involves provision of public conservation service. This justifies governments offering incentives for RNV conservation based on costs to landholders associated with reduction in grazing and extraction of timber products, as well as the costs of improved RNV management associated with fencing, weed control and feral animal management. ANZECC (2000) additionally recommended that:

- public investment should be contributed by the three levels of government in proportion to their relative responsibilities; and

- where community expectations resulting in legislative or policy changes cause duty of care to be shifted significantly over a short period of time, one-off payments can be made in recognition of the need to adjust to a new regime.

Levels of government

Though individual states and territories have primary responsibility for land and natural resource management, the Commonwealth and local governments have important roles. There is a need to involve all levels of government in a coordinated approach to the management of natural resources on privately owned property (Young, M. 1997). The responsibilities of each level of government, community groups, catchment management authorities and non-government groups also need to be clearly defined (Thorman 1997). Within a jurisdiction, many levels of government, agencies and community sectors are involved in policy development and program delivery.

The Commonwealth has a responsibility to management of areas that lie within its own jurisdiction (for example, defence force establishments), and to ensure that Australia's obligations under international laws, treaties and agreements are met. The Commonwealth also facilitates the coordination of natural resource management policy across all jurisdictions, including development of national standards, guidelines and strategies such as the *National Strategy for*

Ecologically Sustainable Development and the *National Strategy for the Conservation of Australia 's Biological Diversity*. The Commonwealth is also involved in the establishment of programs, provision of funding, and use of taxation mechanisms to encourage or dissuade particular land management practices.

State and territory governments have primary responsibility for land use on both public and private land, including the establishment, administration and implementation of the legislative framework. Through their legislative powers, they also control the framework within which local government operates. There are a large number of state programs and strategies that focus on and support improved natural resource management on privately owned land. State and territory governments also employ a range of economic instruments and provide technical advice and extension services.

Local government influences natural resource management on private land through planning schemes, environmental zoning and protection orders. Some local governments use instruments such as levies, rate relief and differential rating, grants, and community education to achieve environmental objectives. However, natural resource management appears to be a low priority with many local governments. A recent review of local government by the National Office of Local Government failed to mention natural resource management as one of the services provided by local government (Binning *et al.* 1999). The capacity of local government to influence natural resource management is constrained by a lack of legislative power and limited resources. In recent years, there have been attempts to amend the legislation to provide a stronger role for local government in natural resource management (Binning *et al.* 1999). Local government is well placed to understand local conditions and can bring community concerns before other levels of government (Young *et al.* 1996).

Devolution of responsibility to the regional level

A significant trend in both national and state policies has been the devolution of responsibilities to regional organisations. In NSW, for example, the *Native Vegetation Conservation Act 1997* provides for regional vegetation management plans to be developed by regional vegetation committees. Tension exists between providing clear direction through state and Commonwealth legislative frameworks, and maintaining flexibility to accommodate regional differences (ANZECC 2000). Unless issues such as the definition of duty of care are resolved in a manner that protects legitimate state and national interests, there is a danger that local and regional interests will largely determine land management outcomes. Concentrating decision-making power at the regional level may result in continued erosion of public good values such as biodiversity conservation. Regional communities also have little incentive, at present, to take into account the effects their actions have on down-catchment communities. On the other hand, empowering regional communities makes for more flexible, locally relevant land use decisions, and increases landholder support for the outcomes of planning processes. To gain the benefits of devolution to regions, while still maintaining the wider public interest, minimum acceptable standards need to be set in relation to key natural resource management issues. Examples of standards include catchment-based caps on water allocations and salt exports; and requirements that, where possible, at least 30% of pre-European cover of each regional vegetation type is conserved, together with revegetation of depleted vegetation types. Such standards need to be developed though cooperative agreements between federal, state and regional interests.

3. Policy instruments

There are a large number of policy instruments that can be applied to the management of natural resources on private land. The policy instruments have been categorised under the following headings: regulatory instruments; economic instruments; management agreements; and education.

3.1 Regulatory instruments

Regulatory instruments seek to influence the behaviour of resource users through the control of processes and products, protecting resources from further degradation. They aim to control or discontinue the use of a resource through the application of methods such as licensing, setting of standards and zoning. Regulatory instruments have been used by governments as a safeguard against uncertainty (Miles *et al.* 1998; Rae 1997). If other measures fail, then regulations can deter undesirable practices (Young *et al.* 1996). Industries can also undertake self-regulation through the adoption of codes of practice or other standards of behaviour. Self-regulation can be attractive to industry as a means of avoiding imposition of externally imposed restrictions, and as a demonstration of social and environmental responsibility.

Environmental regulations are primarily based on state and territory legislation. There are approximately 80 Acts administered by the Department of Land and Water Conservation (NSW); 109 Acts administered by the Department of Natural Resources and Environment (Victoria); approximately 40 Acts administered by the Department of Natural Resources (Queensland); 48 Acts administered by the Department of Environment and Land Management (Tasmania); 27 Acts by the Department of Lands, Planning and Environment (Northern Territory); and approximately 20 Acts by the Department of Urban Services (ACT). There are also numerous regulations and by-laws that accompany this legislation (Industry Commission 1998).

Regulatory instruments are relatively inflexible, and by setting minimum standards, they may discourage innovative measures (Izmir 1996; Rae 1997). Regulatory instruments fail to address incremental degradation. Clearing regulations, for example, do not precent the incremental degradation of RNV from threats such as rising water tables, the impact of grazing, fire or fertiliser, invasion of exotic weeds, and insect attack. Nadolny *et al.* (1991) and James (1997) concluded that regulatory instruments on their own would never be a sufficient means of managing natural resources, particularly where the resource is geographically diverse. Regulations may impose inappropriate and costly constraints upon some landholders (Hodge 1991; Young 1996). Without community support for regulations, it is unlikely that the original natural resource management objectives would be achieved. These instruments involve high administration costs to ensure compliance (Rae 1997). On the other hand, regulatory approaches are an effective way to set and enforce standards that ensure that the public interest is protected.

3.1.1 Clearing regulations for remnant native vegetation

Clearing regulations vary from coercive strategies such as prohibition through law, to consensus strategies involving contracts between landholders and authorities (Farrier 1992; Miles *et al.* 1998). Land clearing regulations can either be part of a special Act of Parliament or be a regulation or planning instrument under other legislation such as environmental planning legislation. 'Without appropriate regulation there is no ability to prevent unsustainable land clearing and consequent negative externalities. Land clearing regulation should provide all landholders with a clear indication of what the community considers as appropriate practice' (ANZECC 2000, p. 32).

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, which took effect from July 2000, introduced a number of processes that affect the clearing of RNV, including a Commonwealth approval process where land clearing would have a 'significant impact' on a matter of 'national environmental significance'. The Commonwealth government also released a *National Framework for Management and Monitoring of Australia's Native Vegetation* in March

2000. The document restates the 1997 Natural Heritage Trust (NHT) goal that the decline of RNV in Australia should be reversed by 2001. It does not set any targets for clearing or revegetation in individual areas, indicating that the states should set their own targets (ANZECC 2000).

The NSW Government, in 1995, implemented native vegetation clearing controls through a State Planning Policy (SEPP 46). This policy aimed to control the clearing of native vegetation until permanent legislation could be developed after consultation with landholders. Under SEPP 46 a landholder needed to acquire consent to clear native vegetation exceeding two hectares per year. Applications were assessed with regard to such things as biodiversity, soil erosion, salinity, cultural sites and social and economic values. Controversy surrounded the introduction of the policy and consequently changes were made (Binning & Young 1997). In 1997, SEPP 46 was revoked and the *Native Vegetation Conservation Act 1997* was introduced. The Act uses Regional Vegetation Management Plans (RVMP) to manage RNV. With regard to the clearance of RNV, a RVMP identifies areas of vegetation that can be cleared without an application, as well as those areas that require approval from the department of Land and Water Conservation (DLWC) (DLWC 1998a; DLWC 1998b). A RVMP is prepared by a community based Regional Vegetation Committee that consists of representatives from the rural community, local government, the DLWC, Landcare, NSW Agriculture, NSW National Parks and Wildlife Service (NPWS), the Aboriginal community, as well as non-government members from a Catchment Management Committee and a scientific RNV expert recommended by the National Herbarium or the Australian Ecological Society (DLWC 1998b).

The RVMP approach was expected to reduce the need for landholders to seek permission for clearing (DLWC 1998b). However, the NSW State government has recently expressed concern over the rate of clearing applications being received. Applications had increased by more than 30,000 hectares over applications in 1998, with applications for a total area of 168,481 hectares in 1999. The DLWC received 784 applications to clear land in 1999 (compared to 472 in 1998), of which 95% were approved, accounting for 80% of the total. Despite the fact that a large majority of the applications were for thinning rather than full scale clearing, the DLWC has appointed an external expert panel to review the application assessment guidelines (LAWN 2000a).

Victoria has comprehensive clearing regulations in place as a result of amendments in 1989 to the *Planning and Environment Act 1987*. Under the Native Vegetation Retention Planning Control Program, land above 0.4 hectares in size is regulated. Applications to clear native vegetation take into account habitat values, genetic diversity, carbon storage, land degradation, groundwater, water resources, sustainable use of land, and the aesthetic values of the area. Local councils in Victoria determine applications where areas are less than 10 hectares. Advice must be sought from the DNRE for all other applications (Binning & Young 1997). The DNRE is the primary referral agency and recommendations from the DNRE can only be overturned by appeal to the Victorian Civil Administrative Tribunal. Depending on the application, there may be other referral authorities, such as the Environment Protection Authority (Cotter *pers comm.*).

Before the 1989 amendments, between 1972 and 1987, RNV was being cleared at an average rate of 15,000 hectares per annum (DNRE 1996). Between 1990 and 1992, clearing was reduced from approximately 6,160 hectares per year to 3,150 hectares per year (DNRE 2000a). Most recent estimates have suggested that Victorian vegetation is being cleared at a rate of 2,500 hectares per year (DNRE 2000b). Although the regulations have been considered successful in reducing broad scale clearing of RNV, the Victorian government has recently released plans to review the management of RNV. In August 2000, the government outlined plans to introduce a new framework for managing RNV, including ten regional plans. The new draft framework identifies principles and goals for RNV management on both public and privately owned land. *Restoring Our Catchments: Victoria's Draft Native Vegetation Management Framework* also identifies the need to update Victoria's Planning Provisions with regards to the clearance of RNV. A discussion paper outlining possible changes to the current system will be developed following the close of public comment for the draft framework in December 2000 (DNRE 2000c).

Regulations to control the rate of clearing in South Australia were introduced in 1983 under the *Planning Act 1982*. Problems arose with the Act regarding the lack of compensation offered to landholders who were being denied permission to clear (TPLUC 1996). In an attempt to rectify problems, the Native Vegetation Authority was set up under the *Native Vegetation Act 1985* (ANZECC 1996). The Act provided financial support to landholders denied permission to clear their land. This approach was deemed more successful, with 94% of the land that was subject to applications being protected (Farrier 1995). However, landholders began to apply to clear in order to gain financial support. The Act was subsequently replaced with the *Native Vegetation Act 1991* (ANZECC 1996). The new Act included a greater emphasis on the protection of wildlife and soil conservation; abolished broad scale clearing and cancelled financial assistance to landholders who were denied permission to clear. Under the *Native Vegetation Act 1991*, the Native Vegetation Council has the responsibility to review applications. If an application is approved, the landholder enters into an agreement to replace the cleared area by revegetating another site on the property. The aim is to achieve a net gain in RNV across South Australia (Government of South Australia 1995). The *Native Vegetation Act 1991* was recently reviewed. The inter-departmental draft review, released early in 2000 for public comment, indicated that the South Australian government had been unsuccessful in prosecuting illegal clearing and suggested the need for new powers and stronger penalties to enforce the Act (LAWN 2000a). Other review recommendations included:

- the removal of the exemption for clearing around a proposed building site;
- the tightening of exemptions for bushfire protection, firewood collection and fence post materials; and
- the tightening of exemptions for clearing fence lines and access roads (LAWN 1999).

The review also proposed a 'fee per tree' payment scheme for clearing applications that would replace the flat rate of $50 per application. The review highlighted the fact that in the case of large-scale applications, this fee does not cover the processing costs (such as field assessments). A fee of $20 per tree was suggested payable to the Native Vegetation Council even if the application was rejected (LAWN 1999).

Under the *Soil and Land Conservation Act 1945-88*, Western Australian landholders requesting approval to clear more than one hectare of native vegetation must apply to the Department of Agriculture. Additional regulations were included in the Act in 1995, however the rate of approval has been considered too high (usually over 80%) (Binning & Young 1997).

Queensland is in the process of implementing clearing regulations that passed through State Parliament in December 1999. The new Bill gave the State government the authority to control clearing on freehold land. The Bill also limits the clearing of both freehold and leasehold land to 70% of vegetation (LAWN 2000a). The Queensland Premier, Mr Peter Beattie, has called for the Federal government to contribute $103 million to compensate landholders affected by the new legislation. The Federal government has rejected the Premier's request, prompting Mr Beattie to 'partially' proclaim the new legislation. The new legislation applied to all leasehold land and approximately 925,000 hectares of freehold land that supports endangered species (LAWN 2000b). Despite this limitation, the new Act has come under criticism from farmer groups that claim the new regulations interfere with the rights of landholders to manage their land (LAWN 2000a). Negotiations between the Queensland and Commonwealth governments are continuing.

There is no legislation directly controlling the clearing of native vegetation in Tasmania and the Northern Territory. However, under the *Pastoral Lands Act 1992*, lessees must apply to clear RNV through the Pastoral Lands Board (Binning & Young 1997). All land in the ACT is leasehold, and native vegetation is managed as part of lease agreements. Property Management Agreements with the government must be developed when leases are renewed or purchased. Areas of high conservation value can be protected permanently under the *Nature Conservation Act 1980* and the *Land (Planning and Environment Act 1991* (Binning & Young 1997).

There is a general lack of consistency between approaches to native vegetation management across the states and territories. Mike Young (1997) suggested that these differences could be explained by variations in the stage of development, or could be a reflection of the different perceptions held by the states and territories as to the value of RNV. The regulatory approaches taken in Victoria and South Australia have achieved substantial reductions in the rates of RNV clearing in those two states. Land clearing is still a major problem in NSW and Queensland.

3.1.2 Zoning

Local governments can regulate natural resource management through restrictions on sub-division of private land, and through zoning. Both of these instruments operate through planning schemes, which in Victoria are developed by local governments and ratified by the State government under the *Planning and Environment Act 1987*. Zones can be developed to exclude or require specific land use activities.

A number of local councils throughout Australia have initiated zoning schemes to conserve RNV and biodiversity values. The Shire of Nillumbik (on the urban rural fringe north of Melbourne) has in place an Environmental Living Zone in which the clearing of vegetation without permission from the Shire is prohibited. Only the planting of endemic species is allowed, ownership of dogs and cats is banned, and new houses are required to conform to design principles that maintain the environmental attributes of the Shire (Bushcare 1999).

The Brisbane City Council also has in place a zoning scheme (an urban conservation zone) that enables the Council to put into action Vegetation Protection Orders (VPOs) for areas that are considered to be of high conservation value. Any landholder that enters into a Voluntary Conservation Agreement by placing land within the conservation zone is entitled to a grant of up to $15,000. Approval to develop any land that is protected by a VPO must be sought from the Council (Bushcare 1999).

3.1.3 Subdivision

As with clearing regulations for RNV, subdivision varies considerably across Australia. At present in Victoria, subdivisions in rural land zones must be at least 40 hectares in size. For example, if a property is 79 hectares it cannot be subdivided (Cotter *pers comm.*). However, local councils can establish their own subdivision laws as set out in the Victorian Planning Provisions. For example, the City of Greater Bendigo has chosen to increase the minimum subdivision size to 80 hectares (Braslis *pers comm.*). Smaller properties may be subdivided in rural residential and residential zones.

Litchfield Shire Council (on the outskirts of Darwin) is managing problems associated with the subdivision of blocks by excluding areas such as wetlands from sub-divisions. These areas are instead used for such purposes as wildlife corridors and public reserves (Bushcare 1999).

3.1.4 Self-regulation

Industries can chose to adopt a self-regulatory approach for achieving professional, safety, legal, social or environmental objectives. The use of such mechanisms in relation to natural resource management on private land is currently minimal.

Codes of practice are a method of self-regulation by which an industry strives to achieve best practice. Such codes are most effective when they incorporate incentives to encourage compliance (ANZECC 2000). As far as we are aware, there are no codes of practice that address salinity or RNV issues. An *Environmental Management System* , such as the International Standards Organisation (ISO) 14000 series of standards, allow for the management, measurement and review

of work procedures to improve environmental management. There are over 200 quality assurance schemes used in Australian agriculture. These may or may not qualify as an EMS, depending on whether they address environmental management as well as production objectives (ANZECC 2000).

3.2 Economic instruments

Economic instruments, acting through market processes and other financial mechanisms, have the ability to demonstrate resource scarcities to users, thus creating incentives for rational resource use. Economic instruments include financial burdens on resource users; incentives for reducing environmental degradation; and incentives for supplying environmental goods.

Questions arise over what should be the responsibility of landholders, and the extent the public begin to pay for the delivery of a conservation service. As noted in Section 2, a 'duty of care statement' can be used to identify where a landholder's responsibility for sustainable management stops, and where a public conservation service starts. Payment-based incentives should only be available for actions that are consistent with a public conservation service over and above a landholder's sustainable management responsibility.

Cost sharing measures are sometimes described in terms of polluter pays and beneficiary pays. Under the polluter pays principle, landholders are required to bear the costs associated with any negative impacts their activities have on, for example, infrastructure or the productivity of downstream properties. This approach generally requires that the source of the problem can be unambiguously identified, and attributed to particular landholders. Under the beneficiary pays principle, those who gain benefits from a landholder's conservation activities cover the cost of these activities. For example, research has shown that most Victorians value RNV for its biodiversity and that landholders face a net cost if they were to adopt more conservation oriented management (Lockwood & Walpole 1999b). In this case, the beneficiaries of conservation (the general public) can be asked to cover at least part of landholders' costs.

ANZECC (2000) identified three forms of incentives. *Transition incentives* are one-off payments that can assist landholders to meet new regulations. They are directed towards minimising the difficulties for landholders in adjusting to a new policy regime, and to encourage landholder support for the new management standards. The incentive payments available in South Australia between 1985 and 1991 for protecting vegetation following refusal of a clearance application could be considered an example of a transition incentive (ANZECC 2000).

Catalytic incentives are relatively small payments that are designed to secure landholder participation in best practices, but not to fully compensate them for the net costs of adoption. These incentives attempt to capture the goodwill that landholders have to undertake on-ground works in the public interest (ANZECC 2000). Small payments can minimise the public investment required to achieve on-ground outcomes, but are unlikely to be sufficient to change the land management practices of those landholders who do not already have both a strong commitment to achieving environmental outcomes, and the financial resources to cover those additional costs of adopting best practice that are not covered by the incentive payment. Examples of catalytic incentives include Bushcare and Landcare grants, and Greening Australia fencing assistance programs.

Full cost sharing incentives are based on a comprehensive identification of the costs and benefits of a best practice, as well as who bears the costs and who enjoys the benefits. Cost sharing is then done according to the beneficiary pays or polluter pays principles. Non-market economic values can be quantified by methods such as contingent valuation or choice modelling, and included within a cost-benefit framework (Lockwood & Walpole 1999b). Such analyses typically recommend much higher payments than would be made under a catalytic approach. Formal cost sharing frameworks need to be linked to formal management agreements/covenants that secure the

public investment (Miles *et al*. 1998). Full cost sharing incentives are likely to attract more landholders to adopt best practices than other forms of incentive, and are the most equitable approach. However, it was estimated that public funding for vegetation management would have to rise by at least an order of magnitude in order to support full cost sharing (ANZECC 2000).

An example of full cost sharing is the arrangements made under the Coorong Regional Action Plan in South Australia (ANZECC 2000). The Coorong District Council developed a framework for cost sharing for on ground works that gives priority to the control of dryland salinity through plantings in recharge areas, protection of RNV, and reclaiming salt affected land. The framework aims to take into account both the private and public benefits from conservation works. Under the scheme, the establishment of introduced pasture, for example, would attract a lower payment than the establishment of native vegetation (Bushcare 1999).

Economic instruments offer greater scope and more effective means for managing natural resources than other mechanisms (James 1997). The shift to greater use of economic instruments is evident in National Strategies such as the *National Strategy for Ecologically Sustainable Development*, in which the development of cost-effective and flexible policy instruments is a 'guiding principle' (Council of Australian Governments 1992; Miles *et al.* 1998).

Despite the advantages of economic instruments, it was noted by Rae (1997), that there are disadvantages associated with the use of these incentives. Subsidies or tax concessions can be seen to reward landholders that may have managed their land poorly in the past. They also provide no guarantee of success. Landholders may fail to respond to economic instruments in the manner predicted by economic theory. Cultural or social factors may be more influential on some landholder's decision-making than economic factors. For example, some farmers may see themselves as producers of wheat, rice wool or beef, but not of biodiversity, and therefore resist any incentives to switch their products.

Economic instruments used in Australian include grants, taxation, rate relief and rebates, environmental levies, acquisition of key sites, revolving funds and market creation.

3.2.1 Grants

A grant is a non-repayable form of financial assistance that can be offered if specific activities are undertaken to reduce environmental degradation. Grants can be administered at all levels of government. Ongoing stewardship payments can also be provided to landholders who manage their land for conservation and provide environmental 'products' (Miles *et al.* 1998).

Activities funded by Bushcare, for example, include the protection of RNV, strategic re-establishment of vegetation in priority areas, institutional change, planning and research. Bushcare guidelines detail the level of funding available for particular conservation related activities. For example, remnant vegetation fencing incentives provide for:

- up to $600/km where not protected under a management agreement;
- up to $1,200/km where the area will be protected under a fixed-term management agreement or covenant; and
- all reasonable costs of fencing, including labour, where the area will be protected in perpetuity by a binding covenant on title (Miles *et al.* 1998).

Salt Action Irrigation Incentives are available to landholders in NSW to encourage landholders to adopt more efficient irrigation practices and technology (such as drip and micro-irrigation systems), reducing the amount of water wasted. To be eligible to participate in the incentive scheme, landholders must attend an irrigation management course (Cox & Giddings 1997). The incentives are shown in Table 1.

Table 1. Salt Action Irrigation Incentives (Cox & Giddings 1997)

Management activities	Incentives offered
Upgrading irrigation systems	10% of total cost up to $5000
Soil pit surveys	50% of total cost up to $1500
Automation	50% of total cost up to $3000
Scheduling equipment	50% of total cost up to $3000

In 1999, the Victorian State government invested $9 million for the next three years in the Replanting Victoria 2020 initiative. The funding has been allocated to 12 revegetation projects that aim to increase carbon sinks, as well as helping to conserve biodiversity and address land and water degradation. The projects have been planned by the Victorian Catchment Management Authorities, and cover privately owned land, roadsides, riparian areas and parks (DNRE 1999a). Table 2 provides a summary of the projects and funding granted.

Other grant programs in Victoria include:

- Tree Victoria Incentives (grants between $1,000 and $15,000);
- Victorian Government Community Catchment Management Grants;
- Victorian Government Landcare Partnership Initiative Grants;
- Salinity Grants;
- Land Protection Incentive Scheme;
- Rabbit Busters; and
- Weed Initiative.

A number of local councils have implemented various economic incentive schemes in an effort to heed the concerns of the community regarding the protection and conservation of natural resources.

Since 1995 the Manningham City Council (Victoria) has had a Local Environmental Assistance Fund, covering such things as pest plant and animal control, erosion, and revegetation. Landholders can apply for a grant of up to $800 for each land management activity, on a dollar for dollar basis. Priority is given to land identified as being significant or is protected by a covenant, and landholder groups. In 1999, 70 landholders received funding to undertake environmental works on their properties. For the 2000 grant round, a budget of $40,000 was available and applications totalled $65,000 (Bushcare 1999; Manningham City Council 1999a).

Table 2. Summary of projects funded by the Replanting Victoria 2020 initiative (DNRE 1999a)

Project area	Project description	Funding over 3 years
West Gippsland	Establishment of 180 hectares of trees & understorey along rail tracks.	$300,000
Port Phillip	Revegetation of 100 hectares in South Gippsland & the Bass Hills, including farm forestry plantations. Will act as a carbon sink & address erosion.	$280,000
East Gippsland	Revegetation along rivers & creeks. Remnant vegetation will be protected and improved through fencing & weed control.	$300,000
Corangamite (City of Greater Geelong)	Tree and groundcover plantings on the 13 km of the Princess Highway roadsides and centre median strips. Hoping to extend plantings onto private properties.	$100,000
Corangamite (Anakie)	Establishment of a wildlife corridor by linking existing remnant native vegetation.	$58,000
Corangamite (Linton)	Establishment of 80 hectares of vegetation by a group of 23 landholders. Will provide a future carbon sink & address salinity, water runoff & biodiversity loss.	$200,000
Corangamite (Otways)	Establishment of vegetation to link the existing coastal remnants to the Otways. Seed will be collected by local Landcare groups.	$140,000
Glenelg-Hopkins	Establishment of 50,000 trees & 48,000 understorey plants to revegetate areas along the Wannon River & saline areas. Will also provide a future carbon sink.	$400,000
Wimmera	Undertaking 4 different projects that will establish trees to increase biodiversity, address land degradation, and establish a future carbon sink.	$400,000
North Central	Revegetation of 520 hectares of the uplands to address high salinity risk areas.	$400,000
Mallee	Establishment of 90,000 trees & understorey plants to enhance the existing woodland communities. Will also involve fencing out critical wildlife habitat.	$220,000
North East	Revegetation of riparian areas, primarily to protect the Ovens River from salinity.	$320,000

The City of Greater Bendigo established an environmental grant scheme to provide incorporated groups and organisations with access to small amounts of funds to carry out environmental works (generally up to $3,000 per group administered over a 12 month funding period). The scheme aimed to address catchment management issues, while achieving the specific aims of community groups. The Council has a community-based committee that reviews these applications. A Community Environmental Officer inspects the finished project and the group must complete a project report. This grants scheme allocated $25,000 in 1998-99. The City of Greater Bendigo is also in the process of developing an incentive scheme to encourage the protection of remnant native vegetation on private properties (Bushcare 1999).

In 1995, the Shepparton Irrigation Region Sustainable Regional Development Board implemented, a Land Protection Incentive Grant to protect the natural environment on private agricultural land. The incentives provided for fencing, tree planting, structures, earthworks and equipment hire (SIRSRDB 1995).

On the south coast of Western Australia, the Shire of Denmark currently operates a scheme that provides direct grants to landholders who agree to fence along creeks on their properties (Bushcare

1999). Also in Western Australia, the Shire of Mellewa provides financial assistance to landholders that agree to increase roadside vegetation corridors by relocating fence lines further from the road. Landholders remove the existing fence and transfer control of the land to Council. The Council in return covers the costs of the new fence, surveying, and spraying the land. Landholders and community groups replant the roadside corridors (Thorman 1997; Bushcare 1999).

3.2.2 Taxation incentives

Tax incentives are indirect forms of financial assistance. The strengths of taxation incentives are their accessibility through existing administrative processes and their capacity to reinforce the motivations of landholders to privately invest in public goods (ANZECC 2000).

While there are considerable tax advantages available to primary producers, there are no tax incentives that specifically encourage land to be managed for nature conservation. There are taxation deductions available to businesses that relate to Landcare activities. These Landcare activities are defined in Section 387-55 of the *Income Tax Assessment Act* 1997. Landholders are able to choose between an instant tax deduction and a tax rebate of 34 cents in the dollar. The tax rebate is available to those landholders with a taxable income of less than $20,700. Landcare related activities eligible for taxation incentives include:

- works undertaken to combat or prevent land degradation;
- costs associated with planting trees primarily for land degradation control and prevention (such as salinity, erosion, windbreaks and native regeneration activities);
- contributions of capital to conserve and convey water;
- certain costs of planting trees if the principal purpose is commercial plantations;
- the preparation of property management plans; and
- fencing costs (for exclusion of stock and vermin to control/repair land degradation, and for the separation of land classes in accordance with an approved management plan) (Bushcare 1999).

During its first year of operation, 1998/99, there was a low uptake of the Landcare taxation incentives. The NHT had allocated $80 million over four years for the scheme, however, the scheme had cost only $168,000 in its first year of operation (LAWN 2000a). There have been concerns from landholder groups that the threshold for claiming the rebate is too low. They argued that landholders with such low incomes would lack the necessary income to carry out Landcare activities in the first place (LAWN 2000b). In interviews of landholders conducted by Slee (1998), tax incentives to encourage RNV conservation received a mixed reaction, with one view being that even if farmers had spare money, they were generally unlikely to spend it on activities such as fencing-off or managing native vegetation.

There have been critical reviews of the existing tax incentives for Landcare activities. The allowance under Subdivisions 387-A and 388-A to let landholders claim deductions for the construction of such things as dams and irrigation channels could be seen as encouraging the development of resources, not conservation (Peterson 1995; Young *et al.* 1996). There is also the tendency for the tax incentives to favour those landholders with larger properties and higher incomes (Miles *et al.* 1998). Tax based instruments also fail to address regional differences in land degradation issues, and there is no mechanism to accommodate national and state priorities for action.

There has been a tendency in Australia to tax things of value and not those activities that are in fact detrimental. Mike Young (1997) suggested that such things as pollution and the consumption of natural resources could be taxed more effectively to provide people with the incentive to avoid such practices in the future. However, if environmental taxes and levies are seen by communities

as just another form of general taxation with the intent of raising revenue, there will be limited community and political acceptance (Izmir 1996).

3.2.3 Local government rate relief and rebates

The current rating schemes used in Australia provide relatively few incentives for landholders to conserve RNV on their properties. In NSW, for example, land used for farming actually incurs lower rates than land that is used to conserve natural resources (Young *et al.* 1996). The majority of rating systems are based on an unimproved value determined by deducting the value of improvements necessary to maximise the profitable use from the market value of the land (Young *et al.* 1996). There is a need to revise the land valuation system of many local governments, or offer a rebate for landholders that do not clear RNV.

A number of councils do use rate reductions or rebates to encourage landholders to set aside or manage land for conservation purposes. The schemes operated are very similar in design. In general, landholders are required to complete a 'Works Proposed' form that details the land degradation problems to be addressed. Councils may request an inspection of the property to assess the proposal. Landholders are required to provide evidence that works have been carried out in order to receive a rate rebate. There are varying degrees of success amongst the different councils, with a number of councils reviewing their schemes in an effort to attract more landholders. Whelan (1997) commented, that although the rate relief offered often results in a minimal saving (due to rural rating and the amount of land that is actually taken out), the schemes recognise landholder efforts to conserve RNV.

In 1990, the Cooloola Shire Council (Queensland) began offering a rate rebate to landholders addressing land degradation and conservation values on their properties. Unlike a number of other councils, the Cooloola scheme also incorporates a farm forestry rebate. The scheme is subsidised by an environmental levy, acknowledging the community benefits that are associated with improved management of natural resources. On offer are rate rebates up to 50%, with the size of the rebate proportional to the amount of land that is covered by a conservation or farm forestry agreement. At the end of 1999, the scheme covered 368 hectares of private land (Bushcare 1999; Cooloola Shire Council 1998).

Another example in Queensland is the Johnstone Shire Council, where (using NHT and Sugar Coast Environmental Rescue Package money), a system of voluntary agreements for the implementation of rate deferrals for habitat conservation was initiated in 1998. At December 1999, 60 agreements covering 1,745 hectares have been entered into by landholders (Gordon *pers comm.*).

In an effort to protect RNV, the Logan City Council in Queensland constructed the 'Residential Conservation Zone' that involved incentives for landholders to conserve their land. Landholders can opt to rezone their property to take advantage of rate rebates. Landholders must abide by restricted development and clearing regulations, rehabilitate degraded areas and sustainably manage the natural resources on their properties (Bushcare 1999). Rate rebates on offer range between 25% and 50% (Bushcare 1999). Ipswich City Council (Queensland) and the Shire of Nillumbik also operate rate rebate schemes.

The Shire of Serpentine-Jarrahdale (Western Australia) introduced a scheme in 1994 as part of the Shire of Serpentine-Jarrahdale Rural Strategy. This scheme incorporated a conservation zone into the town planning scheme (Shire of Serpentine-Jarrahdale 1994). The scheme concentrates on private land that has significant stands of RNV and wetlands. To date the initiative has attracted only three landholders protecting an area of 1,460 hectares of RNV. The Shire admitted that the process of refining and implementing the scheme has been arduous with the need 'to have the agreement of the State Government Planning Department and landholders' (Del Marco *pers comm.*). The Council favours the use of economic incentives to improve the management of

natural resources on private land, but it acknowledges that it has insufficient resources to fund large-scale conservation works (Shire of Serpentine-Jarrahdale 1994).

Melton Shire Council in Victoria implemented a rates rebate scheme to control weeds, pest animals and land degradation in general (Bushcare 1999). It has been estimated that 95% of landholders within the targeted areas have participated in the scheme (McLeod 1997). The council is currently in the process of mapping weed infestations on properties to assess the performance of landholders (Bushcare 1999).

The Shire of Strathbogie has developed a rural land rate as part of the Council's Land Management Program. The program links pest plant and animal control with the more common approach of rate differentials. The rate is available to rural properties (two hectares or larger) that are managed to achieve long-term community goals (Brownstein *pers comm.*).

The City of Greater Bendigo (in partnership with the DNRE) introduced an incentive scheme in 1994 to address dryland salinity. The scheme offered a rebate to landholders that planted trees and perennial pastures on areas of high recharge. The scheme provided a 100% rebate on rates for one year if perennial pastures were planted and ten years for trees. The scheme received a good response for only the first two years. The Council now believes that the scheme did not offer a large enough incentive, was restrictive in its application and could have been better promoted. The scheme is currently under review by the Council (Sheenan *pers comm.*).

Other councils are also developing or considering similar schemes. At present, the City of Greater Shepparton provides no incentives for landholders to address dryland salinity. However, studies are being undertaken by the Council that may lead to the implementation of incentive schemes. The Shire of Yarra Ranges recently completed a review of incentives used by other local governments in Australia, and is looking to introduce incentives for conservation on private land financial year (Braslis *pers comm.*).

Currently, there is no process to reimburse local councils for their contributions to protecting natural resources. In fact, there is a tendency for the State Local Government Grants Commission to be seen as encouraging (unintentionally) councils to develop local areas, rather than protecting natural values. If biodiversity values were actually considered by the Grants Commission, councils would have financial incentives to encourage landholders to protect the natural resources on their properties (Young, M. 1997).

3.2.4 Environmental levies

Environmental levies are used to raise funds for environmental management (such as administration of agreements, grants or the purchase of significant areas of land). Environmental levies reduce the amount of funding that must be provided from Commonwealth and state government sources. The South Australian Government, for example, passed legislation to allow regional catchment boards to levy people in their region to provide funds for programs addressing land and water degradation (Young, E. 1997). However, the Victorian Government recently revoked the right of catchment management authorities to levy catchment management fees.

The use of environmental levies is becoming more popular with local councils. A number of councils in NSW such as Coffs Harbour and Warringah have received Ministerial support to increase the 'environmental levy'. Several councils in Western Australia (Katanning Shire Council, Cunderdin Shire Council and Tammin Shire Council are examples) have raised their environmental levies to continue the employment of Landcare coordinators (Bushcare 1999).

3.2.5 Acquisition of key sites

The purchase of key sites by government is another possible strategy to protect natural resources. The acquisition of key natural resource management sites is considered a high cost strategy, and is not considered a feasible approach for local governments. There are few areas where this instrument has been used. One example is the Shire of Nillumbik (Victoria), which acquired 140 hectares of land to establish reserves (Bushcare 1999).

3.2.6 Re-configuration of land use

Support can be provided to assist landholders to re-configure land uses on their properties. People interested in being conservation managers (thereby attracting stewardship payments) can acquire forested or degraded land, while areas suitable for production can be consolidated to make them economically viable.

3.2.7 Revolving funds

Revolving funds can be used to purchase land, attach a covenant and then sell the property in the 'conservation land' market (Bushcare 1999, ANZECC 2000). Landholders receive the market value for the property. Covenants bind future owners of the property. In this way, conservation values are protected, without requiring the government to use public funds, other than providing the initial capital. The scheme requires an initial establishment of capital, and enabling legislation. It may be inappropriate for government agencies to manage a revolving fund, as they are restrained by political processes and do not have the flexibility to respond quickly to market opportunities. A fund operated by an independent trust has the potential to attract private sector funding and support. Land banks can also be set up at a regional level, whereby areas of high conservation value or areas important for salinity mitigation can be purchased and re-sold with restrictions placed on future use.

A revolving fund can also be used to provide loans to landholders for environmental works. The Landcare Revolving Loan Fund Limited, established in February 1999, is a public company owned by seven Landcare groups in the Broken River Catchment (Victoria). The company provides low cost loans to landholders wanting to undertake environmental works. Resources for the pilot stage of the fund were provided by the Northeast Victorian Branch of the Australian Forest Growers and the Molyullah/Tatong Tree and Land Protection Group (RIRDC 1999).

3.2.8 Market creation

Market approaches such as tradeable permits have the ability to place a monetary value on activities responsible for environmental degradation, and enable markets to balance the consumption or production of a resource (AGO 1999a). A value for a scarce environmental asset can be captured by creating tradeable property rights over its use. For example, in the case of water management, environmental flows are first secured through regulation, at the level of the total allowable quota, and the market is used to determine the price. Quotas are allocated to individual water users who may trade them (ANZECC 2000). Establishment of markets for water was a major part of the Council of Australian Governments water reform agenda. Water markets have been established in Victoria and NSW, but further work is required to improve their effectiveness.

There is potential for such systems to be extended to salt emissions. As with water, a ceiling could be placed on total salt export from a basin or catchment, and tradeable permits issued up to this level. Rights to recharge aquifers could also be created with the value of rights dependent on their location within the catchment. Landholders who revegetate areas could sell their rights to others wishing to undertake cropping or grazing activities (ANZECC 2000). The VCG (2000) recommended that markets would be desirable for the management of dryland salinity, and suggested incentives such as salinity credits for salt load reductions and recharge credits.

Another recent example of a market-based approach is the development of a national greenhouse gas emission trading system to help Australia fulfil its commitments under the international Kyoto Protocol declared in December 1997. The vegetation conservation, as well as new plantings, could have a market value as a carbon sink in offsetting emissions. The Protocol has not been ratified by all member nations, however this is expected in early 2001 (State Forests of NSW 2000a). The market is being developed at a national scale to promote consistency, to ensure no one is disadvantaged due to geographic location, and to limit the costs of abatement. Permits will be allocated by the Commonwealth Government for the emission of gases and credits for those that possess carbon sinks. The aim of the market is to encourage communities to conserve and replant large stands of vegetation that will not only assist the in the control of greenhouse gas emissions, but will also improve other natural resource management issues such as salinity. The credits could be sold or traded within the system (AGO 1999b; AGO 1999c). The number of permits allocated would be controlled by the Commonwealth Government and dependent on the amount of greenhouse gas emissions permitted under the Kyoto Protocol.

Landholders could benefit from a carbon credits market in several ways. They could rent their land to an organisation, avoid upfront capital or ongoing costs of plantation establishment, and receive a regular income from the lessee. Alternatively, they could establish a plantation themselves for the carbon credit market, but would then incur the establishment and management costs. If there is the intention to harvest the stand, carbon credits will be lost, but if the plantation is to be kept for environmental purposes such as salinity prevention or erosion control, the carbon credits could be retained and sold (Sate Forests of NSW 2000a).

In the absence of an actual market, the potential value of carbon credits is unknown. Estimates have ranged between $2 per tonne up to $60 per tonne (State Forests of NSW 2000a). However, two power producers have entered into agreements with the State Forests of NSW. The first, Delta Electricity, is providing land for forest plantations in exchange for the rights to the carbon credits in the future. Pacific Power, the second of the two companies, has agreed to pay the State Forests of NSW for the carbon credits generated in the future from a 1,000 hectare plantation (State Forests of NSW 1999). In March 2000, the State Forests of NSW also entered into an agreement with the Japanese power utility, Tokyo Electric Power Company. Up to 40,000 hectares of plantations will be established on the north coast and southern tablelands of NSW to provide carbon sinks (LAWN 2000a).

Under Article 3.3 of the Kyoto Protocol the only carbon credits that can be traded to meet required emission reductions are those credits sequestered between 2008 and 2012 (the first commitment period under the Kyoto Protocol). Currently, any carbon sequestered up to 2008 cannot be sold as carbon credits to meet the Kyoto emission reduction targets (State Forests of NSW 2000a).

The design of the Greenhouse Gas Abatement Program is currently being considered by the Commonwealth Government, with detailed program guidelines to be developed (AGO 1999d). The sixth Kyoto Protocol Conference of Parties (COP6) meeting, to be held in The Hague in November 2000, will address issues relating to the treatment of greenhouse sinks.

Recently, the use of *tradeable permit* schemes has been initiated for salinity and phosphorus management in a number of rivers. The Salinity and Drainage Strategy of the Murray Darling Basin Commission has implemented a program of salt credits. The strategy recognised the Macquarie River as one of the most affected rivers in the Basin and is trialing a system of trading units to encourage landholders to revegetate areas in the catchment to reduce salinity in the river (State Forests of NSW 2000b).

The NSW Environment protection Authority began a series of economic incentive schemes looking at the control of phosphorus in the Hawkesbury-Nepean River System, and a reduction in

salinity in the Hunter River. The scheme for the Hunter River, implemented in 1995, was based on a system of tradeable discharge credits for mines and power stations (Izmir 1996).

3.3 Management agreements

A management agreement is a contract between a landholder and a third party (including local government or non-government organisations) regarding the management of privately owned land (Binning & Young 1997; Bushcare 1999). Management agreements are administered primarily at the state government level.

Management agreements are emerging as a popular approach to managing natural resources, particularly RNV. Management agreements can incorporate a number of approaches (such as voluntarism, regulation, finance and education) to off set the relative weaknesses of individual approaches (Miles *et al.* 1998).

3.3.1 Non-binding agreements

Non-binding management agreements are voluntary in nature and require the commitment of landholders. Examples of non-binding agreements include conservation management agreements, conservation easements and leases.

Voluntary agreements generally have low administrative costs, high levels of community involvement and community and political acceptability (Platt & Ahern 1995; Young *et al.* 1996). For landholders with genuine concern for the protection of natural resources, voluntary agreements can be effective (Miles *et al.* 1998). However, for many landholders concern is not enough. For this reason, TPLUC (1996) noted that voluntary agreements are more successful when combined with legislation or financial incentives to encourage landholders to enter into them.

An example of a non-binding management agreement scheme is Land for Wildlife operated by DNRE in Victoria. Initiated in 1981, landholders were encouraged to register properties that were being managed for conservation purposes. Landholders became part of a network and received recognition for their efforts and extension support and advice (Binning & Young 1997). There are no financial incentives and landholders may withdraw from the program at any time, although there appears to be a low drop out rate. The scheme currently involves over 5,000 landholders, covering an area of 520,000 hectares (DNRE 2000c).

The Department of Conservation and Land Management in Western Australia is using a similar approach to manage wildlife and habitats on private and community owned land. The scheme aims to allow enterprises to operate while preserving wildlife habitat. Landholders that register under the scheme receive on-site advice. Landholders are able to attend field days and receive regular newsletters and other relevant publications. The scheme acknowledges its compatibility with Landcare, promoting the fact that wildlife management can be integrated into most Landcare activities (DCLM 1999).

Eleven local councils in southeast Queensland also participate in a Land for Wildlife Scheme. To date the scheme has secured 325 agreements, covering 3,094 hectares. The scheme was initiated using NHT funding, and will continue to operate through council support (Bushcare 1999). Other states, including Tasmania and NSW, are also considering implementing a Land for Wildlife scheme (Binning & Young 1997).

Other voluntary membership schemes include friends groups (Young *et al.* 1996), which have the ability to raise significant community support. For example, nine 'Local Environmental Groups' have formed in the Manningham City Council area involving over 150 landholders. The groups originally formed out of concern over rabbit control but are proposing to extend their involvement to include other management issues (Manningham City Council 1999b).

3.3.2 Binding management agreements

Binding agreements include various forms of contracts that place enforceable obligations on a landholder. A covenant is a legal contract that binds landholders for a fixed period of time or in perpetuity and is registered on the land title. Entry into a covenant is voluntary, but once entered into, all future owners of the land are bound by the conditions of the original agreement (Industry Commission 1998). Statutory covenants are most commonly used in Australia (ANZECC 1996). These covenants prescribe both positive and negative actions, as opposed to common law covenants, that concentrate on negative or restrictive actions (Binning & Young 1997).

Whelan (1997) suggested that landholders are often reluctant to enter into covenants unless there is some sort of economic incentive, such as fencing assistance or a rate rebate. Often a rate rebate is small but it is acknowledges the landholder's contributions. Some agreements allow a landholder to develop a portion of their property in return for the conservation of the remainder.

The majority of Australian states offer some form of conservation agreements. In Victoria, the Trust For Nature had in place 230 covenants covering an area of over 6,500 hectares (Binning & Young 1997). In 1980, legislation was proclaimed in South Australia to provide for the conservation of natural and cultural values on privately owned properties (Wotton 1982). The South Australian Heritage Agreement was a covenanting system that provided for voluntary agreements that legally bind the state government and landholders. Incentives for landholders included rate rebates, fencing subsidies and management advice (Coates 1987). ANZECC (1996) concluded that the scheme was relatively unsuccessful, with only approximately 120 agreements registered (each covering an area less than 30 hectares), with clearing continuing at a rate of approximately 40,000 hectares per annum.

Statutory covenants in perpetuity, known as Heritage Agreements, are now used in South Australia. It was estimated that there have been 1,050 heritage agreements entered into (Binning & Young 1997). The cost of fencing is paid for in full by the Native Vegetation Fund (which has spent approximately $6 million on the Heritage Agreements). Landholders are also able to apply for addition funding. This assistance is limited to around $130,000 (Young, E. 1997).

New South Wales has in place Voluntary Conservation Agreements. These statutory covenants (created under the *National Parks and Wildlife Act 1974*) are attached to the title of the land, and bind future landholders. Landholders that enter into the agreements are able to apply for limited funding to carry out on groundwork. The funding is allocated by the NSW NPWS. The NPWS encourages local councils to provide rate rebates to landholders that enter into the conservation agreements. Binning & Young (1997) reported that there were 34 conservation agreements in place with a further 160 expressions of interest.

There are a number of different types of management agreements used in Victoria. Management agreements operated by the Trust For Nature encourage landholders to enter into covenants, which are binding in perpetuity. The costs of entering into covenants are covered by the Trust, however landholders are asked to donate $300 per property to fund ongoing monitoring. Binning & Young (1997) reported that there were 230 covenants covering 6,500 hectares of land.

Western Australia has in place a Remnant Vegetation Protection Scheme that assists landholders who volunteer to fence off RNV. The entire cost of fencing materials is covered by the scheme. The funding is accompanied by a 30-year covenant to protect and manage native vegetation. Binning & Young (1997) reported that under the scheme 1,094 agreements have been funded with over 38,000 hectares of RNV being protected at a cost of $2.25 million. Funding has been assured for 5 years at $900,000 per year (FORTECH 1997).

The Northern Territory has in place a system of perpetuity agreements under the *Territory Parks and Wildlife Act 1993*. Binning & Young (1997) reported that 11,000 hectares is protected under two covenants.

3.3.3 Farm forestry joint ventures

A joint venture is defined by Curtis & Race (1998, p. 16) as 'a legal arrangement between two or more parties to combine land, capital, management, and market opportunities for commercial treecrop production'. These arrangements have been primarily developed to reduce market uncertainties, an important factor in increasing the adoption rate of farm forestry. At 1997, Australia-wide joint ventures between growers and industry/government had enabled the establishment of 82,900 hectares (mostly since 1985). This represents approximately eight per cent of Australia's plantation resource (BRS 1997). A number of different types of joint venture agreements are discussed below and outlined in Table 3.

Table 3. Farm forestry agreements (Curtis & Race 1998)

Arrangement	Characteristics	Primary stakeholders
Lease joint venture	Regular payments to landholders. Industry own trees	Landholders and industry/government
Cropshare joint venture	Growers and industry share costs and returns proportionally	Growers and industry/government
Marketing joint venture	Growers own trees, industry offers sale at market price	Growers and industry/government
Cost recovery joint venture	Government initiates farm forestry development and seeks full/part-repayment when viable	Growers and government
Subsidy joint venture	Growers' establishment costs subsidised by government	Growers and government
Grower cooperatives	Aggregation of grower supplies - efficient purchasing for industry	Growers
Market brokers	Negotiate link (sales) between growers and industry	Growers and/or industry
On-farm processing	Exploiting niche markets and value adding may improve viability for growers	Growers

Lease joint ventures involve industry/government paying a lease to the landholder. They are used predominantly by small-scale growers, and offer landholders a reliable source of income, while allowing industry to control the quality and quantity of the timber being produced. Landholders are not required to learn extensive new silviculture skills. There have been a number of instances where such arrangements have been used throughout Australia. Since 1988, the use of lease agreements in southwest Western Australia has established 33,000 hectares of eucalyptus for pulpwood. Two large organisations, Bunnings and CALM offered lease joint ventures paying between $120-200/hectare (dependant on such things as the quality of the site, distance from the processor, and the area to be planted). A lease scheme for the production of eucalypt pulpwood was also established in 1995 by Midway Wood Products in southwest Victoria in 1995 (Curtis & Race 1998).

Cropshare joint ventures involve landholders and industry/government sharing the inputs and returns throughout the life of the tree crop. Landholders may choose to contribute the land only, but may also be involved in the establishment and management of the trees. Through the use of a cropshare scheme, Boral Timber Tasmania has established 5,000 hectares, meeting its goal of securing 25 to 30% of its future timber supply through joint ventures. In both Albury and Hobart, the Australian Paper Mills offer cropshare joint ventures for the production of softwoods. The scheme involved 45 properties, establishing 5,100 hectares of trees to be sold as sawlogs (Curtis & Race 1998).

Marketing joint ventures provide a guarantee of sale for the grower, generally at the market price at the time of harvest. This type of contract stipulates that the industry partner must be given first option to purchase, however, if a higher price exists, the grower may sell to another purchaser. Marketing joint ventures were offered by Primary Industries South Australia (PISA) on behalf of Kimberly-Clark Australia, and Mitsui Plantation Development Pty Ltd. The scheme was directed at the production of eucalypt pulpwood, and has established 4,000 hectares since 1989, averaging 600 hectares per year (Curtis & Race 1998).

Cost recovery joint ventures involve governments initiating farm forestry development and seeking full/part-repayment when viable. For example, in 1992 CALM began to operate the Oil Mallee joint venture in the cereal cropping regions of southwest WA. Although this region is not well suited to the existing forms of farm forestry, it was hoped that a viable eucalypt oil industry could be developed and expanded. By 1998, the scheme had attracted 250 landholders and 6,000 hectares had been established (Curtis & Race 1998).

Grant joint ventures subsidise tree establishment. An example of a grant joint venture is the DNRE scheme in which landholders must contribute $500 per hectare to the partnership, with DNRE organising the establishment of eucalypt hardwood sawlogs. DNRE are responsible for the management of the tree crop for the first 18 months, after which it retains no interest in the tree crop, and no claim to any financial returns. The intent of the scheme is to attract a sawlog processor to the region. The first year of the scheme, 1996-97, saw an area of 340 hectares established, with 600 hectares established in the second year (Curtis & Race 1998).

Joint venture programs are offered by State Forests of NSW. Landholders are able to enter into annuity agreements with the State Forests of NSW to encourage landholders to establish both hardwood and softwood plantations. The landholders provide land for the establishment of the plantation (at least 50 hectares for hardwood and at least 40 hectares for softwood). Further responsibilities are negotiable. The State Forests of NSW are able to prepare the site, plant and manage the trees, and market the treecrop (State Forests of NSW 2000c; State Forests of NSW 2000d). Any landholder inputs are recorded and taken into account (Greening Australia 1996). Landholders retain the title of the land and are paid on a regular basis for the life of the plantations (up to 30 years) (State Forests of NSW 2000c). In the first year of the project 53 landholders committed 1384 hectares to the project (AACM 1996). An additional $6 million was contributed by the NSW Government in 1993-94 to increase establishment rates (Greening Australia 1996).

3.3.4 Other management agreements

There are a number of other types of management agreements that can be used for the management of natural resources. Bonus development benefits allow landholders to develop a portion of their property in return for the conservation of the remainder (Bushcare 1999). Transition agreements are used by governments to secure the land use changes that result from a legislative change. A government may alter legislation that can be achieved using the management agreements. Usually this form of management agreement is accompanied by economic incentives to help the landholders meet the new standards set out in the legislation (Binning & Young 1997)

3.4 Education

It has been suggested by a number of authors (Price 1995; Alexander 1995; Nadolny *et al.* 1995; Siepen 1995; Wells 1995) that the continuing clearing of RNV on private properties can be attributed to lack of awareness of the importance of RNV. People are more likely to act in an environmentally responsible manner if they have a basic understanding of the issues relevant to them. Education can therefore be seen as a long-term strategy (Young *et al.* 1996). There has been considerable investment of resources over the two decades in awareness raising and education programs, including those carried out by Landcare groups. There is evidence that these activities have contributed to increased awareness and understanding of land management issues, and that these changes enhance landholder capacity to adopt best practice (Vanclay 1992; Curtis & De Lacy 1996). There is a link between concern about salinity and adoption of best practices (Curtis *et al.* 2000), suggesting an important role for community education activities that raise awareness of salinity impacts and increase understanding of the complex processes that contribute to land and water degradation. However, though most landholders already have a strong stewardship ethic, such attitudes are not linked to increased adoption of best practices (Curtis & De Lacy 1998).

Environmental programs can be used to encompass a very wide range of activities (field days, workshops, printed material, films and so on) spanning all levels of government. Federal and state governments are generally responsible for wide ranging approaches, whereas local governments are more involved with implementing programs specific to their local area. There are also joint-agreements, such as the Saltwatch Program that involves over 300 Victorian schools, as well as environmental departments and local councils (DNRE 1997). Landcare has been effective in providing landholder education. Groups are involved in a variety of activities such as meetings, field days, farm walks and demonstration sites. Information is exchanged through educational and promotional activities such as tours, conferences, newsletters and field guides. An example of extension material used to assist landholders in the management of RNV are tool kits developed by the Environmental Studies Unit at Charles Sturt University, Bathurst. There are a range of kits aimed at assisting landholders with the assessment of RNV, fauna and waterways, and with the management and rehabilitation of degraded areas. The tool kits also address economics associated with the preservation and rehabilitation of RNV (Goldney & Wakefield 1996).

Regional agroforestry networks were developed in Victoria as a way of sharing and communicating knowledge. In 1996 there were twelve of these networks, each receiving the statewide newsletter *Agroforestry News*. This newsletter effectively informed 5,000 people of developments in farm forestry. In South Australia, PISA undertakes a number of multi-funded projects that act to educate landholders about various aspects of farm forestry. These include: *Converting Talk into Action* (encouraging growing and marketing wood collectively); *Healthy Wealthy Watersheds* (the integration of farm forestry into catchment management); and *Farm Tree Improvement Project* (farm tree selection project) (Greening Australia 1996).

Governments are providing resources for activities such as property management planning and community education and awareness programs about biodiversity. Property management planning is seen as being a valuable mechanism that has the potential to lead to greater appreciation by farmers of the need to protect and manage remnant native vegetation on farms (Slee 1998). The Farm Diversification Information Service is a Victorian government initiative that aims to provide information on new and emerging animal and plant industries. The service provides information about the production and marketing requirements and further industry contacts. There is also the Regional Marketing Network set up in Victoria to provide producer groups and regional processors with current and potential market information. It provides opportunity for local producers, processors and local government organisations to better utilise the research and extension services of DNRE (DNRE 1999c).

The Victorian government has implemented the Farm Tree$ Planning Service as a service provided through the State Private Forestry Strategy. The scheme aims to provide recommendations and assessment options for landholders that are interested in enhancing their

agricultural productivity through the establishment of commercial trees. It will allow landholders to make better informed decisions based on on-site evaluations of individual properties. A plan is produced that incorporates maps, recommendations, anticipated costs and possible returns. Landholders are under no obligation to invest even when that plan is prepared (VFF & DNRE 2000).

A large number of local governments also operate education programs. Manningham City Council operates property management courses that involve group tours examining examples of land management practices. The council also conducts private consultations with landholders on their properties, and conducts monthly flora and fauna courses that attract between 30-60 people (Bushcare 1999).

Ipswich City Council (Queensland) has in place information initiatives that include fact sheets and management seminars for landholders. The Council also provides landholders with assistance with such things as vegetation mapping and management (Bushcare 1999; Manningham City Council 1999a).

4. Conclusion

There are a wide range of policy instruments that can be used to manage natural resources on private property, including regulatory instruments (clearing regulations, zoning, subdivision, self-regulation), economic instruments (grants, taxation incentives, rate relief and rebates, environmental levies, acquisition of key sites, re-configuration of land use, revolving funds, market creation), management agreements (non-binding and binding, farm forestry, transition, unique site, bonus development benefits) and education. As each individual instrument has strengths and weaknesses, there is a need to use a mix of policy instruments to provide a flexible approach that can be adapted to suit individual needs.

The responsibilities of landholders, particularly in relation to a duty of care, need to be clearly established. All levels of government need to be involved in a coordinated approach to natural resource management on privately owned property. There is little consistency among many approaches used by various levels of government and among state governments (for example clearing regulations for RNV). The role that each level of government plays needs to be clearly defined, including how much decision making power should be devolved to the regional and local levels. Funding and cost sharing are crucial issues. We agree with Dore *et al* (1999, p. v) that:

> Perhaps the most important national challenge is to establish secure – but experimental and evolving – institutional arrangements for NRM [natural resource management], that extend beyond political and budgetary cycles. A paradigm shift is required that views government investment in NRM as a core element of government business requiring strong ongoing commitment, akin to health and education. To achieve this outcome there is an urgent need to clarify the criteria through which responsibilities for program management are allocated, shared or devolved between Commonwealth, State, Territory and Local governments and other regional or catchment based organisations.

The recently developed *National framework for the management and monitoring of Australia 's native vegetation* (ANZECC 2000) is a step in the right direction.

5. References

AACM International Pty. Ltd 1996 *Commercial farm forestry in Australia - development of a strategy framework.* Rural Industries Research and Development Corporation, Land and Water Resources Research and Development Corporation, and Forest and Wood Products Research and Development Corporation, Canberra.

Alexander, H. 1995 Factors promoting of reducing the maintenance of native vegetation on farms. In Price, P. (ed). *Socio-economic aspects maintaining native vegetation on agricultural land.* Land and Water Resources Research and Development Corporation, Canberra.

ANZECC 1996 *Nature conservation on private land: Commonwealth, state and territory legislation and programs - a report of the working group on nature conservation on private land prepared for the Australian and New Zealand environment and conservation council standing committee on conservation.* Australian Nature Conservation Agency, Canberra.

ANZECC 2000 *National framework for the management and monitoring of Australia 's native vegetation*. Environment Australia, Canberra.

Australian Greenhouse Office (AGO) 1999a *National emissions trading: issuing permits (Discussion Paper 2).* Australian Greenhouse Office, Canberra.

Australian Greenhouse Office 1999b *National emissions trading: establishing the boundaries (Discussion Paper 1).* Australian Greenhouse Office, Canberra.

Australian Greenhouse Office 1999c *National emissions trading: crediting the carbon (Discussion Paper 3).* Australian Greenhouse Office, Canberra.

Australian Greenhouse Office 1999d $400M abatement program takes shape. *Greenhouse News* 2(4).

Binning, C. and Young, M. 1997 *Motivating people: using management agreements to conserve remnant vegetation.* Environment Australia Biodiversity Group, Canberra.

Binning, C., Young, M. and Cripps, E. 1999 *Beyond roads, rates & rubbish: opportunities for local government to conserve native vegetation.*. Environment Australia Biodiversity Group, Canberra.

Bushcare. 1999 *Bushcare*. http://www.alga.com.au/bio2.htm#practical

Bureau of Resource Sciences (BRS). 1997 *National plantation inventory of Australia.* Commonwealth of Australia, Canberra.

Coates, A.M. (1987) *Management of native vegetation on farmland in the wheatbelt of Western Australia*. Department of Agriculture, Perth.

Cooloola Shire Council 1998 *Cooloola conservation strategy - rates relief scheme information sheet.* Cooloola Shire Council, Cooloola.

Council of Australian Governments 1992 *National strategy for ecologically sustainable development.* AGPS, Canberra.

Cox, S. and Giddings, J. 1997 *Irrigation incentives*. http://www.agric.nsw.gov.au /Past/WDN/August_1997/Story4.html

Curtis, A. and De Lacy, T. 1996. Landcare in Australia: does it make a difference. *Journal of Environmental Management* 46: 119-137.

Curtis, A. and De Lacy, T. 1998. Landcare, stewardship and sustainable agriculture in Australia. *Environmental Values* 7: 59-78.

Curtis, A. and Race, D. 1998 *Links between farm forestry growers & the wood processing industry: lessons from the Green Triangle, Tasmania and Western Australia.* Rural Industries Research and Development Corporation, Canberra.

Curtis, A., MacKay, J., Van Nouhuys, M., Lockwood, M., Byron, I. and Graham, M. 2000 *Exploring landholder willingness and capacity to manage dryland salinity: the Goulburn Broken Catchment.* Johnstone Centre, Charles Sturt University, Albury.

Department of Conservation and Land Management 1999 *Land for Wildlife - how you can help wildlife on private and community-owned land*. Department of Conservation and Land Management, Perth.

Department of Land and Water Conservation (DLWC) 1998a *Native Vegetation Conservation Act: fact sheet No. 1.* DLWC, Sydney.

Department of Land and Water Conservation 1998b *Native Vegetation Conservation Act: fact sheet No. 3.* DLWC, Sydney.
Department of Natural Resources and Environment (DNRE) 1996 *Planning guidelines for native vegetation retention controls.* DNRE, Melbourne.
Department of Natural Resources and Environment 1997 *Managing Victoria's catchments - partnerships in action*. DNRE, Melbourne.
Department of Natural Resources and Environment 1999a *In sink with our future: replanting Victoria 2020 (Year 1)*. DNRE, Melbourne.
Department of Natural Resources and Environment 1999b *Farmer services in Victoria: quick reference guide*. http://www.nre.vic.gov.au/farming/services/quick.htm
Department of Natural Resources and Environment 2000a *Native vegetation: planning guidelines for native vegetation retention controls*. http://www.nre.vic.gov.au/4A2567D0024CB2
Department of Natural Resources and Environment 2000b *Restoring our catchments: Victoria's draft native vegetation management framework.* DNRE, Melbourne.
Department of Natural Resources and Environment 2000c *Land for Wildlife*. http://www.nre.vic.gov.au/4A25676D00283C7
Dore, J., Binning, C. and Hayes, G. (1999) Native vegetation national overview: States/Territories/Commonwealth stocktake of native vegetation management Department of Environment and Heritage, Canberra.
Farrier, D. 1992 Legal regimes concerned with the regulation and management of native vegetation on freehold and crown leasehold land in the states and territories of Australia. In NSW Environmental Defenders Office, Farrier, D., Byron, N. and Australian Resource Assessment Commission (eds) *A review of the legislative and regulatory framework affecting forest management on private and leasehold lands.* Resource Assessment Commission, Canberra.
Farrier, D. (1995) Policy instruments for conserving biodiversity on private land. In Bradstock, R.A., Auld, T.D., Keith, D.A., Kingsford, R.T., Lunney, D. and Siversten, D.P. (eds) *Conserving biodiversity: threats and solutions*. Surrey Beatty & Sons, Sydney.
FORTECH 1997 *Review of vegetation programs 1989-1995.* Environment Australia, Canberra.
Goldney, D. and Wakefield, S. 1996 *A landholder's guide to bushland assessment: kit 1*. Charles Sturt University, Bathurst.
Government of South Australia. 1995 *Guide to the Native Vegetation Act: how it affects rural land owners.* South Australian Department of Environment and Natural Resources, Adelaide.
Greening Australia 1996 *Farm forestry in Australia: integrating commercial & conservation benefits.* Greening Australia, Canberra.
Hodge, I. 1991 Incentive policies and the rural environment. *Journal of Rural Studies* 7 (4): 373-384.
Industry Commission 1998 *A full repairing lease: inquiry into ecologically sustainable land management.* Industry Commission, Canberra.
Izmir, G. 1996 Tax and levies as instruments for environmental policy. In *Taxation and the environment.* Department of the Environment, Sport and Territories, Canberra.
James, D. 1997 *Environmental incentives: Australia's experience with economic instruments for environmental management.* Environment Australia, Canberra.
Land and Water News (LAWN) 1999 *Land and water news: an independent, monthly news round-up.* 3(11) December 6.
Land and Water News 2000a *Land and water news: an independent, monthly news round-up.* 4(1) February 7.
Land and Water News 2000b *Land and water news: an independent, monthly news round-up.* 4(1) March 13.
Lockwood, M. and Walpole, S. (1999a) *Benefit cost analysis of remnant native vegetation conservation*. Johnstone Centre Report No. 130. Johnstone Centre, Albury.
Lockwood, M. and Walpole, S. (1999b) *A revised incentive policy for remnant vegetation conservation*. Johnstone Centre Report No. 131. Johnstone Centre, Albury.
Manningham City Council. 1999a *Local Environment Assistance Fund - learning to love remnants.* Manningham City Council, Doncaster.

Manningham City Council 1999b The hard work pays off. Save Our Species: *L.E.A.F Newsletter* 1(1).

McLeod, J. 1997 A rural rebate to recognise Landcare. In *Environs Australia 1997 yearbook*. http://www.peg.apc.org/~councilnet/clnet/yearbook97/ch13.3.html

Miles, C.A., Lockwood, M. and Walpole, S. 1998 *Incentive policies for remnant vegetation conservation.* Johnstone Centre: Report No 108. Johnstone Centre, Albury.

Nadolny, C., Burrows, W.H., Pickard, J. and Hannam, I. 1991 Tree clearing in Australia. *Search* 22 (2): 43-52.

Norgaard, R.B. 1997 Economic instruments for achieving environmental goals. In *Environmental economics round table proceedings.* Environmental Economics Research Paper No. 6. Environment Australia, Canberra.

Peterson, D. 1995 The Landcare taxation provisions- some issues. In Australian Bureau of Agricultural Resource Economics (ABARE) (eds). *Outlook 95.* ABARE, Canberra.

Platt, S.J. and Ahern, L.D. 1995 Nature conservation on private land in Victoria, Australia the role of Land for Wildlife. In Saunders, D.A., Craig, J.L. & Mattiske, E.M. (eds) *Nature conservation 4: the role of networks.* Surrey Beatty & Sons, Sydney.

Price, P. 1995 *Socio-economic aspects maintaining native vegetation on agricultural land.* Land and Water Resources Research and Development Corporation, Canberra.

Rae, J. 1997 Economic instruments for environmental protection. In *Environmental economics round table proceedings.* Environmental Economics Research Paper No. 6. Environment Australia, Canberra.

Rural Industries Research and Development Corporation (RIRDC) 1999 *Agroforestry and farm forestry*. Publication No. 99/164. RIRDC, Canberra.

Siepen, G. 1995 Factors promoting of reducing the maintenance of native vegetation on farms in Queensland. In Price, P. (ed) *Socio-economic aspects maintaining native vegetation on agricultural land.* Land and Water Resources Research and Development Corporation, Canberra.

Shepparton Irrigation Region Sustainable Regional Development Board (SIRSRDB) 1995 *Land Protection Incentive Scheme*. http://www.sirsrdb.vic.gov.au/html/land_protection .html

Shire of Serpentine-Jarrahdale 1994 *Shire of Serpentine-Jarrahdale rural strategy.* Shire of Serpentine-Jarrahdale, Western Australia.

Slee, D. and Associates (1998) *Remnant native vegetation – perceptions and policies: a review of legislation and incentive programs.* Environment Australia, Canberra.

State Forests of New South Wales 1999 *Forest facts - planted forests*. State Forests of New South Wales, Sydney.

State Forests of New South Wales 2000a *Forest facts - growing trees for carbon credits*. State Forests of New South Wales, Sydney.

State Forests of New South Wales 2000b *Forest facts - salinity control credits*. State Forests of New South Wales, Sydney.

State Forests of New South Wales 2000c *Forest facts - hardwood plantations on your property*. State Forests of New South Wales, Sydney.

State Forests of New South Wales 2000d *Forest facts - softwood plantations on your property*. State Forests of New South Wales, Sydney.

Tasmanian Public Land Use Commission (1996) *Inquiry into areas to be reserved under the Tasmanian-Commonwealth Regional Forest Agreement: background report part F - mechanisms for achieving conservation management on private forested land: a discussion paper*. Tasmanian Public Land Use Commission, Hobart.

Thorman, R. 1997 The Landcare-local government link. In *Environs Australia 1997 yearbook*. http://www.peg.apc.org/~councilnet/clnet/yearbook97/ch13.1.html

Vanclay, F. 1992. The social context of farmers' adoption of environmentally-sound farming practices. In Lawrence, G., Vanclay, F. and Furze, B. (eds) *Agriculture, environment and society*. Macmillan, Melbourne.

Victorian Farmers Federation & the Department of Natural Resources and Environment 2000 *Farm$mart update: your farming future*. VFF & DNRE, Melbourne

Virtual Consulting Group (VCG) 2000 *Enhancing institutional support for the management of dryland salinity: a discussion paper*. VCG, Albury.

Wells, P. 1995 Factors promoting of reducing the maintenance of native vegetation on farms in Tasmania. In Price, P. (ed) *Socio-economic aspects maintaining native vegetation on agricultural land.* Land and Water Resources Research and development Corporation, Canberra.

Whelan, B. 1997 Discussant. In *Environmental economics round table proceedings.* Environmental Economics Research Paper No. 6. Environment Australia, Canberra.

Wotton, D.C. 1982 South Australian heritage agreements and their role in nature protection. *Heritage Australia*, 1(1): 14-15.

Young, E 1997 *Use of covenants in off-park conservation in South Australia.* Unpublished paper, Department of Environmental and Natural Resources, Adelaide.

Young, M.D. 1996 Mixing instruments and institutional arrangements for optimal biodiversity conservation. In *OECD international conference on incentive measures for biodiversity conservation and sustainable use.* OECD, Paris.

Young, M.D. 1997 Mining or minding: opportunities for Australia to improve conservation of remnant vegetation and to alleviate land degradation. In *Environmental economics round table proceedings.* Environmental Economics Research Paper No. 6. Environment Australia, Canberra.

Young, M.D., Gunningham, N., Elix, J., Lambert, J., Howard, B., Grabosky, P. and McCrone, E. 1996 *Reimbursing the future.* Biodiversity Series, Paper No. 9, Biodiversity Unit, Department of the Environment, Sport and Territories, Canberra.

Personal Communications

Braslis, Eric, City of Greater Shepparton, February 2000.

Brownstein, Linda, Local Government Catchment Project, Shire of Strathbogie, July 1999.

Cotter, Mark, The Department of Natural Resources and Environment, Benalla, February 2000.

Del Marco, Andrew, Environmental Officer, Shire of Serpentine-Jarrahdale, January 2000.

Gordon, Mark, Natural Systems and Wildlife Management Conservation Officer, Johnstone Shire Council, November 1999.