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Land Repair Fund: a model for exploiting the nexus between land repair, improved production and profit

by

John E Leake* and Julian B Morison**

*** Institute for International Development Ltd**

**** EconSearch Pty Ltd, Charles Drew , Scholefield Robinson Horticultural Services Pty Ltd**

Correspondence to: Julian Morison , EconSearch Pty Ltd , 214 Kensington Road , Marryatville SA 5068

Ph: (08) 8431 5533 Mbl: 0419 869633 Fax: (08) 8431 7710

email: jbmorison@econsearch.com.au

Abstract

Typically, the techniques used by the best farm managers to improve productivity are correlated with actions that address land and water degradation issues, thus establishing a nexus between land repair, improved production and profit.

To address broader environmental degradation issues, there are a number of programs through which landholders can voluntarily conserve areas of ecological value on their properties. They range from non-binding, temporary agreements to binding agreements that are attached perpetually to the title of the land.

There are other ecosystem values for which incentives are being developed, for example, salinity, carbon sequestration and amenity purposes and often there is a range of these that may be applicable to a particular land area.

This paper overviews some of the existing revolving fund schemes that have been implemented or are currently being tested in Australia, considers the payment of landholders for providing ecosystem

services and then provides details on a case study of one type of revolving fund, the Land Repair Fund.

There is a wide range of structural, legal, financial, investment and fiscal options available to assist in encouraging private investment in the repair of degraded lands in Australia. It should be possible to attract investors who are seeking longer-term returns on investment assisted by appropriate tax concessions and /or payments perhaps through tenders for desired ecosystem services.

A single, fixed structure and business model will not address the significant variation in conditions and needs relating to particular properties or areas in need of repair. The appropriate business structure may vary significantly from case to case and be enhanced by a variety of possible payments for ecosystem services. It is this area in particular where government, perhaps through local and regional natural resource management boards, who can assess desired ecosystem service outcomes, could play a role in facilitating private investment in funds that will, in turn, invest in large scale land repair activity.

The case studies discussed in this paper demonstrate that investment in land repair can be financially attractive. The main drivers of profit are derived from the scale of operation and leading management practices that have historically generated attractive returns in top performing Australian farm businesses.

1. Introduction

The community□s attitude towards land and water use in most OECD nations is rapidly evolving from the situation where humans mainly looked for ecosystem □goods□ to harvest, food, fibre etc, towards a situation where they place much more value on ecosystem □services□ that support the continued harvest, air and water purification, bio diversity, and amenity and other social values (Huylenbroeck and Durand). Attitudes towards land use property rights are also evolving with greater emphasis on stewardship, including for these ecosystem values. Mechanisms for the community to influence stewardship are evolving less quickly. Private and public incentives to maintain and develop the capacity of land to continue to provide ecosystem goods have always existed as the products are saleable, if imperfectly expressed, in land management practice but incentives to protect and enhance the ecosystem values of land are much less developed as these values are not easily traded or otherwise rewarded.□ This paper discusses the evolution of different mechanisms to provide incentives for both ecosystem and productive uses, as either separate activities or in conjunction, focussing on market instruments.□ Much of this work has arisen out of a community interest in conservation.

For example, conservation on private land is a vitally important element of biodiversity protection in Australia. Due to the limited availability of public land for habitat protection and the expense associated with acquisition, private landholders hold the key to the survival of many flora and fauna communities (EDO 2005).

There are a number of programs through which landholders can voluntarily conserve areas of ecological value on their properties. They range from non-binding, temporary agreements to binding agreements that are attached perpetually to the title of the land. These might include schemes such as voluntary vegetation plans and voluntary conservation agreements. In addition to these types of schemes, there have been a number of other schemes designed to facilitate the purchase of private land, undertake some form of restoration or rehabilitation of the land and then resell the land.

There are other ecosystem values for which incentives are being developed, for example, salinity, carbon sequestration and amenity purposes and often there is a range of these that may be applicable to a particular land area.□

This paper overviews some of the existing revolving fund schemes that have been implemented or are currently being tested in Australia, considers the payment of landholders for providing ecosystem services and then provides details on a case study of one type of revolving fund, the Land Repair Fund.

2. Revolving funds as a mechanism for delivering conservation outcomes

One of the problems highlighted in natural resource management plans and biodiversity strategies[1] is simply the magnitude or scale of the land degradation problem. There is a fairly widespread opinion that private investment will be required to restore □health□ to Australia□s natural resources of land and water on the scale desired by the community or to facilitate changed land use in a changing climate. While there are various private sector philanthropic trusts and officially sponsored investment vehicles addressing the need for investment in public benefit outcomes, there are no large investment vehicles that aim at both outcomes.

A recent study by the International Institute for Development (IID) (2005) argued that investment to achieve both public and private benefit in natural resource management is not only profitable but necessary for long term productivity. It showed that while agriculture has historically shown low cash returns, at least for the majority of farmers, the top 25% of farms in all sectors have consistently performed at least as well as any other sector of the economy in wealth generation terms. While the reasons for poor returns by the majority of farmers vary, IID (2005) has shown there is a strong correlation between poor returns and low productivity due to inappropriate management decisions often associated with lack of appropriate finance. Typically, the techniques used by the best managers to improve productivity are correlated with actions that address land and water degradation issues, thus establishing a nexus between land repair, improved production and profit (IID 2005, p. 25).

The opportunity for a revolving fund, such as the proposed land repair fund, is to acquire land that has been exhausted through exploitative management so that it performs below average in wealth generation terms and to restore it and its management so it performs in the top 25% of farms or is reassigned to a more valued use. Importantly, the risk of implementation, innovation and timing delays can be offset by use of taxation incentives and the role of business structure is critical in accessing suitable capital for land repair activities.

There are other opportunities for a land repair fund to rehabilitate degraded land in near urban areas by changing land use to facilitate amenity and rural living use and so provide funds to create reserves and wetlands, etc. also utilising taxation incentives. In more remote areas it could be possible to invest profitably to change land and water use by utilising a mix of incentives including taxation and environmental service credits (IID 2005, p. i).

Another example is the Nature Conservation Trust in New South Wales. The Trust was established under the Nature Conservation Trust Act 2001 to foster conservation on privately managed land in partnership with land managers. The Trust is independent of government, with funding supplied largely through philanthropy and industry investment (EDO 2005).

The main function of the Trust is to establish a revolving fund, buying and on-selling property following the attachment of conservation covenants to the land. The Trust may also enter into agreements with landholders to manage land for the protection of natural heritage. The agreements may provide for technical, financial and other support. Rate relief is also available for land covered by a trust agreement.

Trust agreements are voluntary, but the terms are binding and enforceable on all parties to the agreement. Trust agreements may be registered on the land title, thereby binding subsequent owners. The agreement may be varied by a subsequent agreement between the parties.

Bushbank is a revolving fund for nature conservation in Western Australia. It commenced operations in August 2001 for purchase of priority areas of remnant bushland. It was established with $2 million in startup monies provided by the WA Government and the Natural Heritage Trust and managed as a consortium of the Agriculture Department, CALM, World Wide Fund for Nature, National Trust and Landcare Trust. It is overseen by an independent board while day to day administration rests with the National Trust.

Bushbank operates by purchasing, covenanting and on-selling conservation land. The proceeds from the sale of the land are returned to the capital fund to purchase and protect more natural habitat.

Bushbank was modelled on Victoria□s Trust for Nature, a revolving fund established in 1989 to purchase significant native habitats. Bush properties are purchased by the Trust and then on-sold with a conservation covenant on the title. The money raised from the sale is used to purchase further properties for conservation.

A further example is the Greening Australia Land Innovation Fund (Binning, Hatfield Dodds and Brandis 2005). The Fund was established to investigate the degree to which an investment leverage approach is able to achieve environmental benefits that are unlikely to be achieved through devolved grants or competitive auctions for ecosystem services.

The leverage fund differs from competitive tenders in the manner it deals with information asymmetry. By being involved in the management of projects it has full information on management actions, financial returns and estimated opportunity costs. This involvement reveals information about proponents□ prices for the adoption of innovative land use systems.

The Land Innovation Fund was established as an unregistered management investment scheme, allowing up to 20 wholesale investors to invest in the Fund. The Fund is governed by an independent trustee board, comprising business and NRM experts, and is managed by Greening Australia.

3. Landholder payment for providing ecosystem services

The willingness of private landholders to accept payment for the production of environmental services will reflect both direct and opportunity costs to landholders in producing the services and any private benefits they receive. In some instances landholders may be able to increase production of these services without incurring significant cost (and may even realise net benefits). However, in most cases, greater supply of services will represent a real net cost to landholders.□

In some instances, landholders who have already adopted conservation-orientated farm production systems may offer only small additional environmental services. On the other hand, some farmers may be able to offer substantial new services because their existing farm management practices seek to maximise commercial returns without regard to the substantial environmental externalities created. This poses the question □ should new environmental services from these two properties be considered only on cost per unit of environmental service basis, or are there other considerations as to who should receive public support?

How the burden of increased resource conservation should be shared between landholders and other members of the public will depend upon who the community believes implicitly holds the rights to these resources and impacts arising from their use.

For example, following principles outlined by the OECD, Australian governments have pursued □polluter pays□ policies to deal with industrial pollution □ implying the broader community holds the right to clean air and water. Under this principle governments provide no financial support, but rather pursue regulatory or suasive policies to compel polluters to reduce emissions. This has variously involved the introduction of regulations requiring reductions in emissions from specific activities, and in the case of NSW, pollution taxes on remaining emissions.

In the rural context, governments have generally adopted a □beneficiary pays□ principle to investments (such as rehabilitating native habitat and reducing off-farm watertable and salinity impacts) that reduce environmental degradation arising from past land use choices □ implying landholders hold rights to degrade environments beyond their farm gate and hence any restriction on these rights must be compensated by beneficiaries. This approach is for example embodied in the MDBC□s cost-sharing arrangements for on-farm works. Importantly, these arrangements distinguish between direct beneficiaries (that should be identified and required to pay for the benefits they enjoy □ users pays) and indirect beneficiaries (who should collectively through government contribute to the costs of new works □ beneficiary compensates).

However the situation with many current rural activities is less clear, with for example rural runoff to rivers subject to water quality regulations, land clearing to the Native Vegetation regulations, and so on, while other impacts such as generation of greenhouse gases and soil loss, remain largely unregulated or landholders are not required to compensate for the resulting externality costs that arise.

Binning and Young (1997) and the Productivity Commission (2001) have referred to society□s expectation of landholders as a duty of care □ an implicit property right. This duty of care reflects the social responsibilities sought and an allocation of rights between landholders and broader society for externalities from land use. The allocation has historically been largely implicit as statutory rights often have not been modified or established. Notably, the duty of care is a dynamic allocation of rights, reflecting changing community desires for conservation and improved environmental outcomes.

Increasing the provision of environmental services at the farm level through payment for these services by government would be consistent with the beneficiary pays principle but inconsistent with the polluter pays principle or a more conservation orientated duty of care. However, even in these latter cases there remains a strong argument for government financial support of actions to increase the private provision of environmental services.

Current land uses have arisen, amongst other things, in response to prevailing property rights (whether statute based or implicit). The returns from these land uses are generally capitalised into property prices and underlie adopted farming systems and debt levels. The imposition of significant new obligations on landholders may lead to significant operating and capital losses and difficulties in servicing debt[2]. This in turn may lead to significant structural adjustment in the sector. Putting aside attendant social issues, farm adjustment is likely to be slow, with environmental gains also slow to be realised. Under such circumstances, a polluter pays approach may work against achieving environmental gains that embody a degree of irreversibility □ such as loss of biodiversity or long-term salinisation. In such circumstances beneficiaries would gain more by forgoing some □rights□ and ensuring required reforms were achieved.

In relation to managing native vegetation, ANZECC adopted the principle that financial assistance should generally not be paid to landholders to meet their duty of care, although, □where community

expectations resulting in legislative or policy changes cause duty of care to be shifted significantly over a short period of time, financial assistance may be provided to speed the transition to the new arrangements and maintain community support. Such payments should be one-off in recognition of the need to adjust to a new regime (ANZECC 1999).

Sheahan (2000) has suggested that a duty of care statement could be framed to define sustainable land management as distinct from what constitutes a public conservation service. It should explicitly refer to sustainable management of biodiversity and native vegetation, as well as management of other natural resources. A duty of care statement would help define the point at which private responsibility for vegetation management stops and publicly funded incentives start.

In summary, there are strong grounds for government to promote the provision of environmental services by private landholders through purchasing land use change. But before this can occur, two critical questions must be answered. Firstly, what duty of care should be expected from landholders and form the threshold that defines private versus social cost? Secondly, what price should be paid to landholders for the provision of the additional environmental services given the significant benefits that could be shared between the community and landholders? Auction and tender instruments provide a means to answer the latter question, such that environmental outcomes can be maximised within available government budget allocations. Can similar outcomes be achieved through the establishment of a revolving fund to acquire land that has been exhausted and to restore it and its management so that it generates both environmental services and a financial return? The following case study is a demonstration of how this might be done.

4. Land Repair Fund Case Study

The Land Repair Study[3] (The Study) was intended to make a prima facie case that it is possible to invest to apply new technology and improved management to rehabilitate degraded agricultural land and that this will deliver both good private returns and public benefits. A further aim was identify if the scale and risk profile of opportunities for such investment are sufficient to develop a new class of investment fund attractive to socially responsible investors and inclusion in the Socially Responsible Investment Index (SRI).

Australian agriculture has long emphasised production but much of this has led to land degradation. Indeed, about 28% of land is judged by farmers themselves to suffer from degradation. Much of the emphasis in investment decisions in agriculture has been towards finding land that is in good condition and maximising returns. This practice can result in degradation for various reasons including if reinvestment to replace nutrients taken out in harvests or erosion is not practiced, a form of management known as mining the soil resource.

The Study focused on the opposite end of agriculture; to identify opportunities to obtain and repair unhealthy[4] land that has been degraded[5] and determine whether or not sufficient private benefit can be obtained to pay for this investment to restore the resource and justify the use of official incentives designed to encourage such investment. It looked beyond the usual value of ecosystem goods that might be harvested from the land, food, fibre etc, towards the values of ecosystem services that support the continued harvest, air and water purification, bio diversity, and amenity and other social values increasingly important in OECD countries[6].

The Study necessarily took two paths as much of the literature addressing investments to combat land degradation has evaluated its impact on the production of ecosystem goods, traditionally the concern of the community, rather than ecosystem services now increasingly valued but more difficult to quantify the benefits of in financial terms.

1. It reviewed the data on land degradation across product sectors and the scale of the opportunity through estimates of foregone production and the actual results of investment, public and private.
2. It reviewed public investment including direct investment, market based instruments (MBI) and taxation incentives to deliver ecosystems services.

4.1 Historical and estimated returns from investment in land degradation

The Study[7] reviewed the National Land and Water Audit and its associated reports on different forms of degradation and the causes. One report (Hajkowicz and Young 2002), assessed the three most significant soil factors for which data exists, sodicity, acidity and salinity providing some indication of the scale and potential benefits of addressing degradation limiting production. These authors found that some 23% of land suffers from some yield loss from these factors and that the gross benefit (defined as the additional profit at full equity attainable from agriculture if a soil constraint were removed without cost) to be: dryland salinity about $187 million per year, acidity about $1,585 million per year and $1,035 million per year for sodicity. They went on to conclude from a cost benefit analysis that lime and gypsum applications beyond current levels are profitable in just 4% of sodic or acid soils affected but that there are, potentially, considerable financial gains, with net present values of soil treatments run in perpetuity ranging from $10.8 to $16.5 billion (determined with a private landholder discount rate of 10%, with treatments run in perpetuity). Another of these reports Australians and Natural Resource Management 2002 (ANRM 2002)[8] which examined the social and economic dimensions of natural resource management concluded that land degradation persists for a variety of physical, biological, economic and social causes that interact in complex ways. By necessity it is the on-farm manager that is the actor faced with this complexity.

On-farm management is a common factor in land degradation as either, or both, a cause or response. There are many factors other than salinity, sodicity and acidity that constrain crop and pasture yields, e.g. soil compaction, soil erosion, weed infestation, etc and all are affected by on-farm management. There has been significant and ongoing development of best practices to address all of these factors but uptake is slow. For example the Australian Grains Industry in two benchmarking assessments of industry practices in 1994 and 1998 concluded that although some 74% of farmers had changed practices in this period in response to extension only about 7% had adopted best practice. Recent work with wheat in the Mallee regions of South Australia, Victoria and New South Wales by the CSIRO[9] has shown that farmers who followed best practice procedures produced an average 20 grams of wheat per mm of rainfall across the basin compared with the actual average across the basin of only 8-10 grams over a 40 year period.

Access to finance is another factor in farm performance, debt levels have increased sharply since the 1980s but this is concentrated in the top quartile of farms. Brown (2001) discussed in section 3.5 Volume 1 of The Study, has suggested the reasons for this poor use of finance by the bottom three quartiles as including:

- small project size (<$1million);
- cash returns are usually lower that threshold rates sought by providers of equity capital;
- high information cost in project identification and evaluation;
- many primary producers are uncomfortable considering alliances, joint ventures etc;
- non rural communities have little knowledge and understanding of rural investments; and
- farming and related downstream processing is considered as low tech and thus unattractive to venture capital.

Variation in farm performance has been empirically demonstrated in surveys such as the Australian Farm Surveys conducted for over 50 years by ABARE and its predecessors and the Farm Monitor Project in South West Victoria which has been conducted for more than 30 years[10]. These showed the difference between the farm business profit and the return to capital for average farms and the top 25% of farms in a range of farm types and across three levels of total farm capital (scale) throughout Australia and the average for the period 1992-93 to 1998-99 is shown in Table 1 below.

Table 1 Farm Financial Performance (FY 93-99) by Farm Type: Difference between Top 25% and Average

Farm Type	Financial Performance	Farms with a capital value:		
		<$1m	$1-3m	>$3m
Wheat & other crops	Profit ($)	76,347	138,160	265,707
	Return to Capital (%)	10.7	8.9	8.6
Mixed crops-livestock	Profit ($)	40,706	59,650	76,035
	Return to Capital (%)	6.7	4.4	2.1
Sheep	Profit ($)	36,353	39,805	25,203
	Return to Capital (%)	5.9	3.0	2.2
Beef	Profit ($)	29,931	72,080	354,699
	Return to Capital (%)	4.5	3.8	5.2
Sheep-Beef	Profit ($)	34,770	80,079	128,915
	Return to Capital (%)	5.1	4.3	2.2
Dairy	Profit ($)	28,761	55,332	105,842
	Return to Capital (%)	4.8	4.4	4.9

Source: Calculated from Martin et al. (2000, Table 11).

This table indicates that, for the seven years from 1992-93 to 1998-99, of farms growing wheat and other crops and with a total capital value of less than $1 million, the top 25% achieved an average profit over the period of $76,347 more than the average for all farms of the same type and scale. Similarly, the top 25% achieved a return on capital of 10.7 percentage units greater than the average for all farms of the same type and scale averaged over the same 7 years.

The superior performance of the top 25% of farms compared with the average is a robust finding and persists across all types of production and over the 50 years or so the data have been kept, indicating the scope for improvement in performance in this sector. It is noteworthy that the performance of this 25% of farms compares favourably with other sectors of the Australian economy. For example, a recent article reviewing farm performance from the perspective of wealth creation, yield and capital gain, and other asset categories showed that for the selected period, the top 25% of farm businesses (as reported in the ABARE Farm Surveys) achieved the highest Compound Annual Growth (CAGR) followed by All Industrials and Property, and the average farm business achieved the lowest CAGR (Carroll 2003).

Table 2 Value Creation Dec-87 to Dec-02

Asset Category	CAGRa
Top 25% Farm Business	12.0%

All Industrials	11.6%
Property	11.5%
Bonds	10.4%
All Ords	9.7%
Resources	8.0%
Cash	7.7%
Food and Household	7.2%
Average Farm Business	6.5%

¿ *a Compound Annual Growth Rate*

Source: Carroll (2003)

This relationship is of course sensitive to the start and finish points but Carroll (2003) also analysed the comparative risk of investment in these different asset classes from the returns as indicated by the volatility of annual returns and found the standard deviation (SD) of results for the top 25% of farms was similar to the SD for the All Ordinary Index.

This evidence taken as a whole suggests investment to address land degradation can be profitable, relatively safe and on a sufficient scale to be of interest to fund managers. However, it does not address the costs and benefits of rehabilitating land for which a significant proportion of the benefits are essentially public, where some additional private benefit is necessary to secure private investment. Public investment to provide ecosystem services has gradually evolved from a situation where the intended benefits were directly related to ecosystem products, such as wind breaks to reduce windblown erosion onto cereal crop land, to a situation where the services are more removed, such as bio diversity reserves. The next section[11] reviews the performance of two such investments and the methods used to apportion the public and private benefits for the purposes of cost sharing between the providers.

4.2 Public investment to achieve ecosystem products and benefits

The first example was the rehabilitation of Loxton Irrigation (LID) a system established by the Commonwealth Government in 1948 under the War Service Land Settlement Scheme. At the time rehabilitation was being contemplated (1997), the options were:

1. Status quo. No investment in new infrastructure, continue maintenance of existing system.
2. Replacement of channels only with pipes.
3. Refurbishment of the distribution infrastructure and upgrading of pumps for the existing district.
4. Same as for (3) but also including areas for new development.

The analysis was conducted by comparing the benefits and costs of the rehabilitation options (Options 2 to 4) with the benefits and costs of the base case scenario (Option 1).

The Net Present Values (NPV) for all investments were estimated to be positive with the largest benefit being gained from using the saved water to develop the largest new area of irrigation thought to be possible, although the highest benefit cost ratio was for just rehabilitating the existing works (Table 3). The difference was due to the capital required for new development.

Table 3 Results of economic appraisal of various options for Loxton Irrigation District rehabilitation (25 years, 7% discount rate)

Option	Description	PV of Incremental Net Benefits ($m)	BCR	IRR	Payback Period (years)
2	Replace channels only with pipes (all expenditure □up front□)	19.3	1.9	11.5%	15
3	Full rehabilitation - existing area	21.4	2.1	12.2%	14
4a	Existing area plus probable expansion (1,080 ha)	35.9	1.7	12.4%	14
4b	Existing area plus possible expansion (1,650 ha)	43.1	1.6	12.1%	14

Source: EconSearch and McColl Carey Associates (1997)

These benefits were attributed on a regional basis, which approximately equates with the intended contributions. Note that Tables 3 and 4 were calculated as one basis for negotiation and may not represent the actual shares met by each.

Table 4 Partial Allocation of Benefits and Costs - Option 3

ITEM	Present Values ($m, @ 7%, 25 years)			
	Region	State	Nation	Total
BENEFITS				
Incremental horticultural output	30.5a			30.5
Capital value of on-farm water savings	2.9			2.9
Capital value of system water savings	1.5			1.5
Value of reduced salt load		4.8		4.8
Incremental salvage value of the system			0.7	0.7
Secondary impacts b	jobs + income	jobs + income	jobs + income	jobs + income
Sub-Total Incremental Benefits	34.9c	4.8c	0.7c	40.4c
COSTS				
Scheme costs	29.3 (p)	29.3 (p)	29.3 (p)	29.3
Incremental O&M on delivery system	-2.5			-2.5
Incremental on-farm irrigation costs	1.5			1.5
Incremental crop redevelopment costs	3.2			3.2
Expansion area capital costs	-			-
Income forgone extended land	-			-
Capital costs saved			-12.5	-12.5
Sub-Total Incremental Costs	2.2d	-d	-12.5d	19.0
NET PRESENT VALUE				21.4c

- *a Does not account for income tax transfers from growers to the Commonwealth.*
- *b Secondary impacts include environmental benefits as well as employment and income effects. Apart from reduced salt loads to the river, environmental impacts have not been quantified as part of this study.*
- *c Excludes secondary impacts.*
- *d Excludes share of scheme costs.*
- *(p) part - the respective contributions to the scheme costs by the region, state and nation are subject to negotiation.*

Source: EconSearch and McColl Carey Associates (1997)

These findings and subsequent experience indicates that the rehabilitation has been a success in that it has met its objectives. Rehabilitation and expansion has occurred, benefiting the farmers and the region in terms of direct income, reduced system maintenance and flow on employment. The state has benefited from reduced salt accession to the river and the nation apparently benefits from the increased salvage value of the scheme and a share of the flow on benefits as well as avoided future costs.

The second example was the Local Action Plan for the Murray Mallee Region. Dryland agriculture is the dominant land use (76% of total area) in the Murray Mallee. Cereal cropping is the principal industry. Other major industries include grain legumes, wool production, sheep, cattle, pigs, poultry and potatoes. The area consists of a vast plain of low elevation where sand hills and gently sloping sandy rises are interspersed by flats. The sandy soils lack integrity hence the majority of soils are very susceptible to wind erosion.

Past management practices in the region, such as vegetation clearance and constant tillage, have contributed to limiting the agricultural productivity of the land. In response to this a large number of local revegetation and Landcare programs have been established in the region as the community awareness about the importance of the environment has evolved.

The Local Action Plan is concerned with the integration of sustainable agricultural productivity and natural resource management. The objectives of the Local Action Planning project are to:

- maintain or enhance agricultural productivity;
- integrate remnant native vegetation and revegetation (native species and stock fodder species) into the farming system.

There were 12 elements of the project and these were grouped into four sub-components as described below:

- Mobile Dunes: This targets 12,247 ha of long-term eroded area with the aim of stabilising erosion (land classes IV and VII). By using cover crops followed by permanent pasture or fodder crops, a mixture of the two or re-establishing native species
- Stable Dunes: This targets 45% of the erosion classes IV and VII stable dunes estimated in the region to be 609,000 ha. by similar processes as with mobile dunes.
- Remnant Vegetation: This targets 15,045ha or less than 10% of the remnant vegetation in the area using a combination of management, enhancement and establishment of corridor plantings.
- Revegetation: This targets approximately 1,000 ha of badly degraded native vegetation to be established using indigenous species over 10 years.

The summary results for the project as a whole and the four major components are shown in Table 5.

Table 5 Summary results of the Murray Mallee local action plan

Investment component:	PV Benefits On-farm ($m)	PV Benefits Off-site ($m)	PV Benefits Total ($m)	PV Costs ($m)	NPV ($m)	BCR	IRR
Mobile Dunes	1.3	0.6	1.9	2.2	-0.3	0.85	6.6%
Stable Dunes	35.3	13.2	48.5	36.4	12.1	1.33	10.7%
Remnant Vegetation	3.9	2.2	6.2	5.8	0.4	1.06	9.9%
Revegetation	0.5	0.2	0.7	0.9	-0.2	0.74	4.3%
Total	41.0	16.3	57.2	45.4	11.8	1.26	10.4%

Source: EconSearch and AACM International (1998)

The overall project was estimated to return a positive NPV ($11.8 million) and a benefit to cost ratio greater than 1 (i.e. 1.26). The IRR of 10.4% compares well with the current real interest rates available from traditional market investments. These results imply that the project is a positive one in terms of delivering net benefits to society as a whole and particularly attractive considering the number of benefits that could not be quantified.

However, the project generates a high percentage of its benefits for activities that would normally be considered environmental and a significant percentage of the benefits are off farm and rely on cost sharing between the beneficiaries to produce the benefits. The financial rate of return varied from 4.3%

and 6.6% for the severely degraded parts of the system, mobile dunes and re-vegetation, to 10% + for the identifiably productive parts. The inducements for these activities partly appeal to philanthropic impulses from the local community supported by Landcare and NHT type grants apparently allocated following negotiation between the state and the community groups.

Table 6 illustrates the split of benefits between the three stakeholders that were considered in this project - On-farm landholders, Local Community and the Wider Community.

Table 6 Cost Sharing - total project

	PV Benefits Total ($m)	Stakeholder Share of Benefits ($m)		
		On-Farm	Local	Wider
On-farm Benefits	41.0	41.0		
Specific Off-site Benefits	6.9			6.9
Share of Generic Off-site Benefits	9.1	0.8	1.0	7.2
Total Benefits	57.0	41.8	1.0	14.2
Share of Benefits		73.3%	1.8%	24.9%
Cost of Share ($m)		33.3	0.8	11.3

Source: EconSearch and AACM International (1998)

The bottom rows of Table 6 indicates that the cost share split using the Beneficiary Pays principle would be 73% to on-farm landholders, 2% to local community and 25% to the State and/or Federal Government. (This was prepared as one basis for negotiation and may not have been that followed).

The case studies together illustrate and confirm several issues that are relevant to the employment of private sector funds in addressing land degradation where off-farm benefits are expected.

- The benefits from land repair activities are invariably a combination of a direct, on-farm, private nature and an off-farm, non-market nature.
- Some of the non-market, off-farm benefits result from changes in on-farm practices.
- Many of the potential benefits of land and water repair will not be obtainable without adoption of best management practices, access to finance and action at a scale greater than an individual property.
- Private investment in severally degraded or non productive assets of necessity show a low financial return and where philanthropic or community values are insufficient for reasons such as remoteness, or lack of amenity value they may not be relied upon for all such activities.

4.2 Public incentives for private investment to produce public ecosystem benefits

In the context of large scale private investment in rehabilitation of degraded land it will often be impractical to reply on philanthropic or community impulses for desired levels of funding. As little documented experience of this type of investment could be found, The Study[12] selected three examples of severe land degradation that had the potential to lead eventually to some actual investment. The case studies were chosen in the South Australian sector of the Murray Valley to meet these criteria:

- The case studies should be representative of significant classes of possible investment in the South Australian part of the Murray Darling Basin, the agreed initial focus of the fund.

- The case studies should, if possible, be potential investment candidates so that an actual investment might result from the investigations.

4.3.1 Case Study One: Coorong Dairies

Coorong Dairies has developed an area of degraded sand hills into the largest herd of pasture-based dairy cattle in the world. The remaining land consists of wind blown sand, vestigial native pine scrub and poor grass lands. The question faced by the owner was whether to leave the degraded land as it is, develop it as more centre pivots or to fence it off and restore the native bush to stabilise the sand. We investigated the bio diversity value of the native bush, the costs of restoring it and the incentives and taxation benefits available to undertake this, then compared this with the client's estimate of the cost and benefit of developing the land for dairying. We commissioned a native vegetation specialist to study the area and discussed options with The Department of Environment and Heritage private covenant officer and then with the Australian Valuers Office (AVO) who decide the value of taxation deductions to apply to gifts and covenanted land. We also commissioned separate legal and accountancy opinions. Inconclusive discussions were also held with the SA Nature Foundation as a possible partner.

Several options were considered and are discussed briefly below.

The **'do nothing' option** was possible for some years but would see a deteriorating and unsightly situation with some risk of wind blown sand to the developed areas. The land in this condition is worth about $1,300 per ha but has no productive use in its current condition.

The **'develop for dairying' option** required land levelling, ripping stone areas, laying supply pipe lines and fencing. The cost of developing land was about $2,800 per ha (not including the water licence, which would cost another $9,900 per ha). In this developed condition the land can produce about 25 tonnes dry matter of good quality forage for dairy cows. In this condition the land was worth about $5,000 per ha (not including the water licence), i.e. a small capital appreciation of about $900 per ha might result from development but, on realisation, this would attract a capital gains tax of 30% giving a net benefit of $630 per ha.

The owners considered the financial rate of return would be positive although not particularly attractive because there was a risk that the erosion might not be contained and it involved a higher development cost than other nearby land in better basic condition. However, with appropriate care, it was considered a sustainable use of the land.

The **'restore the native bush' option** calculating the net cash value of the taxation treatment is not simple (the methodology is described in Volume IV). It showed a marginally better rate of return because of the taxation benefit to be derived from gifting the land to a special purpose trust to hold the restored and preserved native pine bush land. The cash value of this was estimated to be $780 per ha, compared with the net cash value of the 'develop for dairying' option of $630 per ha, as discussed above.

The owners considered the 'restore the native bush' option was the best option because it would also enhance the appearance of the agricultural land and provide some wind protection. Although the land covenant route seemed at first sight to be more attractive, it is not as certain as the gift route because of the different approach taken by the AVO to valuing the covenant to arrive at the taxation deduction.

Submitting these figures to a cost benefit analysis found that the economic rate of return was 21% based on the value for high integrity native vegetation accepted by Government for the Upper South East of South Australia[13]. The financial rate of return due to the taxation incentive was estimated at 14.4%, indicating that restoring and preserving native bush on marginal agricultural land can be financially

attractive. A key assumption here is that the biodiversity values accepted for the Upper South East would be accepted for the Coorong Dairies area. At present there is no set method for determining this.

The case study is considered to be relevant to a great many possible degraded land areas as in most cases there will be land of interest to a land repair fund that is marginal in terms of agricultural use and which might therefore be more appropriately set aside for natural bush land. However, investors will require an unambiguous and transparent system for determining the value of desired ecosystem resources to forward commit funds for such rehabilitation.

4.3.2□□□□ Case Study Two: East Wellington Murray Swamps

A potential client acquired an option to purchase 170 ha of degraded River Murray banks and adjoining formerly irrigated swamps. The hill land had some 92 freehold titles remaining from a 19th century town plan now consisting of wind blown eroding sand hills and an old quarry being used as a dump. The former irrigated swamp land is up to 4 metres below the river behind a levee bank. It is a degrading salinised waste land containing a poor quality tree lot showing evidence of salt damage.□□

The question facing the client was whether to sell the highland to developers associated with a nearby marina who would be able to utilise some of the land titles to form more marina blocks and to abandon the swamp land, or to attempt to find a development option that would enable the swamp land to be converted into a wetland that would contribute to the health of the river. We commissioned a wetland specialist, an engineer and a developer to investigate this option and discussed options with Local and State Government. Two options were considered and the results are briefly discussed below.

The **'do nothing option'** (base case) was to sell the highland to the neighbouring developer. This was profitable and contained no risk but would result in abandoning the swamp land. Considering the quantity of this type of land appearing in the lower Murray (around 5,000 ha) and the cost of creating wetlands, it was considered that without private investment this land would deteriorate further and eventually contribute much more salt to the river as the hydraulic pressure of the higher river forced this salt to the surface. Local government did not like this □do nothing□ option but the existing development plan precluded any other practical option.

The main option analysed was that of developing the highland and swamp land as an integrated whole to maximize the amenity value and to develop a functioning wetland with a wetting and drying cycle. The analysis revealed that only a high value development could afford to include development of the wetland and that approvals for this, if successful, would take some 18 months.

We concluded this was probably the reason the adjoining developer was only interested in buying the high land. We also concluded that if development planning approval can be achieved for all of the proposed changes, the rate of return (estimated at 19% pa) would meet industry expectations and it would take around 10 years for the investment to mature. Submitting the whole enterprise, including gifting the developed wetland to a special purpose trust, to a cost benefit analysis showed an economic rate of return of 12.2% and the financial rate of return of 11.2%.

This case study is considered highly relevant to many areas in the Murray Valley corridor where degraded land exists near urban or potentially valuable amenity areas. In such situations it will often be possible to find sufficient private investment attracted to the amenity and □environmental□ value to fund the desired rehabilitation.

This project has been taken up and the land is in the process of being rezoned to permit the proposed new uses. This rezoning is now in the public consultation phase and has taken about twice the time originally

estimated, even through the project received public support form the Minister of State Planning early in the period and Council had expressed strong support for the rehabilitation of this land as proposed. At the time the project was initiated the NRM board had only just been formed and were not in a position to assist in this process. The actual potential for NRM boards to assist with planning processes thus remains to be tested.□□□□

4.3.3□□□□ Case Study Three: Murray Valley Corridor Vegetation Change

Case study setting: we understood that the Government wishes to act to induce land owners in particular areas of the Murray River Corridor to change dryland grass vegetation to perennial plants in a manner that would greatly reduce salt accessions[14]. The locations of this land have not been publicised but are understood to be where the hydrogeology is conducive to salt leaching to the river. We understood the areas of land where the impact of this salt accession is greatest□ (about 50% of the total) is quite small, less than 3,500 ha, although action over another approximately 18,000 ha would also produce a significant impact.□

We understood the background to this is a Government obligation to reduce salinity accessions to the river under agreements through the MDBC. Government has invested in salt interception schemes to achieve this by pumping deep salty aquifers, now entering the river, away from the river to evaporation basins and this has been quite successful. However, the potential for further cost effective schemes is limited; hence, the interest in plant based solutions to reduce other accessions to the river.

We looked for a combination of incentives and income that might enable a land repair fund to change vegetation in the Murray corridor. We understood that although modelling is suggesting a cost-effective case for incentives to induce planting of perennial vegetation close to the river, the policy settings and precise form of incentive have not been decided. We also considered other possible incentives to plant or preserve perennial vegetation, including preserving native bush and rare or endangered species and the possibility of investor interest in paying for tree planting to sequester carbon.□

We investigated three specific sites along the river where such vegetation changes may be beneficial. The costs and benefits of possible land use changes were modelled to assess the level of private returns while fulfilling NRM objectives of Government and the regional community. Three situations were assessed and are discussed briefly below.

The Noora basin situation (a farmer already planting trees to alleviate wind erosion and worried about rising saline groundwater from the Noora evaporation basin): This property is near Bugle Hut and outside of the 5 kilometre corridor where salt accessions to the river were seen as significant. The only incentives thought to be available for this situation were payments to plant trees to sequester carbon.□ Likely carbon-sequestration credits are estimated using the Australian Greenhouse Office (AGO) calculator. Analysis showed that compared with present land use (assumed to be returning 8% pa) planting trees to reduce wind erosion and water table rise would not produce measurable economic or financial benefits to the investors. The benefits to the farmer were not quantifiable, although the likelihood of a significant reduction in wind erosion was considered to be strong and significant enough for some farmers to invest un-aided. The likelihood of an impact on suggested water table rise was less certain as the performance of trees in a situation where the saline water table may rise is not easily predicted and indeed may not occur at all depending on the actual salinity experienced and the tree species used.

An investor might look at this situation in two ways, as a purchaser of the land, which would include an involvement in the cereal cropping, or as an investor in the trees.□ As an investor in the land the investment may well be attractive, particularly if the cereal land was degraded so that the profit to be

derived from rehabilitating this can be realised. However, as an investor in just the trees this situation was not judged to be viable financially or for the nation in economic terms. This conclusion may change if a good vegetation option to tolerate the salt and the water logging can be identified.

The Paringa situation: (A retiring farmer interested in leaving replanted land and wishing to continue occupation). This situation is mostly situated within 5 kilometres of the river although whether it constitutes a significant salinity risk to the river was not agreed between different authorities (it is said to vary significantly within a short distance). The incentives thought to be possible included payments from an investor interested in sequestering carbon (as above), taxation incentives and the taxation relief possible by gifting the land on which the trees were planted to a Designated Gift Recipient (DGF) and payment for salinity reduction. The land to be re-vegetated has a rocky cap unsuitable for dryland cultivation but can be used for vines. Most of the land is fenced. About half is used for dry land cropping.

Analysis revealed that the quantifiable benefits from revegetating the 50% rocky land approximately equals the benefits derived from grazing this land. If a viable area of grapes could be developed from ripped rocky land, the economic return would rise to 13.6%.

In financial terms, revegetating the rocky land would provide a small positive return over the present use of the land due to the taxation benefits. Adding the vineyard development would increase this rate of return to 13.8% above the returns from current use.

We concluded that this would be a valid investment but when we attempted to validate the estimates of carbon that would sequestered to consider a possible investment, we discovered that actual measurements of past re-vegetation suggested that no more than half of the AGO calculator estimates could be expected. Considering this factor, the only option that would be attractive to an external investor would be the one that includes the option to plant grapes (or some other irrigated agriculture) on part of the land, where this might be shown to be safe.

It is to be emphasised that no firm conclusion was possible on whether any of the land could or could not be developed for more intensive agriculture. However, the case is considered relevant to many marginal situations along the river where a □trade off□ may be possible between desired environmental outcomes and social objectives, such as the increased production that would result with a more appropriate land use than exists at present[15].

The Murbko Situation:□ (A farmer wishing to revegetate some of his land and to remain living there with a view of the river). This situation included a significant area of flood plain, an adjoining area of sandy hill with evidence that seepage to the river occurs under it, and an area of dry cultivation and Mallee scrub behind this. This land comprised a total of some 2,000 hectares in one section, all lease hold. The farmer wanted to subdivide the land to satisfy the terms of a will that was written at a time when subdivision was not subject to development planning approval. The subdivided land was to be sold for irrigation development. However, the landholder now fears that to do this the flood plain would be taken away, including his desired hill country.

This solution will not suit any of the stated purposes as the irrigation land will be developed leading to more seepage, the flood plain will revert to a reserve some feel will not be looked after and the farmer will lose his high land. (This feared situation may not be fully realised but it is the situation investigated as described by the farmer).

The incentives considered to be available included the investor interested in paying for tree planting to sequester carbon and a payment to plant perennials to reduce salt accession to the river from leakage under irrigated or other crops. It was recognised that the high banks with views of the river had an

amenity value but, as with the East Wellington case, this would be difficult to realise under the existing planning rules. The farmer, however, valued his land at $3 million dollars which includes a significant margin for the amenity value and so this was used in the analysis. There were no agreed figures for the value of possible salinity credits as the policies and regulations have yet to be developed. Unpublished figures generated by DWLBC using the SIMPACT model were used for illustrative purposes.

The analysis revealed that the economic benefits of revegetating the land within 5 kilometres of the river based on its opportunity cost and on receiving carbon and salinity credits were better than the present use at 10.3%, while financial benefits using the farmer□s estimated market value were negative, even accounting for the taxation benefit derived from gifting the land with trees on it to a DGR.

It was concluded that this investment was not attractive to an external investor based on the farmer□s notion of value. It is likely that the farmer would, in the end, accept a lower price, in which case the exercise would become more attractive as an external investment. However, this would not make the best use of the land from the broader community view. A better option would be to plan for development based on the most valuable use of the land including that part of the land that has a high amenity value, not just considering it for its agricultural or salinity and carbon credit value.

Although the option of considering a subdivision on the highland similar to East Wellington was not analysed, we do think this would satisfy more of the farmer□s and the community□s desires while producing the benefits sought by government and a good financial return to external investors.

4.3.4□□□□ Conclusion and Possible Future Action

The task of changing the mix of land use in the Murray Corridor is quite complex and while there are attractive elements, such as improving cereal farming and irrigation practices and potentially realisable amenity value, there are many elements that will require incentives to induce broad scale changes in land use and land management practices. There is a clear role for regional bodies such as the Natural Resource Management Boards to assist a land repair fund to forge partnerships with community groups and farmers wishing to partner in group development.

A Quid Pro Quo planning regime would, in most cases, provide an outcome better for the community and investors than a situation where development planning was subject to a very time consuming process involving different authorities, many of whom are not resident in the area. There seems instead to be a role for one or more land repair funds to work with regional natural resource management boards to channel investment into desired NRM outcomes. Structuring a legal arrangement that would facilitate such interaction is a challenge.

5. Conclusions

There is a wide range of structural, legal, financial, investment and fiscal options available to assist in encouraging private investment in the repair of degraded lands in Australia. It should be possible to attract investors who are seeking longer-term returns on investment assisted by appropriate tax concessions.

A single, fixed structure and business model will not address the significant variation in conditions and needs relating to particular properties or areas in need of repair. The appropriate business structure may vary significantly from case to case. It is this area in particular where government could play a role in facilitating private investment in funds that will, in turn, invest in large scale land repair activity.

The case studies discussed in this paper demonstrate that investment in land repair can be financially attractive. The main drivers of profit are derived from the scale of operation and leading management practices that have historically generated attractive returns in top performing Australian farm businesses. Additionally, in dealing with large scale land repair activity, there is scope to significantly reduce transactions costs in the provision of incentives for on-ground works and other landscape rehabilitation activity.

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See, for example, Premier□s Round Table on Sustainability (2004 and 2005).

□□□ See, for example, Davidson, Elliston, Kokic and Lawson (2005).

□□□ A study funded jointly by the SA Centre for Natural Resource Management using National Action Plan II funds and Land Repair Australia.

□□□ Health here is linked to the concept of □ecological integrity□ where the different ecological subsystems tend to act to reinforce each other to continue to deliver the services expected by the community and, applied to the River Murray, this is related to the concept of □a healthy working river□.

□□□ Degradation is used in the sense that changes in the local ecosystem reduce its capacity to deliver the desired services.

□□□ Huylenbroeck and Durand (2003).

□□□ Notably in Volumes II of the Land Repair Study, the principle author of which was Morison.

□□□ National Land & Water Resources Audit 2002.

□□□ As reported in Volume 1 of the Land Repair Study, the principal authors of which where Drew and Leake, three papers published in 2002 and 2003 summarise these findings Sadras, Roget and O□Leary (2002a, 2002b) and Sadras, Roget and Krause (2003).

□□ See for example Martin et al (2000) and Beattie and Hamilton (2001).

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□□ Connor and Bryan (2006).

[15]. In the course of these investigations, maps that Government is preparing to help such decision making were inspected and these suggested that development in this particular site would not be desirable, however the case is still instructive.