

Agri-environmental conservation – the case for an environmental levy

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Recent environmental assessments have highlighted the extent of land degradation in Australia and the significant costs involved in addressing it. With projected investment costs running into tens of billions of dollars, it is not surprising that greater attention is now being focussed on who should pay. One idea gathering significant momentum has been the imposition of an environmental levy. Such a levy would raise public funds to be spent on resource degradation issues and has been proposed to work through the taxation system in a similar fashion to the Medicare levy, albeit for a more limited 10 year period.

The paper assesses the arguments behind the imposition of an environmental levy and considers some of the issues associated with its effective implementation. Particular challenges in the establishment of environmental priorities, public and private attributes of environmental problems and the institutional arrangements for levy collection and management are identified and discussed.

Keywords: Environment, cost-sharing, property rights

1. Introduction

The use and management of natural resources has been an issue of growing concern in Australia over a long period of time. Rising community expectations about the management of resources has been underpinned by greater resource scarcity relative to demands with conflicts resulting between resource users.

More recent concerns about resource use have been further fuelled by increasing evidence of the extent of natural resource degradation in Australia. Key issues include soil erosion, soil acidity, dryland salinity, loss of native vegetation and biodiversity, falling water quality and declines in the environmental health of rivers and groundwater aquifers. The cost of three major types of soil degradation (salinity, sodicity and acidity), have been estimated to be \$2.4b annually (CRC for Soil and Land Management 1999).

The National Farmers Federation (NFF) and the Australian Conservation Foundation (ACF) recently commissioned a study, commonly known as the ‘Repairing the Country’ report¹, on the scale of investment required to arrest the trend of degradation. The findings suggest a total investment in the order of \$65 billion would be required with around \$37 billion being sought from the public sector². With around 65 per cent of Australia’s land mass in private hands, a large proportion of the proposed funding would be directed towards changing agricultural land uses and adopting more sustainable management practices. The use of public funds in this way is consistent with the concerns expressed by the agricultural sector about the erosion of agricultural property rights and the need to more equitably share the costs of agri-environmental conservation between landholders and the general community (so called ‘environmental equity’).

With the prospect of such a large injection of public funds into environmental management, environmental and farming groups have rallied behind calls to establish a new environmental levy. The concept has also been welcomed by Toyne and Farley³ (2000) in their review of the ‘Decade of Landcare’, the recently formed Wentworth Group of Concerned Scientists⁴ and is identified as an initiative worthy of further evaluation in the recommendations of the Standing Committee Inquiry into Catchment Management.

The need for a special purpose levy is based on an assessment that such a significant increase in the funding of environmental issues is outside the scope of existing government budgets and beyond the level of agri-environmental conservation which could reasonably be expected of landholders. It is proposed that the levy would operate through the general taxation system in a similar fashion to the Medicare levy. Toyne and Farley support a 1 per cent Landcare Tax which they estimate would raise around \$30 billion over 10 years.

¹ Virtual Consulting Group & Griffin NRM Pty Ltd (2000), ‘An Investment Scenario’, for National Farmers Federation and Australian Conservation Federation with the assistance of LWRRDC.

² Other projections on the costs of fixing our environmental woes are similarly large. For example, the Commonwealth Treasury Secretary, Mr Ted Evans estimated the cost of repairing the Murray-Darling basin to be at least \$30 billion (House of Representatives Catchment Management Inquiry 2000).

³ Phillip Toyne and Rick Farley formed the original strategic alliance between NFF and ACF which successfully secured funding for Landcare in 1989.

The objective of this paper is to shed some light on the arguments behind the calls for increased environmental funding. The next section of the paper provides an overview of the involvement of government in natural resource management. The two principle reasons promoted for an environmental levy, the increasing costs of degradation and the need for environmental equity, are discussed in Sections 3 and 4, respectively. Section 5 raises some issues in considering whether an environmental levy is an appropriate way to raise funds for environmental priorities while the last section draws together some conclusions.

2. Government involvement in NRM issues

2.1 Government responses

Long standing problems with the use of natural resources have resulted in governments taking an increasing role in their management. A large proportion of government involvement in natural resources comes from State governments because constitutional responsibility for natural resource management (including land and water resources and environmental protection) resides with States. However, the Commonwealth also has a significant influence through its broad ranging responsibilities (international agreements on environmental issues, taxation and trade) and its direct involvement in funding and coordinating major national programs. Governments have attempted to address resource management problems through a range of policies and programs which can be generally categorised as either regulatory, market based or of an information nature.

In many instances, governments have initially adopted legislative and regulatory approaches to pursue environmental objectives. The Productivity Commission's Inquiry into Ecologically Sustainable Land Management noted the large and growing volume of both Commonwealth and State regulation affecting rural land use in Australia. While regulatory approaches have had some success in meeting environmental objectives, they can impose significant costs on particular sectors of the economy because of their lack of flexibility.

At the other end of the policy spectrum lie persuasion and voluntary approaches based around improving awareness of environmental issues. Some of this can be seen through major research programs (Land and Water Australia and MDBC) and community based programs which have education as a major element of their strategy (Landcare).

Governments have also pursued environmental objectives through economic instruments. These are often categorised as either price or quantity based. Price based approaches influence environmental outcomes by modifying prices through charges and taxes, subsidies (eg. taxation concessions for land care). Quantity based instruments often involve the establishment of new rights (eg. cap and trade schemes). Economic instruments operate by changing private incentives to better align private and public interests and are being increasingly looked at by governments because of the flexibility they provide and the incentives they provide for ongoing innovation.

2.2 Levels of funding

An increasing amount of public and private resources is being committed to environmental issues. According to ABS (1998) Governments, industry and households in Australia spent an estimated \$7.9 billion in 1995-96 on measures to protect the environment, up from \$6.6 billion in 1992-93. Total environment protection expenditure represented 1.6 per cent of GDP. The public sector accounted for approximately half (\$3.8 billion) of total environmental protection in 1995-96 with major expenditure on protection of biodiversity and landscape (\$695 million).

The public funding of environmental issues has increased in recent years with Commonwealth, State and local governments spending billions of dollars on environmental and natural resource management programs. Some examples include:

- National Landcare Program – during the 1990's (the 'Decade of Landcare'), expenditure amounted to over \$1 billion with a primary focus on the restoration of degraded lands;
- The Natural Heritage Trust program – involved the expenditure of \$1.5 billion between 1997 and 2002 with a further \$1 billion budgeted for an extension of the program over the next 5 years;
- The National Action Plan for Salinity and Water Quality – a program funded jointly by the States and the Commonwealth with an allocation of \$1.4 billion over the next 5 years.

In addition to these major programs, all levels of government make significant contributions in the form of ongoing environmental programs and initiatives. For example, ABS (2000) estimate that local government alone contributed \$3.5 billion on environment related activities in 1998-99.

3. Economic efficiency aspects - the significance of environmental problems

3.1 Lomborg's litany

Bjorn Lomborg's well publicised book *The Skeptical Environmentalist: Measuring the Real State of the World*, has attracted widespread debate on the significance of environmental problems. A key theme within the book is what Lomborg describes as the 'litany of our ever deteriorating environment'. He suggests that our understanding of the real state of the environment has been massively skewed by environmental advocates and scientists to the extent that we seldom question exaggerated claims of environmental degradation and impending disasters. Lomborg writes:

This understanding of the environment is all pervasive. We are all familiar with the litany: the environment is in poor shape, our resources are running out; the population is ever growing, leaving less to eat; the air and water are becoming more polluted; the planets species are becoming extinct in vast numbers We know the litany and have heard it so often that yet another repetition is, well, almost reassuring. There is just one problem: it does not seem to be backed up by the available evidence (p 4).

The extent of any such litany in respect to environmental issues in Australia is significant as the perception of problems ultimately drives decisions in the political arena. In the light of Lomborg's observations, it may be desirable to review general perceptions of the significance of degradation against evidence of the extent of degradation in Australia. Certainly, there appears to be no shortage of claims about an impending crisis in the state of our natural resources in Australia. Evidence of these views can be readily found in publications across environmental lobby groups, environmental scientists and politicians alike. The following serve as examples:

For years ACF has been warning that Australia is losing the battle to save our rivers, soils, species and natural places, that salinity is getting out of control, and the cost of this environmental degradation – now and into the future – is unacceptable (ACF 2001).

Our land management practices over the past 200 years have left a landscape in which freshwater rivers are choking with sand, where topsoil is being blown into the Tasman Sea, where salt is destroying rivers and land like a cancer, and where many of our native plants and animals are heading for extinction (Wentworth Group of Concerned Scientists 2002).

There is little doubt that Australia faces an environmental crisis. There is also little doubt that the consequences of failing to act in an appropriate way will be crippling to our society and our economy (House of Representatives Standing Committee on Environment and Heritage. 2001).

Australian scorecard

The most recent and comprehensive data on the extent of degradation in Australia is available through the National Land and Water Resources Audit (NLWRA)⁵. Whilst there are deficiencies in terms of trend data, the comprehensive nature of the NLWRA should provide a much better basis for making decisions about environmental priorities in the future. Importantly, it provides a more independent and less emotive account of the state of the environment than that reflected in the statements given above. Current findings suggest a mixture of good and bad news:

- *Australia's agricultural landscapes have doubled in biological productivity since European settlement;*
- *Cropping systems have delivered substantial gains in productivity;*
- *Riverbank erosion is widespread in agricultural landscapes;*
- *Salinity will continue to degrade rural and urban landscapes;*
- *Soil erosion and in-stream turbidity are clearly major issues for eastern Australia;*
- *Nearly half of Australia's subregions are in excellent environmental health, presenting opportunities for protective management (NLWRA 2002, A program of the Natural Heritage Trust, 'Australia's Natural Resources 1997 – 2002 and beyond').*

The implication of these findings is that we should be sceptical of rhetoric which suggest that trends in the state of natural resources are all bad or that the environment is 'going down the gurgler'. This is not to say that the current state of natural resources is acceptable to the community. However, it does suggest we should avoid placing too much emphasis on broad statements about the state of the environment. From a public policy perspective, the acceptance of an overwhelmingly pessimistic view of the state of the environment is likely to divert the allocation of resources from other areas of the economy and trigger a range of possibly inappropriate policy responses.

A tendency to over exaggerate the extent of problems is not an issue confined to the environmental sector. The general public and special interest groups make claims about the significance of problems and hence the inadequacy of resourcing across most areas of government involvement. What differentiates the environmental issue is the bipartisan concern and strength of feeling that people have on the issue. Lomborg argues:

*In the same way as you can only be **for** peace and freedom and **against** hunger and destruction, it is impossible to be anything but **for** the environment. But this has given the environment debate a peculiar status. Over the past few decades there has been an increasing fusion of truth and good intentions in the environmental debate. Not only are we familiar with the litany, and know it to be true. We also know that anyone who claims anything else must have disturbingly evil intentions (pg 32).*

⁵ This is a Commonwealth Government program funded over five years to provide a comprehensive assessment of the state of Australia's natural resource base.

The potential biases in information presented to us on the environment stress the importance of having good information about the state of the environment and trying to be objective in assessing policy options. There should be little argument from economists on this point. Lomborg stresses the importance of not placing too much confidence on the views of environmental lobbyists and suggests that we should ‘strive for a careful democratic check on the environmental debate, by knowing the real state of the world – having knowledge of the most important facts and connections in the essential areas of our world’.

Despite having good processes in place for the reporting of the state of natural resources, some care needs to be taken in the communication of key messages. For example, the 2001 State of the Environment Report refers to problems with land clearing by stating that ‘the rate of land clearance has accelerated, with as much cleared during the last 50 years as in the 150 years before’ (ASEC 2001, pg 7). Information from the Australian Bureau of Statistics (ABS) on clearing rates is given in Table 1.

Table 1: Native vegetation clearance rates⁶

Period	Average annual clearance rate (ha)
1971 to 1980	1,465,153
1981 to 1990	550,567
1991 to 1999	380,897

The statement within the report is not incorrect but it conveys a misleading picture that clearing rates are increasing whereas rates have actually fallen in each 10-year period over the last 30 years. This is not to say that the current rate of clearing is acceptable or desirable, but it does illustrate a long term downward trend not an upward trend.

The importance of having accurate information on the state of the environment is important because funding decisions can become highly politicised. This political aspect can be seen in the writings of Toyne and Farley (2000) in their review of Landcare when they suggest that ‘there is a political imperative to maximise the number of projects funded across the country so that as many voters as possible can see where their Telstra dollars have gone’ (cited in Edwards and Byron 2001). The ambit nature of claims for environmental funding are also evident in the preface to Toyne and Farleys report written by Clive Hamilton of the Australian Institute. Reference is made to the meeting held between the Prime Minister, Farley and Toyne in 1989 which approved \$340 million of Landcare funding over 10 years. Farley is quoted as saying immediately after the meeting; ‘Damn, I knew we should have asked for a billion’.

3.2 Is degradation an economic problem ?

Some economic reasons for degradation

The economic causes of degradation are well documented (see Industry Commission 1998, Chisholm 1987, Kirby and Blythe 1987). A central theme lies in the characteristics of natural resources which results in them being more susceptible to misuse through the existence of market failure. Private markets can fail to allocate environmental resources efficiently because such resources often exhibit the characteristics of non-rivalry and/or non-excludability. Non-rivalry refers to a situation where one

⁶ ABS (2002). ‘Year Book Australia 2002 - Australia's land resources - an overview’. The ABS broke down the 1991-99 period into two periods of 1991-95 and 1996-99. The clearance rates for these periods were 337,350 and 424,444 ha, respectively which suggest an increasing trend. The data have been aggregated to be consistent with the timescale of other data presented.

person's use of a good does not diminish another's, while non-excludability means that the use of the resource by others cannot be prevented.

These characteristics can lead to situations where decision makers do not experience the full costs or benefits of their actions, indicating a divergence between private and social outcomes (externalities). The same characteristics can also lead to the exclusion of public benefits (such as environmental amenity or the preservation of biodiversity) in private decisions because such values are not captured within conventional markets. In these circumstances, landholders are likely to underinvest in conservation activities because they are unable to fully capture the benefits.

Market failure can also arise from information problems. Often there is considerable uncertainty about the links between particular practices and land and water degradation. Poor information also acts as a barrier to landholders in ameliorating degradation and constrains the development and implementation of policies to prevent future land degradation. All of these problems suggest that the unrestricted operation of free markets can lead to socially unacceptable outcomes associated with the use of natural resources. The sources of market failure identified above provide a basic economic rationale for corrective government involvement⁷.

Government policies themselves have also been identified as contributors to the degradation of natural resources. Common examples cited include taxation incentives for land clearing, resource pricing subsidies (eg water pricing), input subsidies (eg fertiliser subsidies leading to increased soil acidification), agricultural price supports and drought policies⁸. With the exception of the latter, many of these arrangements have either been removed or their effects reduced through a process of policy reform.

Extent and costs of degradation

The nature and extent of land degradation has been a key issue for scientists and economists for some time. Indeed, Chisholm and Dumsday (1987) devoted a whole book to the problems of land degradation and potential policies to address it some 15 years ago. More recent contributions come from LWRDC (1998), Industry Commission (1998), and Mullen (2001).

The extent of land degradation in Australia is often discussed in terms of the area of land affected by particular problems, income lost as a result of degradation or the cost associated with repairing it. There are a number of estimates on the nature of these costs. One set of estimates of the extent and costs of degradation appear in Virtual Consulting et al (2000) and are included at Table 2.

Whilst degradation may be broadly attributed to market failure problems, the sheer existence of any level of degradation does not necessarily imply that market failures exist. Put another way, the efficient level of land degradation is not necessarily zero. Most commentaries, and indeed much of the argument for increased public funding of environmental issues, is based on the assumption that the existence of land degradation is itself a sufficient condition for government intervention.

Assuming there is market failure, its form and extent notwithstanding, the next question is how can governments intervene to efficiently address the problem? Whilst information on the level or cost of degradation is important in understanding of the extent of our environmental problems (as discussed above), it is not sufficient for determining what we should do about them. Neither the area of resource

⁷ The existence of market failure provides a necessary but not sufficient condition for government intervention given that such intervention is not costless and that possible regulatory failure can generate inefficiencies beyond that of the market.

⁸ Some authors have noted the potential for transport subsidies to discourage de-stocking during drought periods with adverse environmental impacts (see Edwards, Chisholm and Dumsday 1995)

degradation nor the estimated costs of that degradation inform us about whether the problem can be efficiently addressed.

Table 2: Cost estimates of land and water degradation

Form of degradation	Estimate (\$ million per year)
Salinity	270
Acid soils	300
Sodic soils or structural decline	200
Erosion	80
Irrigation salinity	65
Water quality	450
Total	1,365

Source: Virtual Consulting Group & Griffin NRM Pty Ltd (2000), 'An Investment Scenario', for National Farmers Federation and Australian Conservation Federation with the assistance of LWRRDC.

Assessing the efficiency of increasing public funding of environmental issues requires a forward rather than a backward looking approach. We need to focus on the marginal social benefits from addressing a particular degradation problem relative to the marginal social costs. In contemplating such a task, we should recognise that the sum of public and private benefits from some conservation or environmental protection initiatives may not exceed their costs. In a similar way, we would not expect that a range of public infrastructure projects in other areas, no matter how well intentioned, represented efficient economic investments.

We should also be aware that the nature of the benefits which might arise from the implementation of environmental improvements may be quite difficult to value. In these instances, a pragmatic approach may be to undertake a cost effectiveness analysis of options proposed to address the environmental issue. Similarly, given the potential for political involvement in the allocation of environmental funds, the economist's role may be reduced to one of evaluating how to best allocate the funds across conservation works rather than assessing the merits of the allocation itself.

3.3 Returns from past and proposed environmental expenditure

Past expenditure

A pertinent issue in relation to the expenditure of additional funding for the environment is the level of returns from existing programs. There is a general lack of independent information on this important issue. Bardsley, Chaudri and Stoneham (2001) note that while governments have allocated enormous amounts of funding to environmental concerns there has been little accountability to the public purse on the effectiveness of policies implemented.

Whilst there is little in terms of independent reviews, there is considerable anecdotal evidence of poor returns from programs like NHT and Landcare. For example, the ACF suggest that the NHT program has 'squandered public money and wasted community effort by operating a poorly coordinated grants program rather than a strategic investment program'. Pannell notes that 'the momentum behind ever increasing salinity budgets appears to be irresistible. We need to start spending the money sensibly so

that the new money is not spent as unproductively as the old money'. There appears to be support for the view that NHT has resulted in a large number of small projects being funded with little overall effect. A further question is therefore - if we have difficulty in efficiently investing relatively scarce amounts of funds to environmental issues (eg less than \$2 billion) then what is the probability of spending the proposed \$37 billion in an efficient way?

Proposed environmental expenditure

The findings of the Repairing the Country report (Virtual Consulting et al 2000) estimated that a total investment in the order of \$65 billion would be required to address land degradation with \$37 billion coming from the public sector. The potential returns from environmental expenditure ultimately depend on where the funds are allocated. Table 3 summarises the allocation of funds to particular areas as detailed in the Repairing the Country report.

Table 3: The management changes and investment required to meet national targets

Area of investment	Scale	Total (\$ million) over ten years	Public investment (\$ million) over ten years
Salinity:			
- Small-lot forestry	2.1 million hectares	3100	1.6 (50%)
- Plantation forestry	14.6 million hectares	22000	11 (50%)
- Non-commercial or biodiversity plantings	4.2 million hectares	8400	7.1 (85%)
- Perennial pastures	26 million hectares	4500	900 (20%)
- Fencing	2.4 million kilometres	5500	1.8 (33%)
- Other		2800	1.4 (50%)
Salinity subtotal		46000	24,000
Erosion and soil structure decline		2200	1.2 (55%)
Soil acidification		1200	122 (10%)
Biodiversity protection	2.4 million hectares	5200	4.4 (85%)
Acid sulphate soils		88	69 (78%)
Riparian zone protection		1500	718 (49%)
Land clearing controls implementation		600	600 (100%)
Rangeland retirement for biodiversity		722	722 (100%)
Environmental weed control		100	40 (40%)
Environmental flows		150	150 (100%)
Irrigation drainage control and improved practices		200	60 (30%)
Management of the change		1800	1.7 (93%)
Total capital investment required		60,000	34,000
Annual maintenance requirement		519	321 (62%)

The most significant feature of the allocation is the significant component of funds directed at salinity management (\$46 out of \$65 billion). Recent work on salinity suggests problems in the identification of profitable solutions to salinity problems because many treatments are only partially effective, slow to take effect and expensive (Pannell 2001).

There also appears to be less convincing evidence about the magnitude of externalities of salinity. Revegetation of areas of catchments has also been demonstrated to have an adverse effect on catchment yields leading to a reduction in stream flows (Heaney, Beare and Bell 2000). Combining

these findings with the estimated annual agricultural costs of salinity (eg \$270 million annually), suggests that the broader environmental benefits from salinity control (biodiversity etc) would need to be large for such a plan to be in the community's interest.

Despite some shortcomings, it should be acknowledged that the Repairing the Country report is, at the very least, a step in the right direction as it considers both the benefits and costs of addressing degradation, albeit at a scale which is too broad to be of much practical use.

3.4 Challenges to efficient investment

Uncertainty

Much of land degradation in Australia is geographically diffuse. Commonly, this makes degradation both difficult to accurately measure and difficult to assign to individuals. Physical complexities associated with land degradation processes, including interactions with climatic conditions, suggest that certainty in causes and effects is likely to be the exception rather than the norm. This poses major challenges for efficient investment in addressing existing and preventing further land and water degradation. Natural resource management problems are significantly different to many conventional policy problems due to temporal and spatial scales, pervasive uncertainty, complexity and cross problem connectivity (Dovers 2000). Many reports gloss over the significance of such uncertainties. For example, the Wentworth Group seems overly optimistic about the ability of technical experts to identify standards for environmental management so we can make judgements about landholder responsibilities. Gleeson offers the following remarks:

The Wentworth Group, like many technically deterministic groups and individuals before it, is apparently sufficiently confident in our understanding of the biophysical features of our landscapes to assert that there are best practices that should be applied universally within and across catchments. Land managers applying these best practices would be exempt from economic costs. Such approaches do not account for the heterogeneity that exists in our landscapes, they constrain creativity and cycles of continuous learning and they stifle innovation. (Gleeson 2003, pg 2)

Institutional arrangements

The effectiveness of institutional arrangements to address natural resource management problems has been identified in a series of major reviews as a key issue of concern. For example, the Industry Commission (1998) concluded that there were problems with current institutional arrangements in terms of the limited devolution and capacity of local and regional institutions to deal with environmental problems and that there was poor coordination of responsibilities amongst agencies involved in environmental management. There are also concerns with the proliferation of environmental regulation across many jurisdictions. With the sheer volume of regulation governing land use, there would only be a limited number of landholders with a good understanding of their environmental responsibilities. Bardsley, Chaudri and Stoneham (2001) note that environmental policies have suffered common problems due to piecemeal approaches to the environmental landscape. These approaches have tended to consider particular environmental issues (biodiversity, water quality, dryland salinity etc) in isolation.

Potential for perverse outcomes

Some care should be taken in avoiding potential perverse outcomes from government intervention in resource management. For example, Chisholm (1992) has argued that subsidies aimed at conservation works can reduce the costs of ameliorating degradation and thus can increase the amount of land requiring such works. Hence, subsidies can inadvertently provide an incentive for farmers to adopt more intensive, and potentially more degrading, uses of land.

4. Public funding - environmental equity aspects

4.1 Perspectives on property rights

Part of the rationale for an environmental levy is based on a need to more equitably share the costs of agri-environmental conservation between landholders and the general community (so called ‘environmental equity’). NFF (2001) summarise the issue from their perspective in the following way.

Environmental protection and biodiversity conservation is a shared responsibility of all Australians – however Commonwealth and State legislation imposes much of the cost of conservation directly on farmers. Farmers’ property rights are often reduced or impaired to achieve a community benefit, at not cost to the wider community. Farmers should not be expected to foot the total bill for public good outcomes which benefit the broader community (NFF 2001).

This issue is directly concerned with the nature of agricultural property rights. The changing nature of property rights has been a source of conflict in recent times. The nature of changes was explored in the course of the recent House of Representatives Standing Committee Inquiry into the effects of public good conservation measures.

Over the past two decades, the laws governing land use in all jurisdictions have changed markedly. Practices formerly encouraged, subsidised and often made a condition of becoming a landholder are now prohibited...many landholders consider that the practices, that they were permitted or required to do when taking up the management of land conferred upon them rights to act in certain ways...that they constitute a type of property right.

Contemporary debate in Australia about property rights has featured terms like ‘cost sharing’, ‘a duty of care for the environment’ and ‘ecosystem services’. The meanings of each of these terms is explored below.

Cost sharing

Cost sharing, or investment sharing⁹, is increasingly being found in State and Commonwealth environmental policies. Part of this focus is explained by increasing recognition of the public and private outcomes from conservation activities, combined with limited government budgets to address environmental problems. Investment sharing arrangements are a way in which landholders can be encouraged to provide public goods, which they may have little incentive to provide in the absence of such arrangements.

Recent development of these principles can be found in Murray-Darling Basin Commission (1996) and SCARM (1998). Marshall (1998) reviews the consistency of cost sharing principles with economic efficiency, whilst the Productivity Commission (2001) looks at economic issues associated with applying cost sharing to bio-diversity conservation. Cost sharing is relevant to discussions about property rights because any agreed sharing implicitly makes judgements about rights and responsibilities in environmental management.

Cost sharing often makes reference to two key principles, the Polluter Pays Principle (PPP) and the Beneficiary Pays Principle (BPP). Under the PPP, landholders who cause degradation of land and water resources pay to alleviate and manage the problem in proportion to their contribution to the cost

⁹ (SCARM 1998) refer to cost sharing as investment sharing because it gives greater recognition of contributions to resource management beyond financial costs and broadens the focus to activities that cannot be appropriately thought of as on-ground works.

of the problem (MDBC, 1996). SCARM (1998) notes that 'where polluters or impactors can be identified, the full cost of the impact prevention and control attributable to them, including the cost of required activities, should be born by them'.

The PPP is broadly consistent with economic efficiency in that polluters are forced to incorporate the costs of any environmentally degrading practice (externality) into their decisions. There is some support for the PPP based on the concept of 'equity' or 'fairness'. The PPP can be considered an equitable approach in that those who benefit from environmental degradation are required to bear the social costs of their actions (Productivity Commission, 2001). A particular problem with the application of the PPP is the existence of degradation rising from past activities. This is raised particularly as an issue in the context of Australian agriculture in that some degradation problems can be related to policy settings. It is difficult to mount an argument either on efficiency or equity grounds to support use of the PPP to past practices. Generally these would be treated as sunk costs and therefore irrelevant for future planning.

The Beneficiary Pays Principle (BPP) on the other hand implies that anyone who derives an indirect or intangible benefit (eg enhancement of bio-diversity or aesthetics) from an activity should contribute to its cost. Governments have generally supported a slightly different version of the BPP by including a sufficiency condition. This essentially involves assessing whether or not there could be sufficient private benefits to make the investment worthwhile from the landholders perspective. Governments need only invest an amount which is sufficient to trigger private investment. This is consistent with Hussey's (1996) assertions that public benefits should free ride on private benefits to the greatest extent possible.

Whilst cost sharing arrangements have been developed between landholders and governments over agri-environmental conservation works in some instances, the approach suffers from the problems of asymmetric information. This problem makes negotiations difficult because both parties have hidden information. Landholders have information on the marginal costs of conservation measures whilst governments have information on the marginal benefits from environmental improvements. Asymmetric information limits the potential for efficient markets because it is hazardous to do business with someone who has relevant but hidden information (Bardsley, Chaudri and Stoneham 2001).

Duty of care

A duty of care¹⁰ for the environment has been widely supported across industry and government (see Industry Commission 1998, SCARM 1998, National Farmers Federation 2001) and has been recently introduced into legislation in four States. Arguments put forward in support of an environmental duty of care include its potential to cover gaps in existing specific environmental legislation, the simplification and integration of existing environmental protection legislation and its focus on environmental performance rather than prescription (assuming that voluntary standards and codes are developed under the duty of care framework). Acceptance of a duty of care from a policy perspective can be found in SCARM (1998) which concluded that:

all natural resource users and managers have a duty of care to take all fair and reasonable measures to ensure that they do not damage the natural resource base (and that) users should be responsible for making good any damages incurred as a result of their actions.

¹⁰ A duty of care for the environment extends common law in that common law does not recognise that any duty of care may be afforded to the environment *per se*. The common law can only protect the environment to the extent that legal liabilities for impacts on persons or property arise from some environmental harm (Bates, 2001).

Defining damage as well as linkages to action and where the duty of care lies are central to any discussion of payments for agri-environmental conservation. The duty of care marks the threshold point at which landholders may be required to meet environmental responsibilities and beyond which they could be deemed as providing some form of public conservation. While this has merit it is not clear how governments and landholders could use the concept in a meaningful way to negotiate the funding of agri-environmental conservation. It would appear to have information asymmetry problems similar to those discussed above.

Ecosystem services

The concept of ecosystem services recognises the valuable role that ecosystems can play in providing essential goods and services. A key question is who holds the rights over ecosystem services. If landholders have the right to use their property according to their own interests and withhold such services, then the public will need to compensate landholders for their provision. If the public holds the rights, then the public is entitled to ecosystem services and landholders will need to compensate the public if they are not supplied.

4.2 Implications for public funding of agri-environmental conservation

The concept of supplying ecosystem services relates closely to cost sharing principles (ie. PPP and BPP) and a duty of care for the environment. We can call it different things, but essentially in each of these instances we are talking about rights and responsibilities in environmental management. With the extreme range of views on this area, progress in exactly specifying the nature of rights will be extremely difficult¹¹. On the one hand, there are compelling arguments which challenge the legitimacy of absolutist views of agricultural property rights including the:

- limitation of presumed property rights in actual law;
- right of the state to regulate land use activities in the public interest; and a
- dynamic nature of rights and the need for flexibility in such rights so that the state can meet the aspirations of its citizens as technology and values change (Colby 1995).

An alternative view would highlight the:

- need for secure rights to underpin economic development;
- historical involvement of governments in promoting agricultural development; and
- problems of fiscal illusion¹² if a state can reduce rights

In broad terms, the case for the public funding of agri-environmental conservation will be the subject of on-going debate because agri-environmental conservation activities have different aspects of private and public benefits requiring some value judgements about the level and appropriateness of public funding.

¹¹ Reeve (2002) reviews the nature of agricultural property rights and proposes a structural adjustment framework as a way of entering into a more productive dialogue over rural environmental issues relative to current concepts. He cites a number of advantages of such an approach including that it would provide a conduit for public investment in the conservation of resources, has the desirable features of administrative flexibility and avoids establishing compensation precedents.

¹² In the absence of a requirement for government to pay compensation for regulation, it has been argued that the opportunity costs of existing land uses will be ignored. As a consequence, land use regulations, unburdened by the need to pay compensation, will lead to the over supply of environmental goods. In these cases, government is said to have 'fiscal illusion' in that it only compares the benefit of the public good with the zero cost of compensation.

In general terms, there is a weak case for the expenditure of public funds on environmental issues that have few spillovers to other farmers or the community more generally. Problems of soil acidity and sodicity largely fall into this category because they primarily remain on site. On the other hand, resources which have the characteristics of non-excludability and non-rivalry (like biodiversity) present a better case for the expenditure of public funds.

In considering the amount of public funding to be provided, there should be a focus on the minimum level of incentive required by landholders to facilitate the desired change. Given the problems of asymmetric information referred to above, consideration needs to be given to how to efficiently reveal this information. There are large transaction costs and possible inefficiencies in applying either standard or negotiated cost sharing ratios for particular conservation activities. There would appear to be compelling reasons for involving competitive market processes in determining the level and allocation of public funds.

5. *Is a levy the right instrument?*

5.1 Budget process

In considering whether an environmental levy is an appropriate response to environmental problems, it is sensible to firstly question why environmental spending cannot be funded through normal budget processes. It would seem reasonable to assume that the environment is an increasing priority for governments and that accordingly it should be able to compete with other portfolios in the prioritisation of scarce funds. ‘The conservation budget should not be quarantined from the scrutiny that applies in other areas in the process of bringing expenditures and available resources into balance’ (Edwards and Bryon 2001). From an economy wide view it is important that the potential uses of funds compete with each other so that the best allocation of public resources is achieved.

However it is apparent that special levies are growing in popularity. Some recent examples include:

- The firearms buy back scheme – funded by an increase in the Medicare Levy in 1996-97 from 1.5 to 1.7%. The compensation cost from the scheme was \$398 million and administration cost of \$63 million.
- Dairy industry adjustment levy – to assist the dairy industry cope with deregulation, the government has imposed a 11 cents per litre levy on retail sales of liquid milk (as of July 2000).
- Ansett levy – in 2001 a levy was imposed on air tickets to fund employee entitlements from the former Ansett group of employees.

Whilst there has been one additional income tax levy put in place (the gun buy back levy), all other levies have been imposed directly on industries. The proposed and approved income tax based levies have also arisen in the context of an unforeseen event (eg. the Port Arthur tragedy in the context of the buy back levy and social/political turmoil in the case of East Timor levy). Concerns about the environment don’t fall neatly into a category of ‘unexpected events’

Governments could raise/encourage private expenditure on the environment through:

- An additional income tax levy
- Sale of public assets (eg. Telstra)
- Income taxation concessions – this represents a reduction in taxation revenue to the government and an increase in private environmental expenditure (eg. existing taxation concessions)

- Other taxation concessions (capital gains tax, land tax etc)
- Environmental taxation – this could include Pigouvian taxes that are proportional to environmental pollution, fixed charges, usage prices.

5.2 Criteria

In examining the merits of an environmental levy, the following issues require consideration:

Efficiency

Depends on the way in which resources are allocated to environmental issues. High pay-offs to the community will require investment in areas of market failure and efficient ways for government to intervene. There is also potential to spend it extremely poorly particularly if the severity of degradation is used as a key criterion as appears to be the case with the recommendations with Virtual Consulting et al (2000).

Incentives

The levy has been proposed principally as a revenue raising activity rather than an incentive to change behaviour. Consequently, it may not affect incentives although it is possible that it could detract from levels of existing voluntary expenditure on the environment.

Relationship to existing arrangements

It is not clear how the proceeds of the levy would be allocated across existing jurisdictions/environmental issues. The Wentworth Group (2002) propose to establish a National Commission to set priorities, establish national targets and standards, accredit regional plans, recommend the funding of investment priorities etc. The efficiency of this approach relative to existing arrangements requires closer examination.

Accountability

Depending upon institutional arrangements for the levy, there may be some accountability benefits to the wider community in clearly knowing the extent of environmental expenditure.

Administration costs

The marginal costs of levy collection are likely to be small given existing arrangements for Medicare Levy.

Equity

An environmental levy may adversely affect low income groups if it is applied across the board without the establishment of income thresholds.

6. Conclusion

The need for a special purpose levy is based on an assessment that such a significant increase in the funding of environmental issues is outside the scope of existing government budgets and beyond the level of agri-environmental conservation which could reasonably be expected of landholders. It has been proposed largely on the extent and costs of degradation and the need to better balance the burden of agri-environmental conservation.

Whilst degradation may be related to a source of market failure, the sheer existence of any level of degradation does not necessarily imply that market failure exists. Most commentaries, and indeed much of the argument for increased public funding of environmental issues, is based on the assumption that the existence of land degradation is itself a sufficient condition for government

intervention. Neither the area of resource degradation nor the estimated costs of that degradation provide guidance on whether the problem can be efficiently addressed. It has to be shown that government can do better.

In evaluating whether additional environmental expenditure is warranted, both scientists and economists need to undertake analyses using appropriate methods, accurate data and in a fashion unencumbered by good intentions. ‘The worthiness of the cause offers no guarantee against wasteful allocation of resources to it’ (Edwards and Bryon 2001). Assessing the efficiency of increasing public funding of environmental issues requires a forward rather than a backward looking approach. Research into the marginal social benefits from addressing particular degradation problems relative to their marginal social costs should be a key priority.

There are a number of challenges for the efficient investment of public funds in agri-environmental conservation including uncertainty, institutional arrangements and the potential for perverse outcomes. Combining these with anecdotal information on the previous poor returns from environmental expenditure raises real issues about the ability of governments to efficiently spend large sums of money as envisaged.

The second major reason for increasing public funding of agri-environmental conservation relates to environmental equity. The argument for environmental equity strikes at the heart of the ongoing debate about the nature of property rights. Different terms have been used to describe property rights (cost sharing, duty of care, environmental services) but it remains as intractable as ever. In considering the amount of public funding to be provided, there should be a focus on the minimum level of incentive required by landholders to facilitate the desired change. Given the problems of asymmetric information inherent in any discussion of cost sharing between governments and farmers, there may be an important role for involving competitive market processes in determining the level and allocation of public funds to agri-environmental conservation.

Finally, the paper raises a number of issues to consider whether an environmental levy is the most appropriate instrument in raising funds for increased public funding of environmental issues. A key issue for further work is the expanding role that more voluntary approaches to environmental management may play in the future (environmental management systems, eco-labelling and green accounting in the corporate sector).

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