

**Submission to the  
Standing Committee on Environment and Heritage**

**Inquiry into public good conservation –  
Impact of environmental measures imposed on  
landholders**

**A case study of natural resource cost sharing for works in the Liverpool  
Plains**

*Investment Programs and Institutional arrangements for effective resource  
management*

**Liverpool Plains Land Management Committee  
PO Box 546 Gunnedah NSW 2380**

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## **Executive summary**

Natural Resource Management (NRM) has already undergone several critical phases in the Planning, Research, Implementation, Monitoring and Evaluation model (PRIME) developed by Syme, Nancarrow and Butterworth (1994). Concurrent developments are occurring in all but one PRIME activity - Implementation. The lack of developments aimed at improving the application of desirable practices has been caused when public and private stakeholders claim higher priorities for scarce resources. This tends to be combined with stakeholders using the other participants as an excuse for non action. Results are the slow adoption and application of appropriate management practice. In many catchments this is putting the long term integrity and productivity of resources under severe and potentially irreversible threat. Current responses are fragmentary, least cost and crisis driven.

Policy and resource managers are seeking an expanded range of applied approaches that are rational, institutionally sound, practical, individually responsible and anticipatory. This project will address several important issues;

1. the extent to which the restoration or control of natural resource degradation problems in dryland catchments should be funded;
2. the level of public investment on private land for a mixture of public and private benefits;
3. the practicality and acceptability of identifying, allocating and accounting for investment, between all stakeholders, to sustain land and water resources.
4. what mechanisms are required to ensure efficient and equitable collection and distribution of those funds, and
5. what performance and accountability criteria should be incorporated into such mechanisms.

Considerable work has already been done to identify the nature and extent of natural resource issues in the case study catchment. This has included various geophysical surveys, and assessments of a range of modified or alternative land use practices to address identified problems. Some of this work has also involved modelling likely farm, physical and financial, impacts of various resource degradation scenarios, with and without adoption of modified land use activities.

An important outcome of one study related to rising water tables and associated dryland salinity shows there will be major difficulties faced by farmers if they try to manage these on-farm problems as individuals. These difficulties arise because they are common property problems, which cannot be adequately addressed under existing institutional arrangements. Even with more appropriate institutional arrangements, there remains the fact that some problems have a history predating existing individual stakeholders. This raises the questions of equity about who should pay. Also the capacity of individuals to pay may in some cases be insufficient to redress inherited problems.

The project has undertaken works to help answer all of the questions above. The delivery of the economic analysis in late May of this year will provide the framework for all participants to gauge their respective costs and benefits and for the project to begin the negotiations between all beneficiaries for their commitments, or otherwise, to the funding and implementation of the Liverpool Plains Strategic Action Plan.

While the answers to questions 2 to 5 can be addressed within the project the final outcome will

always be the degree of agreement among all of the beneficiaries to the first question. The preliminary results of the economic analysis has provided some interesting points relating to the apportioning of costs and benefits, internally and externally, and the effects that unpriced costs and benefits will have on the final outcome.

It has been possible to distribute all priced (productive) costs and benefits and allocate these among different components of the landscape. These costs relate to items such as soil and nutrient movement, surface and sub-surface water movement and its related impacts on dryland salinity, water quality for downstream irrigators and flood frequency. The preliminary analysis indicates that the catchment will have a positive cost/benefit ratio for the implementation of the plan.

The analysis indicates that when all priced costs and benefits are distributed and all those that should pay, pay, and all those that should receive benefits, do, there are still some landscape areas of the catchment that bear the burden of change. In these areas, despite meeting all of their obligations to the necessary cost sharing arrangements they still are out of pocket. They are bearing the burden of the unpriced items that do not, and to date have not been able to be, included in any economic analysis of this nature.

These unpriced items include bio-diversity, healthy rivers and functioning eco-systems. Despite the catchment having a positive cost-benefit ratio and all obligations being met there is still a cost for implementation in some landscapes. These costs are in the tens of millions of dollars and cannot be attributed to any polluter or beneficiary. They are 'public good' costs that are part of any agreement that the Liverpool Plains will attempt to negotiate for the implementation of its management plan.

The Liverpool Plains Land Management Committee, through this project, is asking for answers to the questions previously listed. It may well be that, collectively, we are not prepared, or able, to contribute either the funding or the commitments that will be needed for this catchment to fully deal with its natural resource issues.

The following sections are made up of some of the boxes that we have looked into for answers. The outcomes from your inquiry will give as much as is asked and we would look forward to having the opportunity to present the results of the economic analysis and our continued discussions to the committee.

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**SECTION 1, Page 5, Delivering Landscape Scale Management Change** A summary of the Liverpool Plains, the Liverpool Plains Land Management Committee and its aspirations.

**SECTION 2, Page 10, Cost sharing project communications summary**, “A case study of natural resource cost sharing for works in the Liverpool Plains”

**SECTION 3, Page 12, A discussion paper for a meeting of the Liverpool Plains Land Management Committee**, Gunnedah, 2nd September, 1997 “Cost-sharing principles for Integrated catchment management: Some conceptual and practical issues”

**SECTION 4, Page 17, Economics of cost-sharing for agri-environmental conservation**, Graham R. Marshall, Department of Economics, University of New England, Prepared for the project LPM2 *Investment Programs for Effective Natural Resource Management*, funded by the Land and Water Resources Research and Development Corporation.

**SECTION 5, Page 37, Design of an Action Plan (Implementation framework)**, Discussion paper for the application of the Cost Sharing principles for the Liverpool Plains Land Management Committee.

**SECTION 6, Page 44, Liverpool Plains Catchment Vision Statement**

**SECTION 7, page 46, Cost Sharing Principles**, Brief overview of the MDBC Community Advisory Committee’s principles.

**SECTION 8, Page 47, Institutional arrangements for effective Natural Resource Management in the Liverpool Plains**, Discussion paper for the implementation of a Catchment Action Plan for the Liverpool Plains Land Management Committee.

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## **Delivering Landscape Scale Management Change**

The Liverpool Plains Catchment covers approximately 1.2 million hectares of the Upper Namoi River Catchment. It is well defined in the classical understanding of a catchment with surrounding ranges and interspersed hills shedding excess water onto the floodplain. This water traverses the broad, flat valley and exits via a single drainage point, the Namoi River, in the north.

Salt has long been a recognised component of the landscape, slowly building by annual additions from rainfall and sometimes manifesting itself at the soil surface. For centuries however, the salt has mostly remained lower in the soil profile, immobilised by an equilibrium reached between vegetation types, their cover, soil types and rainfall.

In more recent years, intensive land use has upset the equilibrium, recharge to groundwater has increased and water tables are rising, mobilising salt in the landscape. Rivers and streams in the Liverpool Plains are now delivering high levels of salt to the Namoi River and it is predicted that salt exported via the Namoi into the Barwon River will more than double within the next 100 years.

This project aims to deal with the problem at its source – the recharge areas of the Liverpool Ranges. It will achieve this through implementation of the Liverpool Plains Catchment Strategic Action Plan (LPCSAP), 2000 – 2010. The LPCSAP combines the results of eight years extensive scientific research with landholder expertise to develop management strategies specific to defined land management units across the catchment. It is therefore able to deliver salinity outcomes within an integrated catchment management context.

### **The Liverpool Plains Land Management Committee (LPLMC)**

The Liverpool Plains Land Management Committee (LPLMC) is a community-based committee and umbrella organisation for 47 landcare groups. It formed in 1992 as a result of concerns about dryland salinity and floodplain management. In response to increasing general awareness of natural resource issues and the impacts that these land-use issues were having on water quality, the interests and involvement of the committee have broadened and now embrace all aspects of natural resource management in the Liverpool Plains.

An early decision of the LPLMC was to undertake an extensive research program. Its aim was to accurately describe and document the physical and biological characteristics of the catchment and to establish the scientific basis for the various natural resource issues confronting the community. Participation in many research projects and direct involvement in two national Research and Development programs, the National Dryland Salinity Program and the National Eutrophication Management Program, has delivered a large body of scientific literature focusing on the natural resource management issues, including their extent, severity, causes and necessary management responses.

This approach of ‘research first’ distinguishes the LPLMC, and it has now been able to develop a plan with a better opportunity of delivering solutions as it has built a solid scientific knowledge of their causes.

## **The Liverpool Plains Catchment Strategic Action Plan (LPCSAP)**

The LPLMC is now at the stage of implementing its Strategic Action Plan. It has attracted a diverse range of stakeholders who wish to be collaborators and partners. These partners include DLWC, WWF, NSW State Forests, NSW Agriculture, the CB Alexander Agricultural College and the Gunnedah Shire Council.

Their participation, knowledge and varied skills will provide this next phase with a very broad depth of intellectual scrutiny, management expertise and access to those developing innovative and new methods of delivering outcomes to meet sustainable land and water use.

A series of Landscape Management Units (LMU's) has been developed for the catchment. These have been identified and mapped by the amalgamation of geology, topography, hydrology and other characteristics. Based on the LMU's, the plan assesses and demonstrates appropriate catchment scale management options. The management options are based on combined research and landholder expertise and are aimed at achieving target land, water and vegetation improvements. The adoption of these management options will re-establish water balance in the landscape, limit recharge to saline aquifers, reduce mobilisation of salts and stabilise salt loads in rivers and streams.

### **Implementation of the Action Plan**

The planning process is only justified by implementation and the committee is now developing responses to the question: **What arrangements should be put in place to make the plan happen?**

We know now that our original concerns need to be treated in the context of the catchment as a whole, recognising the linkages between all natural resource issues. We also know that in natural resource management, cause and effect can be widely separated, both in time and in space. These problems, and others, such as the need to satisfy the sometimes widely divergent views of many stakeholders and concern about the spending of public money on private land, make whole of catchment plans extremely difficult to implement.

The increasing focus on natural resource issues has highlighted the inadequacy of current management structures to deliver the necessary solutions to identified problems. There is an urgent need to establish equitable and regionally appropriate combinations of instruments for implementing natural resource management plans, particularly in areas where the lack of compliance mechanisms have impeded external investment, for example in dryland agricultural areas.

Natural Resource Management (NRM) has already undergone several critical phases in the Planning, Research, Implementation, Monitoring and Evaluation model (PRIME) developed by Syme, Nancarrow and Butterworth (1994). Concurrent developments are occurring in all but one PRIME activity - Implementation.

In order to determine who, if and how the community is to afford to pay for the recommended on-ground works, LPLMC is co-ordinating a Land and Water Resources Research Development Corporation funded project titled "Investment Programs and Institutional Arrangements for Effective Resource Management", or Cost Sharing Project.

The objective of the Cost Sharing Project is "to develop and deliver a validated methodology for implementing Natural Resource Management investment strategies which take into account acceptable cost sharing and institutional arrangements, using the Liverpool Plains catchment as a case study." It has delivered the methodology, and is in the immediate process of delivering the economic study into the costs and benefits associated with full implementation of the recommended management options, using the LMU's as the central unit. This will allow greater clarity on the internal, and external, costs and benefits.

- Policy and resource managers are seeking an expanded range of applied approaches that are rational, institutionally sound, practical, individually responsible and anticipatory. The Cost Sharing Project addresses several important issues;
- the extent to which the restoration or control of natural resource degradation problems in dryland catchments should be funded;
- the level of public investment on private land for a mixture of public and private benefits;
- the practicality and acceptability of identifying, allocating and accounting for investment, between all stakeholders, to sustain land and water resources.
- what mechanisms are required to ensure efficient and equitable collection and distribution of those funds, and
- what performance and accountability criteria should be incorporated into such mechanisms.

An important outcome of one study into rising water tables and associated dryland salinity shows that farmers will face major difficulties if they try to manage these on-farm problems as individuals. The difficulties arise because they are common property problems, which cannot be adequately addressed under existing institutional arrangements. Even with more appropriate institutional arrangements, there remains the fact that some problems have a history predating existing individual stakeholders. This raises the questions of equity about who should pay. Also the capacity of individuals to pay may in some cases be insufficient to redress inherited problems.

To determine a method of implementing an Action Plan, an Hypothesis was developed and will be tested. The hypothesis is as follows:

- All land managers in the Liverpool plains need financial and other related assistance to implement changes to their current methods of using the land and water resources for their Vision to be realised. Current assistance methods are not considered as adequate, or directed correctly, to implement the scale of change needed. The financial resources of the present land managers are not adequate to meet the costs associated with these changes. Declining terms of trade will not produce an incentive for change. Other than maintaining the productive capacity of the land and water resources there are no other incentives to implement change. Current methods of change are disincentive driven.

• The Liverpool Plains Cost Sharing Project used the Murray Darling Basin Community Advisory Committee's Cost Sharing Principles to postulate 8 design criteria for a framework which would allow government, other beneficiaries and the catchment to assume their responsibilities in rehabilitating and maintaining natural resources. It has assessed a number of different plan delivery mechanisms against these criteria.

**Through this process, Environmental Management Systems (EMS) has been identified as the most appropriate tool for the adoption of sustainable practices. This is consistent with the proposed national strategic approach outlined in the discussion paper, Managing Natural Resources in Rural Australia for a Sustainable Future (p 20).**

EMS is a tool that allows any industry to manage its impact on the environment through the implementation of a plan–do–check–review cycle. It allows for continuous environmental improvement in a commercial context. It is repeatable and objectively verifiable allowing for both self-assessment and independent auditing and certification. It is therefore compliant and overcomes problems associated with cost sharing and the spending of public money on private land. A compliance mechanism has always been lacking for dryland agriculture. EMS fulfils the requirements of a framework suitable to deliver management change while also accommodating cost sharing and a wide variety of land use, catchment processes, numerous stakeholders and varied policy makers.

Using EMS, the LPLMC wants to link the implementation of specific, landscape based management options to incentives provided, ultimately, by the market (Figure 1). These incentives yet are to be quantified, however, whether they provide market share, continued market access or market preferences, they will need to be identified and an analysis undertaken to assess whether they are currently available, emerging or non-existent.

A major component of this current proposal is to develop innovative market mechanisms and appropriate long term incentive schemes to make it possible for a critical mass of investors to participate in EMS. A market will only develop if participants are identifiable, compliant and can reap a ‘reward’; the ‘product’ can be differentiated, identified and audited; and those that do not participate are directly excluded and therefore cannot free-ride on the efforts of participants and investors.

In the Liverpool Plains, initial efforts aim to encourage more people to participate by offering three different entry levels which would vary in their stringency and audit requirements, and vary proportionally in their eligibility for external funding.

- Level 1      At this level landholders would work to achieve technical best management practice (that is comply with research recommendations without social or economic modification), and would be subject to a full external audit. Priorities and impediments to adoption would be identified. This level would demand the highest level of commitment from landholders and, accordingly, would attract the highest level of funding.
- Level 2      This would target specific action through an auction or tender process. At this level there could be some social or economic modification to the management options and, if less demanding, funding to overcome impediments to adoption would be less. The audit may be less rigorous (still external but perhaps by another landholder). Stewardship arrangements would be developed to preserve the land use change in the long term.
- Level 3      This would involve farmer groups (of up to 10 farms) or Landcare groups. Group activity and funding would be co-ordinated to encourage continuous improvement and deliver targeted outcomes. Activities would be funded only if consistent with the regional strategy of the LPCSAP. Projects would be self audited and therefore attracting the lowest level of funding.



This methodology also offers potential for the further use of salinity credits. Investors could include governments, industry or other landholders and the outcomes purchased could include lower salt loads in rivers, carbon sequestration or biodiversity values. Investors would thereby fulfil industry, regulatory or philosophical objectives. At the same time participating landholders would meet the audit requirements of their Environmental Management Systems and, as a result, gain the ongoing benefits of market access.

### **Monitoring and Evaluation**

Much of the monitoring will focus on the Mooki River which is fed by streams originating in the Liverpool Range saline aquifer recharge areas and which delivers high levels of salt and nutrients to the Namoi River. The MDBC Salinity Audit reports that salt loads in the Mooki River at Breeza will exceed 800 EC 41 – 60% of the time by 2020. Results from the National Eutrophication Management Program show that, while the Mooki makes up only 20% of the Namoi flow at Gunnedah, it contributes 90% of the fine suspended sediment and phosphorus.

There is an urgent need for a framework that is able to co-ordinate and implement planning strategies and deliver consistent management options and outcomes which address the continuing degradation of the landscape. The framework needs to be structured to: work on a scale that engenders ownership and commitment of 'members'; pull together expertise; co-ordinate issues; deliver consistent policy; link land use change with socio-economic impact; resource implementation and enable long-term planning.

If they are to participate in this process, governments and the community as a whole, must decide how far they are willing to go. Consumers need to take a conscious decision to share the costs of sustainable management and move above the minimum threshold levels set by legislation.

### **References:**

Newsletter of the National Association of Forest Industries, 1997

Global Green Standards ISO 14000 and Sustainable Development, International Institute for Sustainable Development, 1996

Managing Natural Resources in Rural Australia for a Sustainable Future, 1999.

## SECTION 2

### **A case study of natural resource cost sharing for works in the Liverpool Plains**

#### **Aim**

To develop and deliver a validated methodology for implementing natural resource management investment strategies which takes into account acceptable cost sharing and institutional arrangements, using the Liverpool Plains catchment as a case study.

#### **Background**

The main argument for many now when it comes to our environmental conservation is:  
**who pays for it?**

Using a detailed cost sharing framework identified by the Murray Darling Basin Commission's Community Advisory Committee, decisions might now be made about benefits and costs and the mix of various on-ground works considered appropriate.

Getting works underway in the past has been difficult - they've often been fragmented and driven by least-cost and crisis factors. We can all benefit from a framework that will show us more applied ways that are rational, institutionally sound, practical, individually responsible and anticipatory.

#### **The project**

The project leader is Jim McDonald, a farmer and former chairman of Liverpool Plains Land Management Committee. He says any cost sharing arrangements should include social and unpriced environmental costs, not just dollar costs. There are community and social values to be considered - helping those who can't help themselves, or helping those who are affected by your action or inaction.

There are two linked parts. One will establish principles for deciding appropriate sources, mix and extent of investments. The other will develop and recommend arrangements to simplify the application of those investments and recoup the expected benefits from them.

The project addresses these issues:

- how much we should spend on restoration or control of natural resource degradation
- how much government spends on private land for everyone's benefit.
- how practical and acceptable it is to identify, allocate and account for investment to sustain resources
- what we have to do to ensure efficient and equitable collection and distribution of those funds.
- how we tell if and when we're doing it right - and how to tell how to do it better.

The research examines not only the question of who pays and the management of natural resource sustainability issues, but also identifies when, and if, the second stream is needed to complement cost sharing arrangements.

## **Progress**

Liverpool Plains stakeholders are being involved in this project - they're telling us what their needs are and what catchment management issues must be dealt with. These people are those who might have a direct ownership or responsibility for catchment activities and planning.

So far the research team has reviewed the Murray Darling Basin Commission cost sharing literature to look at theory validity and identify NRM investment strategies. It has determined that the principles are basically sound.

With respect to investment strategies a plan versus no-plan scenario is being undertaken, a do-something or do-nothing look at the catchment - because it might be that spending money on some on-ground works might not solve the problem in the first place. This is being combined with the development of the Liverpool Plains Land Management Committee's Strategic Action Plan. The economic analysis will focus on the major catchment changes and the associated major impacts.

The research also recognised that natural resources have been seen in the past as "free". Because of that we've exploited them. Where it's possible there already is a pricing structure that reflects their productive value, however their future and social values need to be 'valued' too.

The Liverpool Plains (1.2 million hectares in northern NSW) Strategic Action Plan for natural resource management will be completed within the year. So far, the project has gone well. There has been some delay because the cost sharing principles developed at the community advisory level, have not been endorsed by higher authorities. The project will continue and by testing them provide an indication of their effectiveness.

## **How will this project and its outcomes help us better manage our natural resources?**

Better defined roles and responsibilities will allow everyone to be accountable for their action or inaction. Effective institutional arrangements and structures will provide for accountability, the transfer of costs and benefits, monitoring of progress and adjustment of direction. It will also give us specific information from the case study profile about threats from resources degradation to the agricultural industries of the area.

The specific outcomes will also include the :

- development of cost sharing arrangements in a study area;
- broader appreciation of underlying principles necessary for effective cost sharing;
- evaluation of the process necessary to develop and negotiate cost sharing arrangements;
- identification of impediments to effective integration of social, economic and environmental needs for natural resource management.

## **Linkages**

The project has important and strong linkages to the, the NSW Department of Land and Water Conservation, LWRRDC, and the national programs National Dryland Salinity Program and National Eutrophication Management Program.

## **SECTION 3**

# **COST-SHARING PRINCIPLES FOR INTEGRATED CATCHMENT MANAGEMENT: SOME CONCEPTUAL AND PRACTICAL ISSUES**

**A Discussion Paper for a meeting of the Research Subcommittee of  
the Liverpool Plains Land Management Committee,  
Gunnedah, 2nd September, 1997**

Graham Marshall  
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### **1. Introduction**

One of the stated activities of the LWRRDC project entitled “Investment programs and institutional arrangements for effective natural resource management” is:

- “Review literature, with respect to the Murray Darling Basin Commission’s cost sharing methodology, to: (a) devise concepts of theoretical validity.”

These concepts or principles are to be developed for the implementation of on-ground works within a catchment plan. The Liverpool Plains catchment is to be used as a case study.

The aim of this paper is to: (a) stimulate discussion in order to identify which concepts and practical aspects of cost-sharing are in most need of clarification; (b) encourage committee members to nominate factors which they feel are critical to the success of cost-sharing arrangements; and (c) give some idea of my current perspectives regarding cost-sharing arrangements. I should let you know that my ‘hands-on’ experience with catchment planning and cost-sharing arrangements has been as an economist working with community working groups formulating land and water management plans for the various irrigation areas and districts of the Murray, Murrumbidgee and Lachlan valleys.

### **2. Checklist of Issues to be Addressed**

Since there are numerous conceptual issues and practical problems to be resolved in designing and implementing cost-sharing arrangements, it would help me to receive feedback from committee members regarding the issues and problems felt to be in greatest need of attention in this project. In order to expedite this process, I have attempted to compile a list of issues of which I am currently aware. No doubt committee members can and will inform me of others.

## **2.1 The place of on-ground works in catchment management**

- Past government-sponsored on-ground works programs for addressing land and water degradation have often failed to yield sustained public benefits; hence it is imperative that current efforts build on the lessons of the past;
- On-ground works represent a ‘technological fix’ to what is essentially a social problem. Past experience has shown that alone they will not succeed; they must be used as part of an integrated package of policy instruments including education, moral suasion, regulation, economic instruments, etc.
- On-ground works are often a second-best alternative to creating incentives for changes in day-to-day behaviour (either by farmers or government employees). In the irrigation context, for instance, greater care in scheduling irrigations can often greatly reduce the need for mitigating drainage problems through on-ground works such as recirculation systems or provision of public drains;
- Prospects of government contributions for on-ground works through cost-sharing arrangements can sometimes distract a catchment management committee from giving due regard to behavioural change as a full or partial cost-effective substitute to works;
- It may be thought that, in terms of the realities of catchment planning, on-ground works have a practical advantage vis-a-vis attempts to change behaviour insofar as implementation of on-ground works is more easily enforced than behavioural change. To the extent that attainment of environmental benefits from works depends on how they are operated, however, this practical advantage is often illusory. This is because there is often a difference between private interests and the public interest with respect to how on-ground works are used. For example, public benefits in terms of reducing soil salinity from farmers installing spearpoint groundwater pumps will be minimal if it is privately profitable only to use them during droughts to provide stock and domestic water;
- Integrated catchment management is currently benefiting from the considerable goodwill and trust that farmers and other citizens have with regard to the participatory process. A significant number of farmers and other citizens have invested considerable time and energy in this process and it is important that their goodwill and trust is rewarded by instituting changes that have a realistic chance of having a long-lasting impact. Consequently there is a rare ‘window of opportunity’ to make fundamental changes to environmental policy. Unless on-ground works are carefully integrated with other policy measures, there is a real risk that they will serve merely as stop-gap measures, rather than as real steps toward a sustainable future.

## **2.2 Which is the appropriate cost-sharing principle for integrated management of rural catchments?**

- Murray-Darling Basin Commission (MDBC) (1996) concluded that, in general, the beneficiary-pays principle is more appropriate than the polluter-pays principle as a basis for apportioning cost-shares among stakeholders with respect to on-ground works. I have a number of difficulties with the logic used to support this position, but seek guidance as to whether further evaluation of the respective merits of the different principles is justified given that the MDBC position seems to have met widespread acceptance;

- ‘Affordability’ of applying a particular cost-sharing principle is an issue not only for farmers and other citizens but also for governments. To date, however, it seems that affordability has been viewed as not being of concern for governments. The beneficiary-pays principle is of course, compared with polluter-pays, more affordable for farmers and other citizens and less affordable for governments. Given the increasing magnitude of environmental problems to be addressed, it is likely that a shift over time to greater use of the polluter-pays principle will be necessary if an adequate response is to be financially sustained - particularly because this principle, by making resource-degrading activities less profitable, would result overall in a considerably smaller environmental problem requiring remediation.

### **2.3 What does the beneficiary-pays principle really mean?**

- How narrow or broad should the definition of a ‘beneficiary’ be?
- The beneficiary-pays principle seems widely to be interpreted as implying that stakeholders should meet costs pro rata to the share of total benefits they receive. According to economic theory, however, this is not necessarily the case. The theory distinguishes between ‘marginal’ and ‘intra-marginal’ beneficiaries and concludes that it is *not* economically efficient to require intra-marginal beneficiaries to meet costs in proportion to the share of benefits they receive. Thus the general presumption of pro rata apportionment appears to be based on equity considerations rather than on economic efficiency.

### **2.4 In what forms should payment of cost-shares be allowed?**

- Various avenues for raising cost-shares from farmers and other citizens on a monetary basis exist, including collection of rates or levies by Catchment Management Trusts (CMTs), special rate provisions under Section 495 of the Local Government Act and provisions for Section 94 Contribution Plans in the Environmental Planning and Assessment Act;
- Cost-shares from farmers and other citizens have to date also been allowed ‘in-kind’. For instance, the value of contributions by farmers/citizens of labour, machinery and other inputs to tree planting programs have been estimated and included as a contribution to a cost-share. In other cases, private farmer expenditure on on-ground works (eg, laser levelling, spearpoint pump systems) has been allowed as an in-kind contribution. Such a policy raises a number of issues:
  - in-kind contributions from all stakeholders, including from government agencies, should be allowed equally. It would be inefficient and inequitable, for instance, to allow citizen labour as a cost-share contribution but not account for the time spent by extension officers and other government officers in supervising and administering implementation of on-ground works;
  - only the public benefit from in-kind contributions, and, more specifically, only that share of the public benefit relevant to the particular catchment plan being formulated, should be considered when deciding upon the proportion of the cost of the in-kind activity to be allowed as a cost-share contribution. Where a

catchment plan includes an agreement by farmers to adopt on-ground works, for instance, the public benefit would arise only to the extent that the rate of adoption is greater than would be the case without such an agreement and/or the agreement entails the on-ground works being operated more in the public interest than would be the case otherwise. That is, the benefit must be gauged against a realistic without-plan benchmark; and

- only the *net* cost of in-kind activities should be allowed when calculating contributions of stakeholders (eg, farmers) against their cost-share obligations. That is, the cost allowed as an in-kind contribution should be that which remains after subsidies of various kinds (eg, tax concessions, grants, soft credit, etc) have been deducted.

## **2.5 How should the negotiated cost-share for a particular stakeholder group be apportioned among its constituents?**

- Discussion of cost-sharing principles for on-ground works typically is concerned with allocating costs among stakeholder groups. There remains, however, the question of how to allocate responsibility for a group's cost-share (eg, farmers) among its members. Where a part of farmers' cost-share is to be raised by means of a CMT levy, for instance, should the beneficiary-pays or polluter-pays principle be used? Or should a more pragmatic approach, such as basing levies on property values, be considered? Similarly, where a proportion of farmers' cost-share is to be met by in-kind contributions, how should responsibility for performing these in-kind activities be allocated? In this case the issue will often be complicated by the economically-efficient pattern of adoption of these in-kind activities being quite different from the pattern that would be recommended according to either the polluter- or beneficiary-pays principles.

## **2.6 How can agreements to make in-kind cost-share contributions be enforced?**

- Such agreements have typically been of the nature that a particular technology or practice will, in aggregate, be adopted over so many hectares within so many years. Compliance with such agreements has typically depended on 'economic instruments' being applied to make adoption sufficiently attractive for sufficient individuals. Economic instruments include regulations and polluter-pays levies, but the type most commonly used has been subsidies of various forms (eg, grants, tax concessions, soft credit, free skills-training). However, knowing in advance the level of a subsidy that will induce a required level of adoption is highly problematical. Nevertheless, without the use of economic instruments, the 'free-rider' syndrome makes it highly unlikely that global targets will be met.

## **2.7 How are maintenance and operation of on-ground works to be sustained over the long run?**

- Government subsidisation of on-ground works for catchment management through cost-sharing arrangements can be justified to the extent that the initial investments generate sufficiently high and long-lasting streams of public benefits. Historically, however, subsidisation has been limited to the installation of the works with perhaps some provision for a limited period of maintenance thereafter.

In many cases, however, realisation of the hoped-for stream of public benefits depends on a long-term program of works maintenance and also on ongoing incentives for the works to be operated according to the public rather than the private interest. In the past, government agencies seemed to have hoped that their contributions to overcoming the initial hurdle of financing construction/ installation of works would be sufficient to inspire farmers and other citizens to “assume ownership” of the works; and that this sense of ownership would in itself give farmers sufficient incentive to “carry on the good work” into the longer term regardless of the private profitability of doing so. As Barr and Cary (1992) have observed, however, this wishful thinking has usually been sadly misplaced.

- Evaluation of on-ground works therefore needs to acknowledge both the need for, and difficulty of getting commitment to (due to election cycles, etc.), cost-sharing arrangements that are sufficiently robust that maintenance and operation of the works can be afforded through the life of the works. Unless such arrangements can be devised, the risk of lower-than-expected public benefits from on-ground works needs to be realistically accounted for in their benefit-cost evaluations.

### **3. Concluding Comments**

It is clear from the comments above that the issue of cost-sharing arrangements for on-ground works is multi-faceted. The task now is to decide what should be the focus of the next stage of the project looking at how cost-sharing arrangements for on-ground works should be devised within the context of integrated catchment management.

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## **SECTION 4**

# **ECONOMICS OF COST-SHARING FOR AGRI-ENVIRONMENTAL CONSERVATION**

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# ECONOMICS OF COST-SHARING FOR AGRI-ENVIRONMENTAL CONSERVATION<sup>1</sup>

## 1. INTRODUCTION

The problem of how to adequately resource agri-environmental conservation is presently attracting considerable attention from Australian policy-makers. The Murray-Darling Basin Commission (MDBC) (1996) prepared the discussion paper *Cost-Sharing for On-Ground Works* “to provide a basis for better-informed debate on whether paying for sustainable natural resource management is a public, private or shared responsibility among landholders, the community and governments.” More recently, the Standing Committee on Agriculture and Resource Management (SCARM) (1997) issued a draft resolution *Natural Heritage Trust: National Principles for Government/Community Cost Sharing*. Fargher (1997) and Industry Commission (1997) have also contributed to this discourse.

Large demands for resources to enable implementation of the strategies formulated by participatory approaches to agri-environmental conservation have highlighted the urgency of deciding who should pay (Woodhill 1997). Commencing in Victoria in the mid-1980s, irrigators and the state government made important progress in this respect through developing various Salinity Management Plans (SMPs). For each of the Plans, capital and other costs of on-ground works were shared according to a consistent set of guidelines based largely on the Beneficiary-Pays Principle, but to a lesser extent also on the Polluter-Pays Principle. This was a marked change from the previous norm of irrigators paying operating and maintenance costs of irrigation infrastructure investment and government paying the capital costs (Sappideen, Gross and Barr 1992).

More recently in NSW, Land and Water Management Plans (LWMPs) developed during the 1990s for irrigation areas in NSW were strongly influenced by precedents set by SMPs. Based on the apparent success of these Victorian and NSW approaches to irrigated agriculture, at least in terms of governments and citizens agreeing to integrate their conservation efforts and share costs, there is now pressure to adapt these approaches for application to dryland agriculture.

Substantial funds were recently allocated by the Federal Government to the Natural Heritage Trust in recognition of the rapidly increasing demands for resourcing of participatory programs such as these. However, governments in the long run will be unable to address more than a small proportion of the costs of environmental problems associated with agricultural activity (Batie 1986). Thus there is a pressing need to maximise the conservation dividend from the limited government funds that are available. As significant as the cost-sharing advances made in SMPs and LWMPs have been, it is timely to consider whether further advances are required if the overall conservation task is to be afforded.

There appears to be a perception in some quarters that economic efficiency provides an unambiguous basis upon which to choose among the various cost-sharing principles being

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<sup>1</sup> This is a modified version of a paper presented to the 42nd Annual Conference of the Australian Agricultural and Resource Economics Society, University of New England, Armidale, 19-21 January, 1998. The content of the paper does not necessarily reflect the views of LWRRDC or the project manager.

considered. Ambiguity is unattractive to policy-makers because it increases the potential for political arbitrariness or sectoral/regional loyalty to undermine the effectiveness of a cost-sharing program. Accordingly, the aims in this paper are to (a) assess whether economic efficiency provides an unambiguous basis for choosing among cost-sharing principles; and (b) review the extent to which the various cost-sharing principles currently being considered are consistent with economic efficiency.

These aims are consistent with the terms of reference of the consultancy for which the paper was written: “Review literature with respect to the MDBC cost sharing methodology to devise concepts of theoretical validity.” The focus in the paper is accordingly on the cost-sharing principles considered in the MDBC and SCARM publications.

## **2. WHAT ARE ON-GROUND WORKS AND WHY ARE THEY THE FOCUS OF COST-SHARING?**

The first comment to be made about the MDBC’s cost-sharing proposals is that they are restricted to on-ground works. The rationale for restricting cost-sharing to on-ground works is clearly of interest. It is also important to be clear about what ‘on-ground works’ actually means. MDBC (p. v) defined on-ground works as “activities that require capital investment in establishment or construction. ... Examples include: establishment of pastures, shrubs and trees; fencing-off riparian zones, remnant vegetation and gullies and soil conservation earthworks. The cost-sharing framework does not apply to non-works activities such as income foregone from excluding livestock from protected areas, or the purchase of soil conservation equipment and machinery.”

On the basis of this definition and the examples provided, it appears that cost-sharing arrangements would apply only to conservation activities involving on-ground (read “on-site”) establishment/ construction of reasonably durable assets. Even though exclusion of livestock from protected areas represents an opportunity cost to a grazier, it is apparently ruled out by this criterion because the ‘ecological asset’ created (biodiversity) remains less highly regarded than a ‘productive asset’ (eg, fencing or perennial pasture). Soil conservation equipment or machinery is constructed and its purchase clearly represents a capital investment, but it is apparently ruled out because in general it is not constructed on-site.

It is evident from the experience with SMPs and LWMPs that the such approaches have considerable potential to exploit cost-savings available from substituting other conservation options for engineering-type works and from better integrating engineering-type works with other options so as to harness synergies among them. Even though the MDBC has broadened its definition of works to include ‘non-engineering’ works such as establishment of trees and perennial pastures, this definition nevertheless continues to exclude a wide range of potentially important options. This may distort the incentives local communities face when deciding among alternative ways of tackling an environmental problem.

In the Liverpool Plains, for instance, problems associated with groundwater recharge and surface runoff can be ameliorated by introducing farming practices which leave the soil profile drier than would otherwise be the case. Two such practices are planting perennial pastures and intensifying rotations to reduce areas of land left fallowed. Subject to the MDBC definition of on-ground works, the costs of the first practice could be shared with polluters or beneficiaries but the costs of the second practice may not; since each extra annual crop that would be established under the

latter option may be insufficiently durable to be counted as a capital investment. It would not be surprising therefore if the local community showed greater interest in the former option compared to the latter.

Other potentially-valuable options fall more clearly outside the MDBC definition of on-ground works. Considerable conservation benefits can sometimes be obtained by low-cost changes in day-to-day behaviour (either by farmers or government employees). In the irrigation context, for instance, more careful irrigation scheduling can minimise surface run-off and thereby greatly reduce the need for works such as recirculation systems or public drains. A consequence of excluding such options from cost-sharing arrangements is that local communities may neglect them when choosing options to meet their conservation targets.

One reason for restricting cost-sharing arrangements to on-ground works as defined may be the high transaction costs of monitoring and enforcing farmer adoption of other kinds of options. Another reason may be that adequate incentives to adopt some of these other options are provided under alternative arrangements (eg, taxation concessions). These reasons need to be made explicit, however, so they can be debated and so policy makers are better prepared to respond in the future if circumstances change (eg, taxation concessions are removed, or advances in remote sensing technology reduce transaction costs of monitoring day-to-day farmer behaviour).

Any argument based on transaction costs to the effect that cost-sharing arrangements should be restricted to works-type options should in any case be regarded with caution. Future environmental benefits from on-ground works are invariably sensitive to various factors including the ways in which they are operated and maintained. For instance, benefits from planting and fencing tubestock depend on how reliably farmers perform their watering, weed-control and fence-maintenance responsibilities. Watertable-lowering benefits from farmers installing groundwater pumps strongly depend on how much they are used and how well they are maintained.

It is not unusual for private and public interests to differ significantly with respect to how works are installed, operated and maintained. Unless cost-sharing or other incentives are introduced to bridge this difference, farmers' efforts in this regard may be considerably less than hoped for. For instance, governments in the past heavily subsidised construction of on-farm soil conservation works in the expectation that farmers would not require further subsidisation to maintain those works. However, such works have often lacked a sustained impact due to this expectation being overly optimistic (Barr and Carey 1992). Furthermore, transaction costs of ensuring that works are installed, operated and maintained according to the public interest will often be substantial. These costs should be accounted for before passing judgement that transaction costs for works-type options are generally much lower than non-works options.

Where ongoing cost-sharing by government is required to provide sufficient incentive for farmers to operate and maintain works in the public interest, the investment in works is exposed to the risk that subsequent governments will decide to terminate such arrangements. Any comparison of the attractiveness of works against other conservation options needs to account for this risk. Of course this risk can be lessened if government agrees to provide all the funds for ongoing cost-sharing at the outset and allow these funds to be 'quarantined'.

### **3. WHY IS COST-SHARING NEEDED?**

The question of why administered cost-sharing is needed for agri-environmental conservation is addressed in this section. In Australia, after all, it is commonplace to entrust the responsibility for allocating costs of producing or maintaining many goods to markets. Why are ‘conservation goods’ any different?

The main reason is that (i) markets can only arise if those paying for a good can exclude others from the benefits of the transaction, that is, if the good is private; and (ii) it is often not possible to provide conservation as a private good. Private goods are rival and excludable. A good is rival if consumption by one person reduces the amount of the good available for consumption by others, and excludable if the cost of excluding non-payers from enjoying the good is affordable (Wills 1997).

Lack of technological or institutional means to overcome non-rivalry and/or non-excludability often means that there is no alternative but for conservation goods to be consumed as public goods. However, this raises the problem of determining who is to supply such goods. The supply problem arises because the scope that exists for individuals to free-ride on others’ efforts to supply a public good might result in minimal supply (Wills 1997). Although free-riding can sometimes be managed if circumstances favourable for collective action exist or can be created (Lichbach 1996), the solution to date has generally been for such goods to be supplied as a result of government intervention. Unless government is willing to incur the full cost of such provision, there is a need to determine how to share the cost among other parties.

The first cost-sharing principle to be considered is the Polluter-Pays Principle (PPP).

## **4. THE POLLUTER-PAYS PRINCIPLE**

### **4.1 What does it mean?**

The PPP involves full recovery of the costs of treating or preventing environmental degradation from those who cause the degradation. All OECD member governments agreed in 1973 that: “The principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment is the so-called ‘Polluter Pays Principle’ ” (OECD 1975). This commitment was reiterated in a wider arena in Principle 16 of the 1992 Rio Declaration.

The name of this rule is unnecessarily restrictive if taken literally. Pollution (harm associated with emission of wastes into environmental sinks) is only one of many forms of environmental degradation to which the rule has been applied. In this paper pollution therefore refers loosely to harm associated with any form of environmental degradation.

The rule is also unspecific about who is the polluter. According to Pearce (1988), a polluter is a party emitting damaging wastes to the environment. This has often been broadened to any party who degrades the natural environment. Bromley (1996) argues, however, that emissions only constitute pollution when a victim is within the realm of the emission. In some circumstances the victim may be seen as causing pollution by ‘coming to the nuisance’ and should therefore, by Bromley’s reasoning, be regarded as the polluter.

Bromley used the example of a factory emitting smoke and launderers drying clothes outdoors. The factory is the polluter if it arrives after launderers are already established within the

prospective realm of the emissions. However, the launderers may be regarded as polluters if they establish within this realm after the factory is already established.

It not uncommon, however, for 'coming to the nuisance' to be regarded with sympathy by the wider population where it is consistent with society moving toward its long-term goals. Bromley illustrated this with the example of an established feedlot emitting flies and odour being considered the polluter even though a residential developer seeks to establish a new estate in its vicinity. Despite the usefulness of Bromley's perspective, most people's understanding of a polluter accords with Pearce's. Hence Pearce's definition is used in this paper to avoid confusion.

## 4.2 Consistency with economic efficiency

Tilton (1995) suggested that the popularity of the PPP with the general public and policy-makers is explained more by equity considerations than by an economic efficiency motive: it simply seems fair to charge the costs resulting from pollution to those who cause and benefit from it. Nevertheless this rule does further economic efficiency by requiring polluters to 'internalise' costs to society of their environment-degrading activities which they could previously ignore. By effecting this internalisation through taxing polluters, moreover, the PPP results in greater long-run economic efficiency than if polluters were instead subsidised.

Although in the short run the effect of taxing firms a certain amount per unit of their pollution is equivalent to paying a subsidy of the same amount for each unit of pollution that they forego, the long-run effects of the two options are quite different. A polluter-pays tax reduces short-run profitability, induces long-run exit of firms from an industry and thereby reduces the industry's capacity to pollute. This is more consistent with economic efficiency than paying polluters subsidies which increase short-run profits, induce long-run expansion of the industry and thereby increase the industry's capacity to pollute (Baumol and Oates 1988; Pearce and Turner 1990).

Thus the PPP is consistent with economic efficiency insofar as supports taxing polluters rather than subsidising them. Maximisation of economic efficiency, however, requires that polluters be taxed according to marginal cost pricing (Young 1992). The reason is that economic efficiency requires that each input to production be priced at its marginal cost to society. Where conservation activities involve significant fixed costs, however, marginal cost pricing may result in a revenue shortfall (Atkinson and Stiglitz 1980). The MDBC's (p. 55) version of the PPP avoids this problem and is simpler to apply: "... individuals who cause degradation of land and water resources pay to alleviate and manage the problem in proportion to their contribution to the cost of the problem." This is consistent with Pearce (p. 43) arguing that it is fundamental to the PPP that "any tax or charge should be at least proportional to the damage done".

This alternative pricing rule is, however, not the one that results in least sacrifice of economic efficiency if a constraint on revenue shortfall is imposed. The ideal rule in such a case is to apply marginal cost pricing and finance any shortfall by lump-sum charges (Hotelling 1938). A lump-sum charge is one which is unaffected by the level of consumption<sup>2</sup>. In practice, however, it is difficult to find charges that are true lump-sum charges and which are also capable of financing a deficit (Ruggles 1949-50).

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<sup>2</sup> Strictly, such a charge must fall on either producers' or consumers' surplus (Ruggles 1949-50).

The next-best pricing rule from an economic perspective in such circumstances is Ramsey pricing: the mark-up over marginal cost should vary inversely with each consumer's price elasticity of demand (Atkinson and Stiglitz 1980). Thus the mark-up should be highest for polluters whose environment-degrading activity responds least to how much they are charged for that use. Apportioning conservation costs pro rata to environment-degrading activity, as proposed by the MDBC, is therefore no better than a fourth-best way of applying the PPP if the aim is to maximise economic efficiency (or no better than third-best if a constraint on revenue shortfall is imposed).

## **5. EXPERIENCE WITH THE POLLUTER-PAYS PRINCIPLE**

### **5.1 Non-point source degradation**

Much progress has been made in most industrial countries with applying the PPP to pollution from large industrial and municipal point sources of emission (Toby and Smets 1996). The remaining pollution problems typically originate from non-point sources. In such cases application of the PPP is complicated by the considerably greater difficulty of identifying polluters and measuring their emissions. Environmental degradation caused by agriculture often falls into this category.

Difficulties of identifying and monitoring non-point polluters have in some cases been used as a justification for exempting these polluters from liability under the PPP. For instance, the Council of Australian Governments (COAG) (1994) resolved that costs of public benefits or impact management which are unable to be attributed and charged to specific beneficiaries or polluters should be treated as community service obligations. The cost-sharing principles proposed by the MDBC were designed accordingly. Similarly SCARM proposed that the PPP should not apply when it is not possible to identify specific causes of pollution. The OECD Secretariat (1989, cited in Toby and Smets 1996) nevertheless concluded that the PPP should apply to agriculture irrespective of whether its pollution is from point or non-point sources. Similarly, the European Commission (1988, cited in Toby and Smets 1996) stated that the PPP "must of course apply to agricultural activity as it does elsewhere". However, these strong statements have usually not been backed up by actions.

Use of environmental subsidy schemes to reduce agricultural non-point pollution is in fact widespread and growing. There are consequent fears that progress in removing production-oriented agricultural subsidies in industrial countries through the Uruguay Round GATT agreement may be dissipated by new forms of production-enhancing support disguised as 'green' payments (Toby and Smets 1996). Principle 16 of the 1992 Rio Declaration recognised the reality that unilateral application of the PPP by a single country may lower the international competitiveness of its industries when it included the caveat that application of the PPP pay due regard to possibilities of distorting international trade and investment.

The problem with applying the PPP to non-point source problems can nevertheless be expected to diminish over time as new technologies reduce the costs of monitoring these problems (Zilberman, Khanna and Lipper 1997, p. 72). Furthermore, Bromley (p. 19) argued that inability to identify and monitor specific sources of pollution does not necessarily preclude application of the PPP: "... one solves non-point-source pollution problems by forming associations within particular watersheds and making the group of farmers collectively responsible for water quality. If pollution fees are levied, they are assessed against the collective as a group. This then forces



the individuals members of the group to monitor each other's behaviour, and to assess miscreants accordingly.”

This suggests that the term ‘specific ... polluters’ in the above-stated COAG resolution results in non-point source polluters being unnecessarily exempted from liability under the PPP, at least to the extent that it seems to have been widely understood as meaning ‘individual polluters’. However, there are two other reasons why it often has been difficult in practice to apply the PPP to agriculture. The first is that much of the pollution currently observed is the result of past activity.

## **5.2 Degradation caused by past activity**

With regard to the conundrum of assigning liability for environmental damage caused by past activities, Tromans (1995, p. 188) commented: “If contemporary environmental harm is difficult to deal with, then the legacy of past activities presents even more problems ... there arises the very difficult question as to which party or parties should be responsible ... The key issue here is the perception of unfairness that arises from imposing liability for activities that, at the time they were carried out, were in conformity with the applicable law, and indeed may have been in accordance with the contemporary good, or at least acceptable, industry practice.” He continued (p. 190): “Another difficult issue that is often inherent in the cases of historic contamination is the absence of a responsible party, either because that party can no longer be traced, or because they have ceased to exist as a commercial entity, or have become insolvent”.

In the USA, nevertheless, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) passed in 1980, liability for pollution was made retroactive (Tilton 1995). This set a precedent whereby firms may be held liable in the future for their behaviour today, even though they are operating within the law and according to accepted industry practices. However, there is no economic efficiency justification for such an interpretation of the PPP. Since it is simply not possible after the fact to change behaviour in an earlier period, past inefficiencies should be regarded as sunk costs.

Moreover, retroactive liability may create future inefficiencies by increasing the risks that firms and other parties face regarding their environmental responsibilities. In compensation, they will require a higher rate of return on invested capital, resulting in higher consumer prices. The risk premium they will demand is also likely to be higher than the public would be willing to pay to avoid the risk, since the public is in a much better position to spread such risks. The CERCLA experience has also been very expensive in terms of the transaction costs of the legal system trying to determine liability (Tilton 1995).

Equity reasons for applying the PPP retroactively seem equally weak. Firms who in the past polluted within the then existing legal framework were operating according to the accepted rules of the day. If society now concludes their pollution was a mistake that should be rectified, the responsibility for this error lies either with the failure of public policy at the time the pollution occurred or, alternatively, with a changed public preference for environmental resources (Tilton 1995).

The most likely reason for retroactive application of the PPP therefore seems to be governments seeking to limit their expenditures on environmental conservation. For instance, Tilton notes that countries in Eastern Europe, the former Soviet Union, and the developing world, as they

privatise public enterprises, have considered avoiding costs of cleaning up old pollution by transferring this liability to the new property owners.

Although Tilton concluded that equity reasons provide a strong case for government being held liable for pollution caused by past activities, he recognised that ‘second best’ solutions may be required if resistance to increasing taxes and to scaling down existing programs means that governments are not in a position to pay. His preferred second best approach is to tax firms on their output or consumers on their consumption, and dedicate these funds to remediation. This shifts liability to third parties in a way that avoids risk regarding the magnitude of that liability. This approach was followed by the European Community Commission in its Communication on Repairing Damage to the Environment adopted in 1993. In this case funds for environmental rehabilitation were to be raised by levying contributions from the economic sectors most closely linked to the relevant damage.

### **5.3 Politics**

Another reason why it has proved difficult to apply the PPP to agriculture is that this principle challenges the myth that ownership of agricultural land confers absolute property rights unaccompanied by a corresponding duty to steward the natural environment (Bromley 1996). In other areas, such as buildings with heritage significance, it is unexceptional for conservation duties to be imposed on land owners without compensation being paid. Bromley suggests the reason for special latitude being given to agriculture is “the political sentimentality of all things agrarian” (p. 19).

Nevertheless in Australia in recent years there has been increasing realisation of the need to attach an environmental duty of care to ownership of agricultural land. Fargher argued that adoption of the principles of Ecologically Sustainable Development in 1992 by the Federal Government signalled “a transition from resource development to a sustainable resource management approach ... As this transition continues, increasing responsibilities for resource management will be associated with the rights to use land and water resources”. The PPP would apply where resource users fell short of their duty of care, and the BPP would apply where they went beyond it.

Although the MDBC did not refer to a duty of care, this concept is increasingly being adopted by Australian policy-advisers. The Industry Commission made a draft recommendation that a duty of environmental care apply to agricultural producers. Subsequently SCARM resolved: “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”. However, the cost to governments of maintaining the duty of care at around current levels (as seems implied by ‘fair and reasonable’) is likely to become increasingly unaffordable, at least if governments continue to meet the major share of costs allocated to public beneficiaries. This suggests a need for the duty of care to be raised over time.

## **6. BENEFICIARY-PAYS PRINCIPLE**

### **6.1 The User-Pays Principle**

With the PPP having been applied relatively rarely to agriculture, the cost-sharing rule typically used in its place has been the Beneficiary-Pays Principle (BPP). The BPP favours the costs of providing conservation goods (ie, prevention or repair of environmental degradation) being

allocated to those who benefit from those goods<sup>3</sup>. Most case studies described in the MDBC report used modified versions of this principle as the basis for negotiating cost-sharing agreements between governments and community groups.

According to Marsden (1996), there are ‘strict’ and ‘weak’ versions of the BPP. The strict version requires that costs are fully distributed among beneficiaries *pro rata* to their shares of total benefits. MDBC called the strict form the User-Pays Principle (UPP). The weak version requires that all beneficiaries meet some portion of the costs and that together the beneficiaries cover full costs. MDBC called the weak form the Beneficiary-Compensates Principle (BCP).

Of the two versions of the BPP, the UPP has tended to be applied when conservation goods are supplied collectively, either by government or by community-based organisations. A district-level drainage scheme in an irrigation area is one such good. Marsden suggested that application of the UPP to cases where the benefits are essentially private and therefore valued in markets is straightforward. Even so, market benefits can vary considerably among individuals and it is generally too costly to measure how much each individual benefits. The solution typically has been to apportion costs among relatively homogenous user groups<sup>4</sup>.

A further complication where a conservation project has a significant public good component is that individuals can free-ride on the non-market benefits from the public good without revealing how much they benefit. Thus it can be very difficult to estimate total benefits and the shares received by various groups. This is less of a practical problem than it seems at first glance, however, because non-market benefits are often ‘incidental’ to the provision of market benefits (Mishan 1971, p. 112).

Incidental beneficiaries are ‘intra-marginal’ in the sense that they are unwilling to pay for greater conservation than market beneficiaries are already willing to pay for. Since intra-marginal beneficiaries are incidental to the decision regarding how much conservation to provide, it is inconsistent with economic efficiency to allocate to them a share of conservation costs. Intra-marginal benefits should therefore be excluded when calculating total benefits and individuals’ shares thereof. Failing to do so may inappropriately ‘price out’ some intra-marginal beneficiaries’ use of the conservation good and may also, by effectively cross-subsidising the marginal conservation costs for other beneficiaries, result in greater conservation than is economically efficient (Haynes, Geen and Wilks 1986). The MDBC’s (p. 18) insistence that “all people who benefit from on-ground works should contribute to their cost” is thus inconsistent with economic efficiency.

During the 1980s, for instance, the Commonwealth Government moved to recoup its costs of managing coastal fisheries from those benefiting. Although the management effort was primarily directed at conserving fish stocks for commercial fishers, these market beneficiaries argued that it was inequitable to exempt non-market beneficiaries including recreational fishers from meeting a share of costs. Haynes *et al.* concluded, however, that recreational fishers were usually intra-marginal beneficiaries from which it would not be efficient to recoup a share of conservation costs.

Marsden noted that the UPP may also lower economic efficiency by ‘pricing out’ some beneficiaries whose marginal benefits from conservation exceeds the marginal conservation cost

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<sup>3</sup> Siebert (1995) refers to the BPP as the Victim-Pays Principle.

<sup>4</sup> This acceptance of apportioning costs to groups of beneficiaries contrasts markedly with a reluctance to apply the PPP unless it can be applied to individual polluters.

but does not exceed the cost allocated to them on the basis of this principle. Recall that a different version of this problem was encountered when discussing the PPP in the context of a government being unwilling to suffer a revenue shortfall resulting from marginal cost pricing. As in that case, the UPP's response to this problem by way of allocating costs on a pro rata basis is less economically efficient than two-part pricing (marginal cost pricing supplemented by lump-sum charges to cover fixed costs) and Ramsey pricing. Implementation of this last option would need to be applied after careful public consultation, however, to avoid being perceived as arbitrary or biased (Marsden 1996).

## 6.2 The Beneficiary-Compensates Principle

In contrast to the UPP, the BCP has tended to be applied where conservation goods are supplied privately. An example is protection of remnant native vegetation which provides private benefits to a farmer in the form of shelter for livestock and public benefits in the form of biodiversity preservation. MDBC (p. 19) provided a further example of "privately owned and managed wetlands that may increase climatic stability and bio-diversity ...".

Under the BCP, those who are able to privately supply a conservation good are compensated by public beneficiaries wanting more of that good than would otherwise be provided voluntarily<sup>5</sup>. Thus beneficiaries pay private parties, in contrast to the UPP where they pay a collective provider (which has usually been government). The principle underlying the BCP is that the public should free-ride on private initiative as much as possible: "When we decide interfering with the market is justified on public benefit grounds, we only need to do just enough to change the behaviour of market participants in the manner desired ... Throughout the economy public benefits frequently free ride private investment. Good policy takes advantage of this ..." (Hussey 1996, p. 11). Thus compensation should not exceed the additional costs incurred in providing the extra increment of conservation.

Due to the difficulty of apportioning compensation costs to specific public beneficiaries, these costs have typically been met by government as community service obligations as resolved by COAG (1994). Confusion persists, however, regarding which level of government should pay: "it is not certain where the boundaries lie between national, state and local governments when it comes to sharing the costs of activities such as biodiversity conservation, stopping road damage or research and development" (Fargher 1996).

Furthermore, Hussey has been critical of the presumption that government should always meet the costs of providing public benefits: "In regard to most natural resource management issues, I think the case for any general taxpayer funding to secure the much talked about benefits is very weak if non-existent. I reach this conclusion because I think most spillovers can quite easily be internalised to a particular area or region. Any benefits which might spill beyond an area or region are likely to be of a nature which the general community can free ride. It must be remembered that maximising public free riding is in the national interest ... Until such time as we have adequate pricing of individual spillovers, we should apply methods of raising the necessary funding from the catchment population. Only after this has been carefully been considered should we even contemplate the question of whether any general taxpayer funding is justified or needed".

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<sup>5</sup> Thus Hanley, Kirkpatrick, Oglethorpe and Simpson (1996) refer to the BCP as the Provider-Gets Principle.

Such concerns seem to have affected SCARM which resolved: “Government may agree to contribute to land and water management activities where the cumulative up-take of these activities provides significant public benefit or where there is market failure. *However, given the restriction in government funds, it does not follow automatically that government funds should be used*” (italics added). However, raising funds directly from the relevant publics requires an appropriate institutional framework which is largely lacking at present. This is because these publics often cross over several local government jurisdictions. In NSW the Catchment Management Act, 1989, makes provision for this problem to be solved by formation of Catchment Management Trusts which can raise funds directly from specific sub-populations. However, continuing government willingness to pay on behalf of local publics has meant that few such Trusts have been formed.

### **6.3 Second-round benefits**

Finally, there is a need to address the question of whether second-round effects should be considered when applying either form of the BPP. Examples of first-round effects of conservation activity are increased production or reduced production losses, reduced production costs, local government savings on urban water treatment or maintaining recreational facilities, and enhanced recreational experience. Effects such as these typically lead to second-round effects. For instance, increased farm profits due to higher production or lower costs may increase land values. In its list of examples of benefits from conservation works, MDBC (p. 6) included the following second-round benefits: increased land value, increased value of shire real estate and increased regional activity covering several shires.

MDBC also presented a case study of the cost-sharing arrangements for the Upper South-East District in South Australia. From Table B.2 in the case study it is apparent that a range of second-round benefits were included when apportioning cost-shares. These included increased regional economic activity, increased (state) indirect tax revenue, pro-rata gain in state owned land, increased state economic activity, increased (Commonwealth) tax receipts, welfare costs avoided and increased national economic activity.

It is usually reasonable to assume that second-round effects of similar value (although of different character) would occur elsewhere in the Australian economy if the resources to be used in a conservation activity were put to other uses. Thus second-round effects generally represent transfers rather than net benefits to the national economy and should not be considered within benefit-cost analysis (Department of Finance 1991). Similarly, from the national perspective there is no economic justification for including second-round beneficiaries when applying cost-sharing principles (Haynes *et al.* 1986). Of course there may be net benefits for smaller geographical areas from a local conservation project generating second-round effects nearby rather than further away. If this is the case, however, then it should be local beneficiaries that share project costs rather than the general taxpayer population (Haynes *et al.* 1986, Hussey 1996). This appears to be the position adopted by SCARM: “... primary beneficiaries should contribute. Contributions from secondary beneficiaries ... will, where appropriate, be negotiated with the primary beneficiaries.”

## **7. COMPENSATION**

Compensation of those losing as a result of public policy often seems justified by fairness. This is the case with the BCP where private ownership of agricultural land is widely accepted as being unaccompanied by a duty to provide a particular conservation good. However, economists are

aware that compensation needs to be handled carefully if it is not to create incentives which are inconsistent with policy objectives. This problem has been recognised particularly with respect to compensation of pollution victims: “... victims typically have available to them a variety of responses to reduce the damages they suffer ... [C]ompensation of victims is not economically efficient because it weakens or destroys entirely the incentive to engage in the appropriate levels of such defensive activities” (Baumol and Oates 1988, p. 24). It follows that revenues raised by charging polluters for the damages they cause, as required by the PPP, should not be used to compensate the pollution victims.

Some of the perverse behaviours that can arise were indicated by Ferraro and Kramer (1997, p. 196) in their discussion of whether compensation should be paid for wildlife damages to crops, livestock and human lives resulting from declaration of a wildlife reserve: “... the guarantee of full compensation may entice residents to engage in activities that would never have been considered optimal in the absence of assured compensation. Compensation may also reduce the incentives that residents have for engaging in certain behavior changes that may be part of the optimal solution. For example, while it may be more efficient for some residents to emigrate from the area or to intensify production on their current land rather than expand production on new land, compensation may diminish the incentives for such behaviour. Compensation of victims may lead to an increase in immigration to the peripheral zone of the protected area, which may lead to a socially excessive and ecologically damaging amount of activity in the peripheral zone. Such immigration also has the potential to increase the costs of compensation to levels far greater than originally anticipated”.

Rather than compensating victims, however, the BCP involves compensating polluters for opportunity costs of reducing their levels of pollution (since pollution is the opposite of conservation, this is the same as compensating polluters for agreeing to conserve more). If this principle is applied as intended and the compensation provided equals the opportunity cost, profits are unaffected and there are no longer-run consequences. However, polluters often have considerable scope for strategically distorting the information they volunteer about profit losses and other opportunity costs (Wills 1997).

In practice, therefore, application of the BCP can be expected to result in polluters being over-compensated, with the result that rents can be earned from pollution-reduction. This creates perverse incentives for existing polluters and others to increase their capacities to pollute<sup>6</sup>. Thus inefficiencies can arise to the extent that the BCP results in over-compensation for pollution-reduction. These inefficiencies could be reduced if it were possible to design a compensation scheme in such a way that scope to rent-seek was strongly constrained. However, practical and political considerations often hamper such efforts. For instance, lack of data on pollution levels prior to negotiations often means that pollution levels toward the end of negotiations are instead used as the benchmark against which compensation is paid. The often lengthy period of negotiations can provide substantial scope for individuals to rent-seek by raising this benchmark as high as possible.

## **8. SOME PRACTICAL ISSUES**

### **8.1 ‘In-kind’ fulfilment of farmer cost share commitments**

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<sup>6</sup> Tietenberg (1996) illustrated this with the analogy of a hi-fi owner paid by neighbours to reduce noise-making. With noise production thus becoming a profitable activity, formerly quiet neighbours may strategically increase their hi-fi volumes in the hope of extracting similar bribes.

A number of the cost-sharing arrangements finalised to date have relied partly on farmers agreeing to pay a substantial share of their cost share 'in kind'. Farmers generally agreed to contribute by investing in 'best practice' on-farm works which have conservation benefits. However, Hussey's dictum that "public benefits should free-ride private investment to the maximum extent possible" appears to have been overlooked in many of these cases. In general, the full cost of the investment in on-farm works has been allowed as an in-kind contribution despite these works usually providing considerable private benefits to the farmers adopting them.

For instance, the cost sharing arrangements proposed for the Berriquin Land and Water Management Plan included the full value of on-farm expenditures on 'best management practices' (eg, laser levelling, improved pasture management, drainage reuse and storage systems) as an eligible in-kind contribution by farmers against the cost apportioned to them as a beneficiary group (Berriquin Land and Water Management Plan Working Group 1995). This was despite these practices having significant private benefits and despite a recognition in some cases that the benefit from the Plan would largely arise from farmers adopting best practices sooner rather than from increasing the ultimate level of adoption.

In an economic approach to this issue only farmer costs in excess of what they would have incurred without the Plan would be eligible as in-kind contributions. Where best management practices advocated by a Plan are sufficiently profitable that they would be eventually adopted in any case, the Plan would increase farmers' costs only in a present value sense if farmers were required to adopt practices sooner they would have otherwise.

A further issue concerns the risk that farmers will fail to 'deliver' on their in-kind contributions. To the extent that in-kind activities are part of an integrated conservation program, failure to honour such commitments renders a cost-sharing agreement inequitable and means the benefit-cost justification of the program should be revisited. The risk of 'shirking' arises because of the difficulty of establishing contracts with individual farmers regarding fulfilment of their in-kind commitments. These commitments have generally been specified for local farmers as a group, with social forces such as peer pressure relied upon to overcome the temptation for individual farmers to free-ride on others' willingness to honour the group commitment. However, experience demonstrates that such forces need to be strong if shirking by individuals is not to undermine the good intentions of farmers as a group.

## **8.2 Present values as the appropriate basis for cost sharing**

Cost-sharing arrangements usually must deal with costs and benefits of conservation being spread over a considerable period. Since the timing of when particular costs and benefits occur can have a significant effect on their present value, an economic approach to cost-sharing requires that all values be converted to this common denominator. Otherwise the arrangements will favour beneficiaries who receive benefits sooner at the expense of those benefiting later. Also, those incurring costs later will be favoured at the expense of those who incur costs earlier. This seems to have been overlooked in cost sharing arrangement devised to date. For instance, in calculating cost shares for the Berriquin Land and Water Management Plan nominal benefits and costs were summed irrespective of when they were expected to occur (Berriquin Land and Water Management Plan Working Group 1995).

## **8.3 Farmers' capacity to pay**

An issue that often emerges at the stage of actually apportioning project costs on a beneficiary-pays basis is the capacity of farmers to afford the costs allocated to them. There are two reasons why such a concern may arise. Firstly, as noted above, application of the UPP may mean that the cost apportioned to some beneficiaries exceeds the private benefits they obtain from the project. We have seen that this problem can be solved by two-part pricing or by Ramsey pricing.

Secondly, adverse seasons or prices might mean that farmers are temporarily unable to fulfil a cost-share commitment even though their private benefits from a project exceed the cost apportioned to them. However, this is only a real problem if financial institutions are unwilling to provide credit. If this is indeed a problem then the efficient policy response would seem to be for government itself to provide short-term credit until farms are able to trade out of their temporary cash flow problems.

## 9. CONCLUSIONS

The foregoing discussion has demonstrated that the criterion of economic efficiency does not provide an unambiguous basis for choosing among cost-sharing principles in any situation. The efficient rule depends on how property rights are defined, and property rights to many attributes of the natural environment are controversial. Only governments can reduce this ambiguity by better defining these rights. As discussed in section 5.3, there has in fact been increasing interest recently in achieving this outcome by attaching an environmental duty of care to ownership of agricultural land.

Even so, it is useful for economists at this stage to review the extent to which the various cost-sharing principles currently being considered are consistent with economic efficiency. A summary of conclusions reached in this respect follows:

- there appears to be no economic efficiency rationale for limiting cost-sharing arrangements to on-ground works (section 2);
- the PPP is consistent with economic efficiency insofar as it taxes polluters rather than subsidises them (section 4.2);
- if conservation involves fixed costs, the MDBC approach to the PPP of allocating conservation costs pro rata to environment-degrading activity is less efficient than allocating costs according to (in descending order of efficiency) marginal cost pricing, two-part pricing and Ramsey pricing (section 4.2);
- the non-point source nature of agri-environmental degradation does not necessarily exempt agriculture from the PPP (section 5.1);
- retroactive application of the PPP is not consistent with economic efficiency (section 5.2);
- if conservation involves fixed costs, the MDBC approach to the UPP of allocating total costs pro rata to shares of total benefits is less efficient than allocating costs according to (in descending order of efficiency) marginal cost pricing, two-part pricing and Ramsey pricing (section 6.1);



- allocation of costs to intra-marginal beneficiaries under the MDBC approach to the UPP is also inconsistent with economic efficiency (section 6.1);
- economic efficiency requires that costs of providing public benefits be apportioned to the population which receives those benefits. In some cases this involves determining which level of government is most appropriate. In other cases this will require raising funds directly from beneficiaries (section 6.2);
- from the national perspective there is no economic justification for considering second-round effects when applying the BPP (section 6.3);
- consistency of the PPP with economic efficiency requires that revenues raised not be used to compensate the victims of pollution (section 7);
- the BCP is likely to be inconsistent with economic efficiency since farmers in practice are likely to be over-compensated, resulting in perverse incentives to increase pollution capacity (section 7).

Conclusions reached concerning efficiency aspects of various practical issues encountered to date in implementing cost-sharing principles were:

- only farmer costs in excess of what they would have incurred in the ‘without conservation project scenario’ should be eligible as ‘in-kind’ fulfilment of farmer cost share commitments (section 8.1);
- such in-kind agreements should be permitted only where they can be adequately enforced (section 8.1);
- cost-sharing calculations should be based on present values rather than sums of undiscounted costs and benefits (section 8.2).
- if adverse seasons or prices mean farmers temporarily do not have the capacity to fulfil a cost-share commitment *and* credit is unavailable from private sources, the efficient policy response is for government to intervene to arrange credit rather than for farmers’ cost shares to be reduced (section 8.3).

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## SECTION 5

### Design of an Action Plan (Implementation framework)

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“Environmental goods, such as clean air, clean water, biodiversity and aesthetic qualities, are commonly cited examples of non-private goods. Activities by a person or industry that use or consume these goods, at least above certain levels, impose costs on the wider community.

Decisions based on the costs of the activities to the individual or industry will not take into account the costs to the wider community. **There is no market mechanism for the community to recoup these costs.**” (EPA, Using economic instruments to control salinity in the Hunter River, Environmental Economics Series, 1994)

#### Introduction

Natural resources are under continual threat and degradation. These threats to soil and water resources have been signalled many times and many attempts have been made to remove or reduce these threats.

All have relied on two methods of delivery. First a regulatory and educative method. This has long term benefits and protects the minimum benchmark. Any changes necessary over the benchmark are assumed to be delivered by the education component. Second is a program and incentive method. This has been applied during short term programs with small ‘start up’ incentives, usually as a grant.

Both have failed to provide long term incentives for change, large scale land-use changes and long term benefits for those that undertake the required change. Dryland salinity, as an example, has cause and effect many kilometres and decades apart, has scales of land-use change many times greater than any legislative requirement and will need costs and benefits to be distributed across the landscape. Yet dryland salinity should not be isolated as the only natural resource management issues that needs action.

What is required is a framework that

- ties catchment scale outcomes to land-use;
- gives a location and priority for land-use change;
- ties all natural resource management issues together;
- considers the former and delivers ‘best management options’ (bmo’s) for on-site land-use,
- allows for the development of a land-use outcomes market for all, private and public, to participate in and distribute an even flow of costs and benefits;
- gives those that participate in the adoption of bmo’s, or buys from an outcomes market, a long term and identifiable position in a knowledgable market;
- and is compliant driven for delivering outcomes;
- accountable for all costs and benefits;
- monitors catchment scale responses and provides feedback .

The proposal is to use such a framework for delivery of private and public programs to reduce the impacts that the current methods of land-use have. These impacts can be identified either on-site or off-site. The proposal allows for those who benefit off-site, private or public, to contribute to the required land-use changes on-site. It allows for those that contribute, through land-use change on-site, or by buying land-use change off-site, to attribute these benefits to their own identifiable position in a knowledgeable market.

By only basing programs on the above principles can the changes that are required provide long term incentives, ie market participation, and those that participate can benefit. The framework can be encapsulated through the development and adoption of an Environmental Management System (EMS).

It is proposed that the LPLMC deliver its Action Plan through an EMS. Three levels would be identified and cost sharing arrangements delivered through each layer.

The highest layer would target the individual to become certified under ISO 14000 and fulfil all it's requirements. It is anticipated that this would provide the highest incentive for adoption and would also expect the highest level of land-use change. A full marketing program should be tied to this layer and make the market more knowledgeable.

The second tier would be delivered through individual 'outcome based' contracts between the contributor and the targeted land-use change. It would be specifically targeted at priority areas, but not limited to, and the expected benefits would be land-use change and provide an education component as the recipient would be required, as part of the funding agreement, to undertake an audit of their activities against the EMS. This audit would be confidential, undertaken by State agency staff, and designed to remove third party access.

The third tier would be similar to the Landcare grants as they currently occur. However the group would be required to undertake the audit at a larger landscape scale than the previous two and would be funded against the priorities within the Action Plan.

## **Background**

The Liverpool Plains is well defined in the classical understanding of a catchment. Surrounding ranges and interspersed hills shed excess rainfall onto the floodplain, this water traversing the broad flat bottom and exits via a single drainage point (Namoi River) in the North.

Land use intensifies as the soil quality increases through alluvial deposition. Irrigation is made possible through recharge to the regional groundwater system.

While it is recognised that the regional groundwater system is complex there is now a consensus view of the processes at work. This means that sub-catchment characterisation is possible. Due to a number of factors there are both rising and declining water tables within the Liverpool Plains. It is possible that both may occur within smaller, more distinct sub-catchments.

Salt has long been a component of the landscape, slowly building by annual additions from rainfall. Rainfall leached the salt and was stored lower down the soil profile. This salt has

probably remained immobilised for centuries by an equilibrium reached between the vegetation types, their cover, soil types and rainfall.

This same equilibrium also coped with large episodic rainfall events. Vegetation types matched the variability of rainfall, maximising water use in all seasons. These perennial responses worked to provide vegetation cover to maximise water capture and subsequent re-use by plants. Flood events were confronted with native vegetation systems which worked to soak up, spread and slow the floodwaters.

This system was 'catchment' in nature and any attempt to design catchment management options for subsequent landuse will need to account for this and plan accordingly. Natural resource management issues such as floodplain management, dryland salinity, groundwater depletion, water quality and soil erosion have 'causes and effects' many kilometres and decades apart. Indeed many of the past attempts to tackle these issues, despite having recognised this feature, have failed because of it.

Confronted with changed land-uses, catchment processes, numerous stakeholders, varied policy makers, lack of research data and ill-defined political roles and responsibilities the LPLMC is endeavouring to design an Action Plan for stakeholders in the catchment to implement. The Action Plan will need to contain certain characteristics, as have been identified by stakeholders, yet achieve the common vision. (Section 7)

Historically the design of action plans for the protection of the 'common goods' within an agricultural context has used the 'command and control' approach. (Section 9). This approach determines compliance by the State maintaining 'control' over the environmental good is question, usually by the provision of a 'license to use' with 'conditions of use' attached. These provisions have been adopted in various components of agriculture eg historically they were attached to leases and currently are used in some irrigation areas.

The question remains, especially in the context of dryland salinity, is there a method of delivering outcomes that, within, land-use change can occur and provide a long term, as opposed to short term grants, economic base for those that participate.

Implicitly the farmer should 'internalise', or bear, costs associated with the protection of environmental goods (CPEG). It also follows, implicitly, that should farmers be able to 'internalise' and signal these costs, the consumer should recognise them. The consumer should also be secure in the knowledge that environmental goods are not, and would not, be over exploited.

**Design criteria number one;** is for the primary user of any environmental good to 'internalise' all CPEG's. (Consistent with Polluter Pays Principle, Section 8)

If the primary user, in this case the farmer, through the adoption of certain practices, does not impose costs on others or on the environmental good it would be deemed to be economically and environmentally efficient. It would also be deemed that the final price of agricultural produce, including all CPEG's, would reflect the 'true' costs. Unless it is determined the 'price' is too high, and either the continued production of the product is prohibited or political interference is used to either subsidise the producer or consumer, then the 'true' costs must be borne by the consumer of the product.

**Design criteria number two;** is for the consumer to pay for the ‘internalised’ CPEG. (Consistent with the User pays Principle, Section 8)

If we look at two indicators to judge if, historically, this has been the case, we find that both environmental assets and farmers terms of trade, the ratio of farm prices received to prices paid, have been steadily declining. It would seem that neither are able to recoup the costs expressed in the early sentiment.

“In the absence of some form of intervention, usually by Government, non-private goods, will be consumed at a greater than optimal rate. In the past the most common approach to this problem has been to limit, or even prohibit, the discharge of pollutants or other activities that damage the environment. Economists have shown theoretically that this direct regulation approach does not lead to the best solution, in either environmental or economic terms. Alternative approaches have been suggested that use economic incentives to achieve environmental goals in a potentially more efficient way.” (EPA, Using economic instruments to control salinity in the Hunter River, Environmental Economics Series, 1994)

While Australia is yet to fully understand and enunciate the role that agriculture should play within the Australian environment, via an Agricultural Policy, it could be understood that there is and will continue to be a role for agriculture throughout most of Australia.

**Design criteria number three;** is the provision of an instrument that does not prohibit the use of environmental goods, if all costs are accounted for and allocated. (Consistent with the Polluter Pays Principle, Section 8)

Competition plays a major role in the price setting of any product placed in any market. As the real price of all major agricultural commodities are declining it is apparent that competition, and it’s necessary counterpart, productivity, are increasing. Australian agriculture has been able, to a large extent, offset the terms of trade decline through increases in farm productivity, but, productivity has come at a cost.

As society raises the expectation that all costs are to be accounted for, it is argued that as CPEG’s are internalised the nominal price of the product must rise. If the nominal price of the product remains the same, or even lowers, it can only come as a result of the primary user receiving less for their product. This would in turn mean that the farmer would not be allocated those costs that are, and would be, necessary to prevent over exploitation of the natural resources.

**Design criteria number four;** is that the nominal price of the agricultural products should rise above current prices and remain so in real terms. (Consistent with the User pays Principle, Section 8)

If private interests are to benefit from the use of environmental goods, and to be fully compensated for all costs associated with the use of those goods, it is appropriate that the consumer is safe in the knowledge that the resource will not be over-exploited and they will not have to revisit those costs as some later stage. As the costs to the consumer, of regulating compliance mechanisms, and to the primary user, in rehabilitating degradation, could be larger than the nominal price rise received from the produce, an instrument that keeps these costs at a minimum is desirable.



Compliance costs are kept to a minimum in many industries by systems that self regulate but ensure compliance with random independent audits coupled with the threat of losing the benefits that compliance bring.

**Design criteria number five;** is for self regulation and a process of independent auditing. (Consistent with the PPP and economic efficiency, maintaining compliance with reduced transaction costs, Section 8)

If all of the above criteria are met there still remains the problem of being able to provide an instrument that identifies the product in the minds of the primary user and the consumer. Research across a broad range of natural resource issues within Australia is outlining a series of best management options that will reduce costs that are being imposed on others or on the resource.

To the primary user the identification can begin when they have a 'minimum set of use' standards against which they can appraise their current uses. Current environmental policy aims to maintain a basic threshold, a small portion of the landscape where no over-exploitation will occur. By the application of 'best management options' (bmo's) across the whole landscape the costs of over-exploitation could be substantially reduced.

**Design criteria number six;** is to provide an instrument that current practices can be appraised against. The instrument should provide a series of benchmarks or a 'minimum set of use standards' by identifying best management options. (Consistent with Cost Sharing Principle Number Three, Section 8)

The identification of the product in the minds of the consumer can begin when the product can be differentiated from other similar produce. In many industries this is done by 'branding', packaging or promotion. For the supply of bulk agricultural produce that is later substantially modified this is not so easy. While it is entirely appropriate that the modifier can recoup their costs 'market strength and management strategies enable agribusiness to leave the production risks with the farmer, while purchasing raw materials from the farmer as cheaply as possible' (G. Lawrence, F. Vanclay, 1992)

To be differentiated it must be identified with the practices that were used to produce it and the benefits can be captured by the primary user.

**Design criteria number seven;** is to be able to differentiate all agricultural produce that meet the 'minimum set of use standards'. (Consistent with Cost Sharing Principle Number Three, Section 8)

Against all of this is the level of uncertainty and lack of knowledge that continued use of environmental goods brings. In 1992 the Australian Commonwealth introduced a set of principles designed to resolve this issue, the Ecological Sustainable Development Principles (ESD). A range of initiatives have been designed to move agricultural use of environmental goods to full implementation of the ESD principles.

The problems of point sources of pollution have been dealt with by policies designed to remove those identified polluting activities, thus internalising all associated costs. These policies have been implemented over time and have generally been coupled with a range on incentives. It would seem reasonable that the full implementation of the ESD principles for non-point sources

of pollution in agriculture should receive the same time and incentives as past Government and society practice. The development of the 'cost sharing' principles by the Murray-Darling basin Commission's Community Advisory Committee is an attempt to allow this to happen.

**Design criteria number eight;** is to provide a mechanism to allow adjustments, equitably and in time, to the management options that have been developed. (Consistent with User Pays Principle, Section 8)

### **Design Criteria**

- \* is for the primary user of any environmental good to 'internalise' all costs associated with protection of environmental goods.
- \* is for the consumer to pay for the 'internalised' costs associated with the protection of environmental goods.
- \* is the provision of an instrument that does not prohibit the use of environmental goods, if all costs are accounted for and allocated.
- \* is that the nominal price of the agricultural products should rise above current prices and remain so in real terms.
- \* is for self regulation and a process of independent auditing.
- \* is to provide an instrument that current practices can be appraised against. The instrument should provide a series of benchmarks or a 'minimum set of use standards' by identifying best management options.
- \* is to be able to differentiate all agricultural produce that meet the 'minimum set of use standards'.
- \* is to provide a mechanism to allow adjustments, equitably and in time, to the management options that have been developed.

In the design of an Action Plan there are a number of further considerations.

- Is there support for a catchment wide response, in particular to the introduction of any regulatory instruments to provide support for a coordinated approach?
- What are the current regulatory instruments operating in the catchment at this time?, and; how effective are they in meeting their expectations?, and; what would be the possible refinements to these existing instruments?, and; would they then meet requirements?
- Is the instrument focussed on the catchment?
- Can the instrument accommodate numerous natural resource management issues?
- Should the instrument bind the Crown/local government?
- Does the 'body/bodies' have the necessary resources to cover requirements? If not, who should/could resource components/all activities?
- If farmers are to internalise all costs can they be sure that the market will allow them to recoup those costs?
- What is the experience with farm produce that could be considered to currently internalise all costs? ie organic agricultural products, does it internalise all costs, is it fully compensated for all costs?
- What are the experiences of other instruments that internalise costs on industries eg Quality Assurance programs, BMP's, World practice.
- Would the adoption of a QA program lead to non-adopters receiving a discount rather than adopters receiving a premium?

## **Section 6**

# **Liverpool Plains Catchment Vision Statement**

Our vision for the Liverpool Plains Catchment, is for a catchment with a clean and healthy environment, which can provide abundantly, both the economic and social needs of the communities within it. Where the natural resources of the catchment are managed to ensure they are sustained for future generations, while allowing optimal financial returns for the business and farming enterprises operating or being developed within the catchment.

### Specific Vision Points for the Liverpool Plains Catchment

#### Physical Environment of the Catchment

##### **Soil**

- soil erosion minimised
- improved soil fertility and structure
- extensive adoption of zero tillage
- improved nutrient cycle to reduce our reliance on fertilisers.
- coordinated earthworks on flood plain areas
- reduced river siltation

##### **Water**

- sustainable management strategies for the water resources implemented in the catchment
- clean, non-contaminated surface and underground water
- creeks and rivers free flowing
- better water storage in soil profile
- improved on-farm water storage
- sustainable yields of underground water
- run-off controlled
- water more efficient used
- water tables levels controlled, reducing risk salinity problems

##### **Vegetation**

- reforestation
- establishment of corridors of native trees
- reestablishment of highly productive native pastures
- optimum ground cover [perennial pastures, crop stubble, trees]
- coordinated weed control program for the entire catchment
- development of agroforestry

##### **Animals**

- a balanced native animal population
- feral animals eliminated from the catchment

##### **Infrastructure**

- maintained road and railway systems

## Social and Economic Environment of the Catchment

### **Social**

- community acknowledgement of the essential contribution farmers make
- respected and social equality for farmers within the wider community
- high levels of co-operation, participation, and community spirit, within the communities
- increase participation in Landcare groups
- open and free communications occurring
- increased opportunities for employment, especially for the young
- population within the catchment sustained or increased
- enriched social and recreational facilities, particularly for the young
- maintained community services - schools, SES, fire brigade, banks, police, power, hospitals, doctors, public transport etc.

### **Economic**

- increased farm value through improvements of the land
- improved productivity and better financial returns from the farming systems
- all farms enterprises profitable
- commodity prices stabilised
- improved market information, support services and options
- catchment marketed as a 'clean and green' area to enhance sales
- increased export opportunities

The Vision Statement and the Vision Points, developed for the Liverpool Plains Catchment, were compiled from Catchment Visions provided by the following Landcare Groups, located in the Liverpool Plains Catchment.

#### **Mooki** Subcatchment

Blackville, Mount Parry, Yarramanbah/Pump Station Creek, Pine Ridge, Warrah Creek, Upper Breeza, Noggabri

#### **Goran** Subcatchment

Yarraman, Long Mountain, Watermark

#### **Cox's Creek**

Premer, Salt Water Creek, McBurnies Crossing, Mary's Mount, Willala

#### **Rangari** Subcatchment

Halla Linga,

## SECTION 7

### Cost Sharing Principles

There are two components to the application of the MDBC's methodology for investment in natural resource management.

First, the Council of Australian Governments (CoAG) principles for government investment in Programs provides the Cost Sharing Principles (CSP) that underpins the Cost Sharing Framework (CSF).

The **Cost Sharing Principles** provide that;

1. the full cost of providing services to specific identifiable beneficiaries or polluters should be recovered by way of charges to them;
2. costs of public benefits or impact management which are unable to be attributed and charged to specific beneficiaries or polluters should be treated as community service obligations; and
3. where costs are subsidised by government, they should be defined explicitly so that unsustainable precedents are not established.

The **Cost Sharing Framework**, as developed by AACM for the MDBC Community Advisory Committee (CAC) recommends that governments contribute to the cost of on-ground works within action plans only where there has been progress towards satisfying the following criteria;

- community awareness of land and water degradation issues and remedial actions has been increased;
- community awareness has been increased about off-site impacts and other economic externalities associated with land and water degradation;
- policy and legislative impediments to addressing land and water degradation have been removed;
- point source polluters have been identified and measures have been imposed to ensure they pay the full cost of their actions; and
- governments have agreed to invest in implementation of action plans, on a beneficiary pays basis, on behalf of the broad community.

#### Glossary

**Polluters pays principle;** those people who do, or may do, cause pollution should pay for the full cost of preventing, controlling and minimising the impact of their activities on the environment and other people.

**User pays principle;** those people who use or benefit directly from resource use should pay for the full cost of accessing that resource and maintaining it in a state that encourages use.

## SECTION 8

# **Institutional arrangements for effective Natural Resource Management in the Liverpool Plains**

## **Background**

The Liverpool plains is well defined in the classical understanding of a catchment. Surrounding ranges and interspersed hills shed excess rainfall onto the floodplain, this water traversing the broad flat bottom and exits via a single drainage point (Namoi River) in the North.

Land use intensifies as the soil quality increases through alluvial deposition. Irrigation is made possible through recharge to the regional groundwater system.

While it is recognised that the regional groundwater system is complex there is now a consensus view of the processes at work. This means that sub-catchment characterisation is possible. Due to a number of factors there are both rising and declining water tables within the Liverpool Plains. It is possible that both may occur within smaller, more distinct sub-catchments.

Salt has long been a component of the landscape, slowly building by annual additions from rainfall. Rainfall leached the salt and was stored lower down the soil profile. This salt has probably remained immobilised for centuries by an equilibrium reached between the vegetation types, their cover, soil types and rainfall.

This same equilibrium also coped with large episodic rainfall events. Vegetation types matched the variability of rainfall, maximising water use in all seasons. These perennial responses worked to provide vegetation cover to maximise water capture and subsequent re-use by plants. Flood events were confronted with native vegetation systems which worked to soak up, spread and slow the floodwaters.

This system was 'catchment' in nature and any attempt to design catchment management options for subsequent landuse will need to account for this and plan accordingly. Natural resource management issues such as floodplain management, dryland salinity, groundwater depletion and soil erosion have 'causes and effects' many kilometres and decades apart. Indeed many of the past attempts to tackle these issues, despite having recognised this feature, have failed because of it.

Decades of community concern, litigation and unresolved cooperative approaches over floodplain management led to the gazettal of the floodplain areas less than 2% slope under part VIII of the Water Act 1912. This followed the adoption of the main recommendation from the NSW Floodplain (Non-Tidal) Management Advisory Committee established in 1993.

While this is only one 'catchment management' issue it serves to highlight some of the problems faced when confronted with changed land-uses, catchment processes, numerous stakeholders, varied policy makers, lack of research data and ill-defined political roles and responsibilities.

A number of community forums <sup>7</sup>, surveys <sup>8</sup> and Reports <sup>9</sup>, have indicated a willingness from farmers, in particular, to enter into a planned and coordinated catchment approach for all natural resource management issues. These can be coupled with a similar expressed desire <sup>10</sup>, on floodplain management, from the local Government bodies within the Liverpool plains.

Particular attention should be drawn to the Final Report from the NSW Floodplain (Non-tidal) Management Advisory Committee, (1994) as this report has extensively dealt with many of the issues mentioned, especially in regard to possible institutional arrangements.

Investigations <sup>11</sup> have presented possible options for this to occur. Research <sup>12</sup> has also suggested to policy makers, needs, that have been identified during their studies based on survey work.

The NSW Government, in an attempt to integrate land and water management issues, amalgamated the former Soil Conservation Service with the Department of Water Resources in 1995 to the Department of Land and Water Conservation (DLWC). This arrangement was promulgated as a panacea to the complex issues of integration.

## **Possible Options**

### **Environmental Planning and Assessment Act (EPAA) 1980**

The purpose of the EPAA is spelt out in section 5:

The objects of this Act are -

a) to encourage -

i) the proper management, development and conservation of natural and man made resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and better environment;

ii) the promotion and co-ordination of the orderly and economic use and development of land;.....

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<sup>7</sup> LPLMC, Profitable and Sustainable Management of the Liverpool Plains, Results of a community Workshop, March 1996

LPLMC, Floodplain Management Workshop, Gunnedah Golf Club, April 1997

North-west Catchment Management Committee, The Namoi catchment, what you talked about, feedback report, January 1997

<sup>8</sup> Flavel, N. & McLeish, R., Managing the Liverpool Plains: Detailed Survey Data 1995, LPLMC, June 1996

Hooper, B., Floodplain Management and Farmer decision behaviour, evidence from the Namoi Valley, NSW. Occasional Paper No. 7, CWPR, UNE, August 1993

<sup>9</sup> NSW Floodplain (non-tidal) Management Advisory Committee, Floodplain Management on the Liverpool Plains, The Final Report, June 1994

<sup>10</sup> NSW Floodplain (non-tidal) Management Advisory Committee, Floodplain Management on the Liverpool Plains, The Final Report, June 1994

LPLMC, Floodplain Management Workshop, Gunnedah Golf Club, April 1997

<sup>11</sup> NSW Floodplain (non-tidal) Management Advisory Committee, Floodplain Management on the Liverpool Plains, The Final Report, June 1994

Russell SC, Management of Natural resources; An overview of Legislative alternatives, with particular reference to the role of local government in native vegetation retention and floodplain development, DSC

<sup>12</sup> Hooper, B., Adoption of best management practices for dryland salinity, results of a study in the Goran catchment Liverpool Plains, NSW. CWPR, UNE, February 1995

vi) the protection of the environment

b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State; and

c) to provide increased opportunity for the public involvement and participation in environmental planning and assessment.

There are three tiers of hierarchical planning instruments, Local Environmental Plans (LEP), Regional Environmental Plans (REP) and State Environmental Planning Policy (SEPP).

“SEPP’s and REP’s are the domain of the State Government, whereas LEP’s are primarily the domain of local Government. It might, therefore, be expected that where there is any conflict between the provisions of environmental planning instruments, SEPPs and REPs would take precedence over LEPs. The legislation, however, provides that there is no general presumption that this is the case. The most recent instrument prevails over earlier ones, unless one of the instruments makes it clear that this is not the intention.”<sup>13</sup>

The Environmental Planning and Assessment Amendment Bill 1997

#### **Local Environmental Plans (LEP)**

“In the formulation of regional and local plans there is an obligation to prepare an environmental study of land affected by the proposed plan. These studies are open to public comment and must be taken into account in the formulation of a plan”<sup>14</sup>

LEPs may cover the whole or part of the local government area. The legislation also allows for two or more adjoining councils to prepare a common LEP.

#### **Regional Environmental Plans (REP)**

“REPs can only be made where the Minister for Planning reaches the opinion that they are concerned with matters of significance for environmental planning for a region (or part of a region). So far as the law is concerned, the Minister has a very broad discretion to determine precisely what constitutes a region”<sup>15</sup>

#### **State Environmental Planning Policy (SEPP)**

SEPPs are intended to deal with (s 37) “such matters as are, in the opinion of the Director, of significance for environmental planning of the State”

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<sup>13</sup> David Farrier, *The Environmental Law Handbook, Planning and Land Use in New South Wales*, University of Wollongong, 1996

<sup>14</sup> Bates, GM, *Environmental Law in Australia*, Butterworths, 1992

<sup>15</sup> David Farrier, *The Environmental Law Handbook, Planning and Land Use in New South Wales*, University of Wollongong, 1996



“What SEPPs have done, in practice, is to amend the details of existing LEPs, usually by removing development from prohibited zoning categories or imposing consent requirements which do not exist under LEPs”<sup>16</sup>

### **Provisions of the Water Act 1912**

“ Part 8 of the Act is the legislation which sets up a regulatory regime under which any proposal involving the construction of an earthwork, embankment or levee on the bank of a river or lake or land which has been designated as a ‘flood plain’ requires an approval from the (DLWC).

The (DLWC) should not refuse to grant an approval unless it is satisfied that the proposed work is likely to affect, materially and prejudicially the distribution of flood waters in the vicinity of the work.

Provided that the (DLWC) is satisfied that the existence or unmodified state of a work “is likely to affect, materially or prejudicially the distribution of flood waters in the vicinity of the proposed work”, removal or modification of a work can be affected by a notice given to the occupier of the land”<sup>17</sup>

### **Catchment Management Act (Catchment Management Trust)**

“The significant feature of the legislation is the emphasis which it places on positive management through the voluntary cooperation of members of the community”<sup>18</sup>

“Catchment Management Trusts normally comprise: a majority of landholders; persons with an interest in environmental matters within the Trust area; representatives of local Government and persons from appropriate government departments (CMA s 22)”<sup>19</sup>

“The precise purpose of a catchment management trust is spelt out in the detailed regulations setting it up. Within the constraints of these regulations a trust can among other things (CMA s 27):

- generate revenue by levying catchment contributions on land within its area declared by the Minister to be a catchment contribution area (CMA ss 38-51);
- construct and operate works for soil conservation, afforestation, flood mitigation, water conservation, irrigation and river improvements;
- purchase (including making a compulsory purchase: CMA s 52), lease and dispose of land;
- provide assistance to mitigate the effect of flood, drought, fire and other emergencies.

All money received by trusts must be paid into a special fund (CMA ss 34-37). Within a year of its first meeting, a trust must prepare a corporate plan for the Ministers approval. On receipt of this the trust implement the plan (CMA ss 28-30)...

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<sup>16</sup> David Farrier, *The Environmental Law Handbook, Planning and Land Use in New South Wales*, University of Wollongong, 1996

<sup>17</sup> Russell SC, *Management of Natural resources; An overview of Legislative alternatives*, with particular reference to the role of local government in native vegetation retention and floodplain development, DSC

<sup>18</sup> David Farrier, *The Environmental Law Handbook, Planning and Land Use in New South Wales*, University of Wollongong, 1996

<sup>19</sup> Russell SC, *Management of Natural resources; An overview of Legislative alternatives*, with particular reference to the role of local government in native vegetation retention and floodplain development, DSC

Before setting up a trust, the Minister must consider whether there is clear support by landholders, land users and the community, whether these groups have a joint responsibility to deal with degradation of natural resources which is adversely affecting the community, and whether a trust is the most appropriate means of equitably sharing the costs (CMA s 21(2)).”<sup>20</sup>

### **Land and Water Management Plans (LWMP)**

Present LWMPs have been drafted or completed as part of the requirements for the corporatisation /privatisation of NSW irrigation areas and districts, under the Irrigation Corporations Act 1994 (Musgrave).

Following a Workshop on Economic Evaluation Methodology, by the Land and Water Management Planning Economic Committee, three broad considerations were raised about the application of LWMPs to dryland areas. These considerations are also relevant to the ‘catchment management instrument’ that is preferred.

First is the understanding that the LWMP process has not been perfected in the irrigation areas that it has been applied. The workshop developed a series of recommendations aimed at improving the LWMP process and its accountability.

Second, the complexity of diverse processes operating within dryland catchments will place greater demands on time, understanding and data. The point was also raised that this places an extra burden on the participation and enthusiasm of the major stakeholders in the process, as the process could become time consuming, complex and uncoordinated.

Lastly, and far from least, is the fact that dryland communities have shown to be less cohesive than irrigation areas. This could have a direct bearing on the leadership needed for a dryland catchment to develop a catchment management plan to the expectations of a LWMP.

Is there support for a catchment wide response, in particular to the introduction of any regulatory instruments to provide support for a coordinated approach?

What are the current regulatory instruments operating in the catchment at this time? How effective are they in meeting their expectations? What would be the possible refinements to these existing instruments and would they then meet requirements?

Is the instrument focussed on the catchment?

Can the instrument accommodate numerous natural resource management issues?

Should the instrument bind the Crown/local government?

Does the ‘body/bodies’ have the necessary resources to cover requirements? If not, who should/could resources components/all activities?

### **References**

Land and Water Management Planning Economic Committee, *Papers from a Workshop on Economic Evaluation Methodology*, November 1996

## **SECTION 9**

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<sup>20</sup> David Farrier, *The Environmental Law Handbook, Planning and Land Use in New South Wales*, University of Wollongong, 1996

## **Methods of implementing an Action Plan.**

Author; Jim McDonald, "Red Braes" Quirindi NSW 2343, (ph.) 02 6746 1091 (fax) 02 6746 2190. This is a discussion paper only. It is to promote debate about the issues and subjects raised in the paper. It is not to be promoted as policy of the LPLMC. The views raised are from the author only. Do not copy or distribute this paper without the express permission of the author.

### **Hypothesis;**

All land managers in the Liverpool Plains need financial and other related assistance to implement changes to their current methods of using the land and water resources for their Vision to be realised.

Current assistance methods are not considered as adequate, or directed correctly, to implement the scale of change needed.

The financial resources of the present land managers are not adequate to meet the costs associated with these changes. Declining terms of trade will not produce an incentive for change.

Other than maintaining the productive capacity of the land and water resources there are no other incentives to implement change. Current methods of change are disincentive driven.

### **Current assistance;**

Direct financial assistance is given through; taxation benefits, Landcare group funding, access to State and Federal programs, eg drought aid (usually response driven),

Indirect financial and related assistance is given through; Landcare group funding, State/federal programs (Farming for the Future, Rivercare etc.), State/Federal provision of research and extension programs, Industry provision of skills and marketing programs,

### **Current status of direct financial assistance to land managers from State treasury;**

In irrigation areas this assistance is provided through Land and Water Management Plans. These are Action Plans drawn up between the community and the State agencies and usually for a planning period longer than 15 years. Accountability for monies and actions are included in the plans. There are signed agreements between Government and the community to ensure the implementation of the Plan. The community is assured of the provision of monies by State treasury and the taxpayer is assured the actions will be undertaken. In the unlikely event of actions not being undertaken, despite the provision of monies, the taxpayer, by being the owner and issuer of licences to water, still has a very strong incentive mechanism to ensure compliance with the original signed agreement.

In dryland areas there is no planning mechanism in place for the provision of funds either to the catchment level or to the individual land managers. The impediment is the lack of a strong compliance mechanism to ensure agreed actions and on-ground works are implemented. While there are alternatives being explored the implementation of policy continues.

### **Possible alternatives;**

1. Land and Water Management Plans for dryland areas
2. Catchment Plans
3. Minimum threshold regulations ie Native Vegetation Policy, Forest Policy
4. Load based licences for pollution eg. Effluent management in the Pig industry
5. Individual contracts between land managers and the State Government
6. Best Management Practice - ISO 14000
7. Continue current arrangements
8. Land use Planning via Local Government Planning laws

	1	2	3	4	5	6	7	8
Compliance mechanism	??	No	Yes	Yes	Yes	Yes	No	Yes
Self assessment and independently audited	No	Yes	No	No	No	Yes	Yes	No
Voluntary	??	Yes	No	No	Yes	Yes	Yes	No
Allows Catchment scale	Yes	Yes	?	??	??	Yes	No	??
Implements at farm scale	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Continual improvement	??	?	No	??	??	Yes	?	??
Incentive based	Yes	No	No	?	?	Yes	?	No
Disincentive based	Yes	No	Yes	Yes	?	Yes	Yes	Yes
Build on new knowledge	??	Yes	No	?	??	Yes	?	??
Recognises uncertainty	??	?	Yes	Yes	??	Yes	?	No
Proactive	??	?	No	?	??	Yes	No	No
Industry compatible	Yes	Yes	No	?	??	Yes	?	No
Mitigates off-site costs	Yes	Yes	?	??	??	Yes	No	??
Level of adoption	??	??	Full	Full	??	??	?	Full
Market driven	No	No	No	No	No	Yes	Yes	No
Product differentiation	No	No	No	No	No	Yes	No	No
Technically competent	Yes	Yes	?	Yes	Yes	??	No	?
Need for new skills	Yes	Yes	No	No	??	Yes	Yes	??
Stakeholder consensus approach	Yes	Yes	No	No	Yes	Yes	No	??
Degree of change needed from now #1	H	M	M	M	L	H	N/A	L
Outcome based	Yes	Yes	Yes	Yes	Yes	Yes	No	??

Yes, there are substantive examples for this answer

No, there are substantive examples for this answer

?, there are either substantive examples for and against this answer,

??, the answer is unknown as arrangements could affect the answer

#1, An assessment of the changes that would be needed to move from the present manner of management and levels of governing to the full enactment of the alternative. H - High, L - Low, M - Minimal

## **SECTION 10**

### **ISO 14000**

ISO 14000 are a series of standards that have been under development since 1991. They are developed under a Technical Committee (207) of which Australia is a participating member.

ISO 14000 are a series of documents that define the key elements of a management system that will help an organisation address the environmental issues that it faces. The management system includes the setting of goals and priorities, assignment of responsibilities for accomplishing them, measuring and reporting on results, and external verification of claims. The standards do not set performance values. They are concerned with establishing “how to” achieve a goal, not “what” the goal should be. These standards are designed to help a farm address all of the legal, commercial and other challenges related to the environment that it faces today. They would also assure those outside of the farm that the farm is meeting its stated environmental policies.

An environmental management system provides a structures process for;

- identifying the environmental impact of the farms products, processes and activities,
- identifying all legal requirements,
- establishing goals, objectives and targets, and then
- developing a system which will allow these goals, objectives and targets to be achieved.

The single most important characteristic about the standards is they are ‘voluntary’. While there is no legal requirement to use them there could develop, as has in the domestic beef industry where suppliers will prefer to buy from Quality Assured farms, a de facto requirement for the implementation of these standards.

The implementation of the ISO 144000 should be a business decision. The reasons for this decision could range from; capturing market premiums, making sure existing regulations are complied with thereby reducing liabilities that could arise from non-compliance, reducing degradation of the land and water resources, understanding the environmental implications of current land use, reducing input (rainfall, fertiliser, chemical) wastes, reducing eroding soil resources.

Benefits on the farm would include a systemic approach to maintaining environmental resources, reducing liability, greater efficiency, higher performance, regulatory relief, market access, financial concessions. Benefits off the farm would include third party assurance and recognition, expression of due diligence and public image.

References:

Newsletter of the National Association of Forest Industries, 1997

Global Green Standards ISO 14000 and Sustainable Development, International Institute for Sustainable Development, 1996