



CSIRO LAND and WATER

Incentives, Policy and Voluntary Approaches to Improve Natural Resource Management in the Onkaparinga Catchment

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Final Report for the
Onkaparinga Catchment Water Management Board

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EXECUTIVE SUMMARY

The objective of this report is to outline ways that the Onkaparinga Catchment Water Management Board (OCWMB or Board) can lead the catchment community in mutual efforts to increase returns to multiple ecological, economic and social objectives. The report lays out a set of recommendations regarding opportunities for consideration in future strategic planning in four areas of interest to the OCWMB:

- conservation incentives;
- urban water conservation;
- groundwater and farm dam water allocation policy; and
- voluntary environmental management arrangements.

A portfolio of instruments to achieve the Board's goals are considered including:

- using incentives and education to encourage water conservation;
- establishing environmental regulation;
- using markets to move water to higher value activities within the catchment;
- using tendering to make conservation programs more cost effective; and
- promoting environmental management and accreditation systems to promote the best environmental management practices in the catchment area.

Some of the strategies outlined would require action from Commonwealth, State government or local agencies to implement. While the Onkaparinga Catchment Water Management Board doesn't hold all of the levers to set these policies, the Board can have influence with well informed arguments for innovative policy reforms. This report is aimed at giving the Board strategic information it can use to lead initiatives and instigate new thinking.

Conservation Incentives

The largest single expenditure category in the 2001 Onkaparinga Catchment Water Management Plan is rehabilitation and management of waterways. Between 2000 and 2003, \$3.15M (or 36% of the entire \$8.75M three year budget) is earmarked for spending in this category (OCWMB, 2001). Most of this budget will be spent on land conservation cost-sharing incentives. Consequently this is a very important policy area for the Board to consider.

Perhaps the most significant limitation of the current approach is that the return per cost-sharing dollar is less than could be achieved. This is because all cost-sharing payments are the same, irrespective of landholder willingness and capacity to contribute conservation effort.

This report describes an OCWMB opportunity to adopt a tendering system to conservation investment. The tendering approach provides a mechanism enabling landholders who are willing to undertake conservation at less than the current cost-sharing rate the opportunity to do so.

Last year in Victoria, a pilot program to allocate private landholder conservation funds through tender known as Bush-Tender was initiated. Evaluation of the first year of experience with the Victorian Bush-Tender approach found that approximately 33% more conservation effort was attained for the \$400,000 conservation incentive expenditure than would have been with cost-sharing based on a single pre-set rate (Stoneham, Chaudhri, Ha and Strappazon, 2002). Realising similar improvements in the Onkaparinga Catchment is possible.

Opportunities may exist to fund development of such a tendering system through Commonwealth grants. Establishing pilot programs along these lines is a high priority of the emerging National Action Plan for Salinity and Water Quality - Market Based Instruments initiative.

Urban Water Conservation

Urban households and businesses use most of the reticulated water in the Onkaparinga Catchment area. Experience in Australia and other parts of the world suggest that incentive and educational approaches can produce significant urban water conservation benefits. Several policy changes and programming opportunities are identified in this report that the OCWMB, other government agencies and utilities can pursue to enhance urban water conservation in the catchment area including:

1. **Expanding informational materials describing "best bet" household water conservation measures.** At present the Board sponsors two voluntary information programs in the catchment area—"Water Care" and the "Aware 2000 Sustainable Industry" program. Incorporation of information explaining financial returns to "best bet" conservation practices into these programs is likely to increase adoption.
2. **Leading an effort to develop a "five frog" housing water efficiency rating program similar to the five star energy efficiency rating scheme used in the Australian Capital Territory.** Mandating that potential homebuyers be provided with a water efficiency certification, as is done with energy efficiency certification in the ACT, would provide incentives for homeowners to make low cost water efficiency improvements.
3. **Developing a landscape water demand management program in partnership with local government Councils or Utilities.** Such a program would involve an officer visiting businesses and public institutions with large irrigated grounds, performing an irrigation system hardware and management evaluation, making recommendations, and perhaps offering water saving technology investment financing or incentives.

4. **Encouraging water and energy performance contractors to focus on the Onkaparinga Catchment.** This relatively new type of business involves private companies identifying areas where water use is inefficient and then entering into a shared savings agreement with water and energy users. Typically, a water and energy performance contractor identifies ways to install water saving equipment, pays for the installation costs and then receives part of the value of the savings in energy and water consumption costs.

Groundwater Policy in the McLaren Vale

The current McLaren Vale Prescribed Wells Area (MVPWA) Water Allocation Plan balances tension between goals of maximising economic development returns and maintaining resource sustainability. For example, the provision for water trade that allows the sale of water resulting from retirement of irrigated land or irrigation efficiency water savings encourages water to be moved to higher value used. However, sustainability is ensured by prohibiting water trade into the area east of the Willunga fault line where additional withdrawals can potentially seriously and irreversibly damage existing groundwater rights.

Research carried out for this report concluded that to date the restrictions on water use imposed on irrigators through the MVPWA Water Allocation Plan have not had significant adverse economic consequences. This, however, does not mean that aquifer use is now sustainable. Ongoing monitoring is necessary and, at some date in the future, it is likely that further changes in water allocations may be necessary.

One improvement in water allocation rules that the OCWMB may wish to consider is denominating future allocations both as a share of Permissible Annual Volume (PAV – the sustainable annual volume of total aquifer withdrawals allowed in the water allocation plan) and as a water volume. This approach would put in place a mechanism for adjusting allocations in future water allocation plans. If monitoring shows that PAV has been overestimated then the share system facilitates adjustment of everyone's allocation on a pro rata basis.

Farm Dam Policy

The question of the impact of farm dam development in the Onkaparinga is an issue of current interest. Conceptually, each dam that is installed in the catchment reduces the amount of water available to others and, also, changes the nature of environmental flows.

One of the simplest approaches to limiting adverse impacts of farm dams is to cap farm dam development and make the issuance of new dam permits subject to off-set (tradable property right) provisions. Under such an arrangement, in order to obtain a permit to construct a dam, an aspiring dam developer would have to off-set their proposed development by arranging to have another dam of equal or greater size in the same sub-catchment removed. Off-set provisions provide some flexibility for economic development in the future while maintaining controls over potential adverse impacts of development.

There are two ways of achieving this outcome. The first is by once again recommending to the Government that they prescribe the entire Onkaparinga Catchment area. The second is to work with local government councils to achieve the same outcome via development controls.

Voluntary Environmental Management Arrangements

In recent years there has been emerging interest in voluntary environmental management arrangements (VEMAs) to encourage businesses to prove and improve their environmental management credentials. Some VEMAs involve labelling and/or certification to allow businesses to demonstrate adherence to environmental standards.

There are at least two opportunities that the OCWMB may wish to consider to encourage businesses in the catchment area to adopt voluntary environmental management:

1. In order to offer an incentive to participate in a VEMA the Board may wish to consider catchment levy and/or Council rate rebates. For example, rebates could be given to firms that participate in a VEMA that comply with the internationally recognised ISO14001 standard. It is proposed that having served the purpose of an implementation incentive, such rebates would be phased out. This incentive would be in addition to the Commonwealth's proposed income tax rebate of \$3,000 for low income farmers who implement environmental management systems (EMSs).
2. Participating in the Commonwealth-funded pilot projects for EMSs in agriculture and allied rural industries. The Commonwealth Government has committed to funding 15 pilot projects for developing EMSs in agriculture and allied rural industries across Australia. The Board may wish to consider submitting a proposal to undertake such a pilot initiative within the Onkaparinga Catchment area in partnership with relevant State and Commonwealth agencies. The aim of such a regional pilot project could be to foster on-farm development of EMSs, with relevant environmental performance guidelines, on enough farms within a catchment to investigate the potential of such on-ground activities in meeting catchment natural resource management goals.

1. INTRODUCTION

This report is the result of a CSIRO (Policy and Economic Research Unit) and Onkaparinga Catchment Water Management Board (OCWMB) research collaboration to examine cost effective policy and investment opportunities to better realise the five main goals of the OCWMB as expressed in the Onkaparinga Catchment Water Management Plan, 2001:

- rehabilitate and manage watercourses by implementing and promoting best practice environmental management;
- maintain and enhance the quality of surface and groundwater;
- use water sustainably and balance consumptive and environmental water uses for current purposes and future needs, and reuse water from non-traditional sources;
- develop an aware and committed community through effective consultation and education programs, promote environmental responsibility within the community, and involve the community in environmental issues; and
- integrate resource management through coordinated policies and effective partnership.

Board efforts to achieve these goals produce direct and indirect economic benefits. The Board also seeks returns in the form of ecological and social benefits that are not directly traded in markets which include: biodiversity, water quality, water quantity and social, cultural and amenity values. Maximising returns to the Board's investments requires coordinated action by multiple government agencies (i.e. the four Adelaide area catchment boards, DEH, DWR, SA Planning, SA Water and local government) catchment residents and agricultural and industrial businesses. As the agency primarily responsible for delivering significant improvements in the sustainable management of water resources in its area, the OCWMB has significant opportunity to lead coordinated policy initiatives.

The objective of this report is to investigate opportunities to increase joint returns to shared goals of the OCWMB, state and local government agencies, the community, primary producers and industries in the Onkaparinga Catchment Board area. The report outlines possibilities to address water and land management concerns in the Onkaparinga CWMB area using five approaches:

- using incentives and education to encourage water conservation;
- establishing environmental regulation;
- using markets to move water to higher value activities within the catchment;
- using tendering to make conservation programs more cost effective; and
- promoting environmental management and accreditation systems to promote the best environmental managers in the catchment area.

This report outlines specific ways that the Board can lead the catchment community in mutual efforts to increase returns to multiple ecological, economic and social objectives in four areas of interest to the OCWMB:

1. conservation incentives;
2. urban water conservation;
3. groundwater and farm dam water allocation; and
4. voluntary environmental management arrangements.

2. CONSERVATION INCENTIVES

The largest single expenditure category in the 2001 Onkaparinga Catchment Water Management Plan is rehabilitation and management of waterways. Between 2000 and 2003, \$3,15M (or 36% of the entire \$8,75M three year budget) is earmarked for spending in this category (OCWMB, 2001). Most of these expenditures are for conservation cost-sharing incentives. Consequently this is a very important policy area for the Board to consider.

Perhaps the most significant limitation of the current approach is that the return per cost-sharing dollar is less than could be achieved. Currently, many landholders would be willing to provide more conservation for the cost-sharing money they receive.

This section describes an OCWMB opportunity to adopt a tendering system to conservation investment similar to the Bush-Tender program recently piloted in Victoria. The approach ensures that landholders willing to offer significant conservation for less than current cost-sharing rates do so by bidding for funds.

Evaluation of the first year of experience with the Victorian Bush Tender approach found that the agency attained approximately 33% more biodiversity protection effort for its \$400,000 cost-sharing expenditure than it would have had it cost-shared at a single pre-set rate (Stoneham, Chaudhri, Ha and Strappazon, 2002). Realising similar improvements in the Onkaparinga Catchment is possible.

2.1. The Challenge of Redesigning Cost-sharing

The challenge for the Board is to find a way to allow landholders in the catchment area who are willing to undertake conservation effort at less than current cost-sharing rates to do so. With a cost-sharing system based on willingness and capacity to contribute, levels of conservation effort currently achieved could be realised with less spending. The result would be additional budget dollars available to finance other activities.

The essence of the problem with the current cost-sharing approach is illustrated in Figure 1 on the next page. The figure shows seven hypothetical cost-sharing program participants. Each receives the same \$50 cost-share for fencing 100 metres of stream-bank. However, many of the landowners would be willing to fence 100 metres for less than \$50. Landowner 1, for example, is willing to donate her own time to do the fencing and simply requires the \$15 she would need to buy the 100 metres of fencing material. The minimum cost-share she would accept is the blue portion of the landowner 1 bar in figure 1. The red portion of the landowner 1 bar in figure 1 is the payment, in excess of what she requires, that she receives when she accepts the standard \$50 cost-share.

As the blue "minimum cost" bars in Figure 1 illustrate, most of the cost-sharing program participants would be willing to undertake the fencing for considerably less than a \$50 cost-share. As the red "excess payment" bars illustrate, the cost-sharing agency pays significantly more than the minimum

program participants would be willing to accept to carry out the fencing. By replacing the current cost-sharing system with a tender based bidding system the Board could realise considerable savings.

With a tender system, landholders “bid” the minimum cost-share they are willing to accept. Lowest bids for equal value conservation services are funded first. In the example case, landowner 1 would undertake the fencing for a \$15 dollar cost-share saving the cost-sharing agency \$35, landholder 2 would offer to fence for \$18, saving the cost-sharing agency \$32 etc. In the most sophisticated systems, the agencies assign higher value to bids from landowners in high environmental priority areas.

Figure 1 Hypothetical Minimum Acceptable Cost-shares to Fence 100 Metres of Stream-bank, and Payment in Excess of Minimum with \$50 Cost-share

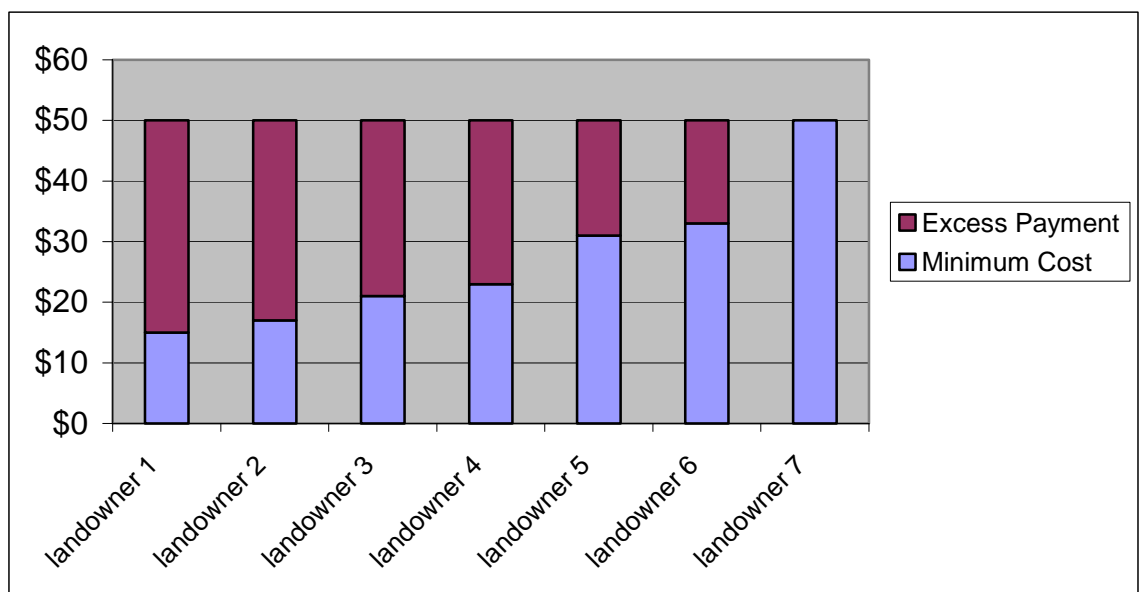


Figure 1 portrays a hypothetical example with only one cost-sharing activity, stream bank fencing. In real cost-sharing programs, potential participants can offer to mix and match multiple activities and agencies value similar activities more in areas of higher ecological priority. Consequently, a somewhat complicated procedure is needed to order bids by their “environmental value” per cost-share dollar.

Fortunately, many of the challenges of implementing a tendering approach have already been worked through in the Victorian Bush-Tender trial program. This trial approach is explained below to give the Board a sense of what would be required to implement tendering in the Onkaparinga Catchment area.

2.2. The Victorian Bush-Tender Trial

The Victorian Department of Natural Resources (DNRE) has recently established a tendering approach to allocation of land conservation cost-sharing known as Bush-Tender. The system is currently being trialled for a three year period at two pilot sites in Victoria comprising an area of some

3,600 square kilometres (DNRE, 2001). The basic idea is that potential participants working with program officers prepare a plan describing on ground works they are willing to offer. After preparing plans potential participants submit a sealed bid stating the cost-share payment they would be willing to accept to carry out the plan. The DNRE then sorts the bids on the basis of cost-share dollars per unit of ecological value. The result is an ordered bar graph of willingness to accept cost-share payment offers similar to what is illustrated in Figure 1 above. Finally, the DNRE accepts cost-sharing offers in order of value of ecological benefits per cost-sharing dollar until the program budget is exhausted.

Briefly stated, the approach involves five steps:

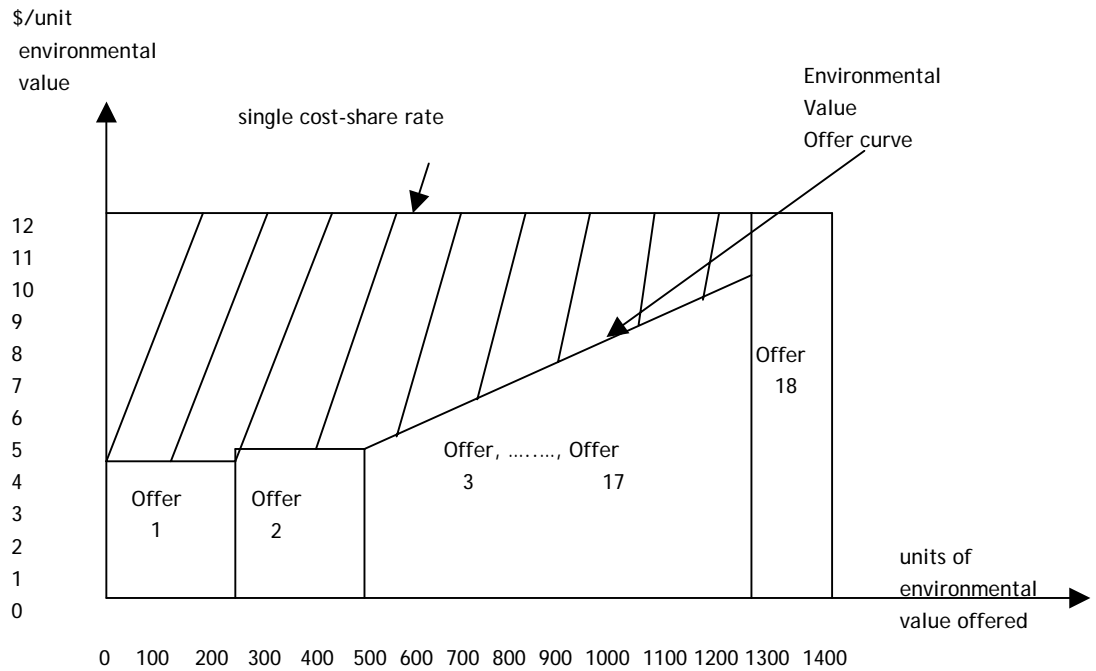
1. The cost-sharing agency sorts land in the area with a **conservation priority score** based on site-specific criteria (for example quality and ecological significance of native vegetation and extent of connected remnant vegetation on adjacent property). The basic objective is to develop a systematic method of giving the same activity (e.g. fencing remnant vegetation) a higher value per cost-sharing dollar in higher biodiversity priority areas.
2. The cost-sharing agency develops an **on-ground works score** system to quantitatively express the value they place on alternative works. For example, the agency may assign a point score of 60 for the act of fencing a hectare of remnant vegetation while maintaining weed control in the fenced area may be assigned a score of 12 points per hectare. The basic idea is to give the agency a single metric for valuing the "environmental value" per hectare of a range of alternative on-ground works a landholder could undertake. The scoring system also helps program officers communicate the relative value of the various on-ground works that can be undertaken by potential program participants.
3. Landholders develop a draft conservation plan and price they are willing to accept to implement the plan. Landholders are guided in this process by information from DNRE field officers explaining the relative value of conservation actions expressed as the scores developed in step 2.
4. The cost-sharing agency chooses bids to fund based on the **environmental value** for each bid derived using the formula:

environmental value =

(conservation priority score) X (on-ground works score).

5. The agency plots an environmental value offer curve on a graph like figure 2 below. The graph is used to identify the bid offering greatest environmental value per cost-sharing dollar for funding first. Successive bids are then chosen for funding in order of environmental value per dollar until all funds are allocated.

Figure 2: Environmental Value Offer Curve



To understand the real advantage of using a Bush-Tender approach in the Onkaparinga Catchment area, consider the example of the hypothetical offer curve in figure 2. Suppose that the Board was able to fund offer 1 from a landholder willing to provide 220 units of “environmental value” at \$4.50/unit, offer 2 from a land holder willing to provide 280 units of “environmental value” at \$4.65/unit, through offer 18, from a land holder willing to provide 150 units of “environmental value” at \$12/unit before the cost-sharing budget was exhausted. The total cost to the Board would be the area under the environmental offer curve up to 1400 units.

To attain the same level of on the ground works with a traditional cost-sharing approach the Board would have had to offer a \$12/unit cost-share (the minimum cost-share that the last participant would have accepted) to all program participants. The additional cost for the traditional cost-sharing approach would be the hatched area under the single cost-sharing rate line and above the environmental offer curve.

2.3. Conservation Incentive Policy Opportunities

There are several benefits of introducing a tendering approach to conservation incentive allocation that speak for adopting this approach in the OCWMB area.

1. Experience in Victoria suggests that the Board could expect large increases in conservation effort to result. Perhaps as much as one third more conservation effort for each Board dollar spent on cost-sharing could be expected.
2. Implementing a tendering system requires developing a conservation priority scoring system to identify highest priority areas of the catchment for conservation activities. As a result funds can be more effectively targeted.
3. Implementing a tendering system requires developing a system to evaluate the conservation value of a range of on-ground works and educate landholders in the process of helping them prepare bids. As a result the community receives precise information about the conservation practices that they can take that contribute most.

As the description above suggests, **implementing a Bush Tender type system involves significant implementation effort** including development of:

- a system for scoring the environmental value of mixed and matched packages of on-ground works;
- site inspection, bid development and monitoring protocols;
- educational programming efforts to familiarise landholders with the system; and
- administrative systems for evaluating bids, enforcing contracts and managing records.

Dealing equitably with existing commitments may require meeting existing implied obligations to cost-share under current rules. Thus a “phase-in” approach to a tendering system might be necessary.

One possibility the Board may wish to consider is positioning to become the site of a pilot tendering program fund under the proposed Commonwealth Market Based Initiatives Program. The National Action Plan for Salinity and Water Quality is currently developing a Market Based Instruments (MBI) initiative (NAP, 2001). The intent of the program is to increase the use of market based instruments like tendering in government programs aimed at salinity, water quality and biodiversity issues. The aim of the initiative is to demonstrate how environmental objectives can be achieved more cost effectively. The initiative is currently in an embryonic state of development. It will eventually fund MBI trials by agencies that can demonstrate the benefits of MBI “best practice” on a large scale, and serve as examples for the rest of the Commonwealth. The OCWMB could position

itself to become a Commonwealth funded tendering pilot program site by showing interest to State Government officials in becoming involved in the MBI initiative and by demonstrating capacity to implement such an approach.

3. URBAN WATER CONSERVATION

Approximately 74% of total reticulated water use in the OCWMB in the 1998/9 fiscal year was by urban residents. The Onkaparinga Catchment Water Management Plan, 2001 projects an additional 18% growth in area population over the next decade. The result will be growing demand for water and water infrastructure and growth in associated environmental impacts.

Some opportunities to conserve water are under direct control of the Board; realising other conservation opportunities would require the Board to convince others of the need for change. The CSIRO-PERU report prepared for the OCWMB on water pricing (Hatton MacDonald, Young and Connor, 2001) identified several ways to encourage reticulated water conservation through pricing including:

- increases in the volumetric (per kL) component of water charges;
- charges related to sewage volume in sewerage pricing; and
- higher peak-season water prices.

These pricing opportunities are issues that need to be raised with other Boards and with State Government representatives. They are not actions the Board can take unilaterally. In addition to pricing policy changes, there are a range of incentive and educational approaches that can significantly reduce water use and the environmental impacts of water use. This section outlines a range of incentive and educational opportunities to encourage households, businesses, and public institutions in the Onkaparinga Catchment Board area to conserve water.

3.1. Onkaparinga Urban Water Conservation Opportunities

Several of the best opportunities to encourage water conservation in the Onkaparinga Catchment area involve what water and power utility companies refer to as “demand management” programs. Typical household water demand management programs involve utility companies offering households audits and reports that identify cost saving opportunities to retrofit houses with water saving hardware like 6/3 dual flush toilets, low flow shower heads and sink aerators. In some cases the utility companies provide financing or cost-sharing incentives for households to install water saving equipment. Box 1 provides information on implementation and economics of several household demand management programs. Their implementation requires a shift in the culture of water utilities from focus on the sale of water to the delivery of high quality water services at the least cost.

Box 1 The Economics of Household Demand Management Programs

In Lismore NSW and Kalgoorlie-Boulder SA, mains water demand fell by 9.2% and 11% respectively through aggressive demand management programs involving retrofitting homes with dual flush toilets, low flow shower heads, sink aerators and garden water timers. An analysis by Allen and Pezzanti, 2001 suggests that a 10% reduction in mains water demand would be a reasonable expectation in the Onkaparinga and other Adelaide area catchments for an aggressive domestic water demand management program similar to those undertaken in Lismore or Kalgoorlie-Boulder.

Implementing such approaches were presumably attractive to the utilities that sponsored them because they were cost effective. Skeel and Hill (2000) found the life cycle cost of showerhead and aerator installations that took place as the result of Seattle's demand management program cost about US\$0.07/kL of water saved while a new water supply would have cost US\$0.34/kL.

Evaluation of the benefits of the Kalgoorlie-Boulder demand management program found that "*the financial benefits in reduced operating and capital costs will more than make up for the financial costs. Based on the original \$2.3 million budget, the projected savings to the Water Corporation are \$3.5 million and to the customer are \$2.8 million over a 2.5 year period*". (WSSA, 1998 as quoted in Allen and Pezzanti, 2001)

All demand management approaches have several characteristics that make them appealing to consumers.

1. Voluntary participation is one advantage of demand management. Instituting voluntary incentives, water audits, and educational approaches tends to encounter little public resistance as non-participants experience little impact and those who do participate typically do so because they perceive a benefit.
2. Demand management is often cost effective from the water user's perspective. The approach overcomes information, scepticism and high discount rate constraints that typically inhibit residents, businesses and public institutions from making money saving efficiency management changes and investments.¹

¹ Information constraints are the cost of researching returns to efficiency investments; high discount rate constraints refer to unwillingness to make conservation investments unless savings payback initial invests in very few years. The two quotes below are with respect to the apparent unwillingness of firms to make cost saving energy technology investments. However, the quotes capture the essence of the two main reasons that both private firms and households fail to invest in water conservation even when it is profitable.

"The lack of easily accessible information on the availability and/or economic and technical viability of energy-efficiency measures under full-scale, actual usage

Four variants of demand management programs that are potentially viable in the Onkaparinga Catchment area are summarised below. They range from relatively low cost activities that the Board can undertake itself through to major programs initiatives that the State, councils, utilities or businesses can undertake.

1. The OCWMB could consider expanding informational materials describing "best bet" household water conservation measures. At the present the Board sponsors two voluntary information programs in the catchment area. The "Water Care" program is aimed at encouraging household water conservation and the "Aware 2000 Sustainable Industry" program is aimed at encouraging eco-efficiency including water conservation and waste water minimisation in small businesses². Presently, neither program provides significant information that explains financial savings that can be realised by people who adopt "best bet" measures. Incorporation of such information into these programs is likely to increase adoption.

2. The Board could lead an effort to develop a "five frog" household water efficiency rating program similar to the five star energy efficiency rating scheme used in the Australian Capital Territory.³ The five star system, introduced in 1998, classifies each house according to the degree to which it is designed to conserve energy. Essentially, the less glass, the more double glazing, the more insulation, etc., the higher the rating is. The intent is to force all owners to pay attention to the energy efficiency of their home. The ACT energy rating legislation requires that no house may be sold without first obtaining a rating and drawing this rating to the attention of the purchaser before a contract is signed.

Conceptually, a water rating system similar to the ACT's five star energy rating system could be developed for urban water use and trialed in the Onkaparinga Catchment area. Under a so-called "Five Frog" system, a house water efficiency audit would be performed. This would involve assigning

conditions amplifies the scepticism. Smaller-sized firms in particular often do not even know about the specific technologies that are available. In particular, many small- to medium-sized industrial firms do not have the expertise on their staff nor the time to address energy efficiency in isolation from more strategic concerns. ...

... for most firms, capital is scarce. Because the links between improvement in energy efficiency and high priority goals such as improvements in plant productivity, product quality, environmental emission requirements, and labour and materials efficiency are generally not understood, energy-efficiency projects are considered non-strategic and take low priority when industrial firms allocate capital. A one- to three-year payback is often required for cost- saving investments such as energy-efficiency projects. Capital rationing, a common budgeting approach, further hinders energy-efficiency investments, since fewer investments are undertaken that would be justified by more conventional budgeting analysis." (Jordan and Nadel, 2001)

² A more detailed description of the Aware 2000 Sustainable Industry program is provided in the section of this report entitled Voluntary Environmental Management Arrangements.

³ The ACT energy program is underpinned by the *Energy Efficiency Ratings (Sale of Premises) Act 1997*.

more points for higher efficiency water appliances. Points would be summed to reach a particular frog rating. One frog might be the current minimum building code requirements. The "five frog" rating would be reserved for houses characterised by water efficient appliances and wastewater disposal, storm water management and garden systems that minimise water use and waste water disposal.

If the trial proves successful, the Board could recommend to the Government that it introduce legislation in SA similar to the ACT energy rating system. Consistent with the government's commitment to improve urban water use, the legislation would require that no house may be sold without first obtaining a water rating certificate. This would ensure that any purchaser is made aware of the water efficiency of a house before signing a contract to buy it.

In the Onkaparinga Catchment Board area and the rest of South Australia charges for sewage are based on property values. These charges do not vary with water usage or sewage volume and thus act as a disincentive for conservation. Metering sewage appears to be an expensive option. Rating houses based on water efficiency would establish significant incentives for people to reduce sewage discharge.

Another option for progressing the opportunity further would be to offer a sewage levy rebate based on an audit of the water efficiency of the house. For a "five frog" rating, the sewage charge might be divided by 5 and the household would pay only 20% of the current property-based charge. All households would be required to pay some base amount because all households receive some benefit from the existence of the sewerage system.

3. In partnership with local government councils or utilities the Board could develop a landscape water demand management program - Such a program would involve an officer visiting businesses and public institutions with large irrigated grounds, performing an irrigation system hardware and management evaluation, making recommendations and perhaps offering water saving technology investment financing or incentives. Nearly half of all water use in the Adelaide area in the summer months is for garden, park and lawn irrigation and anecdotal evidence suggests many systems are operated inefficiently (Allen and Pezzanti, 2001 and Bjornlund *et al.*, 2001). Assessment of landscape irrigation demand strategies in Adelaide (Allen and Pezzanti, 2001 and Bjornland *et al.*, 2001) and elsewhere suggest that a relatively small investment in urban landscape irrigation demand management programming could yield high conservation returns.

A closer look at the economics of a Seattle, USA landscape irrigation demand management program is provided in Box 2. The Seattle experience suggests that the key to developing a cost effective program in Adelaide would be a focus on technical assistance as opposed to financial incentives.

Box 2 Urban Irrigation Demand Management Economics – The Case of the Seattle Water Efficient Irrigation Program

The Seattle Public Utility (serving 1.3 million) Seattle Water Efficient Irrigation program (WEI) is an irrigation water demand management program available to all businesses, and public institutions that irrigate more than 1 acre (0.4 ha) on a voluntary basis. The program includes:

1. An onsite irrigation audit to assess efficiency of irrigation equipment and maintenance;
2. A written report for each client outlining recommended changes in system management and capital investment; and
3. In some cases, cost-sharing for capital investment.

Evaluation by Lawson (2000) of WEI experience between 1995 and 1998 shows that over the four year period the total program cost was around US\$245,000, or approximately US\$61,000 a year. Lawson's estimated per unit cost of water savings was approximately US\$0.215/kL, which was US\$0.513/kL less than the cheapest source of additional water supply.

While about 60% of the program budget was for incentives to encourage purchase of new irrigation hardware, only about 10% of total water savings resulted from the hardware. 90% of program water savings resulted from changes in irrigation management that clients adopted based on program officer recommendations. This implies that 90% of the program water savings could have been achieved with a program based on auditing and management recommendations alone. Lawson concluded that highest program payoffs to the Seattle program, but also to urban irrigation programs in general, are from the information/education activities.

4. The Board could encourage Water and Energy Performance (WEP) contractors to focus on the Onkaparinga Catchment. This relatively new type of business involves private companies identifying areas where water use is inefficient and then entering into a shared savings agreement with water and energy users. Typically, a WEP contractor identifies ways to install water saving equipment, pays for the installation costs and then receives part of the value of the savings in energy and water consumption costs. An example of a shared savings agreement between a private WEP contractor and an Atlanta, USA public housing project is provided as Box 3. The concept of shared savings agreements is alive and well in the Australian energy sector where the Australian Energy Performance Contracting Association (AEPCA) web site⁴ lists 18 member energy service companies. As far as we are aware, extension to the water sector has yet to occur.

⁴ <http://www.aepca.asn.au/index.html>

Box 3 Shared Saving Agreement Example -The Housing Authority of the City of Atlanta (AHA)

AHA signed a contract with the Water & Energy Savings Corporation (WESCo), of Lake Lure, North Carolina, USA on June 30 1998, that involves nine high-rise sites with a total of 1,923 units. The contract between the public institution and the private contractor is a shared savings agreement. Under the agreement investment in water and energy efficiency is provided with no initial cost to the housing authority. The investment will be repaid to the contractor as water and energy costs saving are realised.

" The energy and water conservation measures will include the following: heating and air conditioning equipment, individual metering, lighting upgrades, window and panel replacements, low-volume flush toilets, and low-flow showerheads and faucet aerators for all units. Both water-source and air-to-air heat pumps will provide the space conditioning. Also planned are central gas boilers for domestic hot water heating and a sonic water-leak detection system.

The total cost for the energy and water conservation measures will be US\$4.64 million, with WESCo financing at 4.2%. The measures are expected to yield annual savings of US\$900,000, and WESCo has guaranteed these savings over the 12-year contract."

*Source: National Center for Appropriate Technology website
<http://www.ncat.org/reh/atlanha.html>*

4. GROUNDWATER WATER IN THE MCLAREN VALE

Provisions of the *Water Resources Act, 1997* delegate most of the responsibility for water allocation planning in the McLaren Vale Prescribed Wells Area (MVPWA) to the OCWMB. The challenge the Board faces is to design water allocation rules that ensure sustainable aquifer use, but also succeed in not limiting the economic development value of water in the region.

This section begins by describing the situation that led to groundwater resource prescription in the area and the approach to limiting groundwater extractions that the Board put in place with the first MVPWA water allocation plan. Then water market data from the area is examined to determine whether the MVPWA water allocation rules have created significant rises in the price of water and whether rule modifications deserve consideration in future plans. The conclusion is a set of recommendations regarding changes to future MVPWA water allocation plans that the Board may wish to consider.

4.1. The Situation Leading to Groundwater Resource Prescription

The McLaren Vale Prescribed Wells Area, approximately 320 square kilometres, is the only area in the Onkaparinga Catchment area that is prescribed under the *Water Resources Act 1997*. Groundwater in the area was prescribed because there was concern that withdrawals were taking place at an unsustainable rate. Investigation leading to groundwater prescription over three irrigation seasons (1996/97 to 1998/99) estimated total average extractions in the area prior to prescription at 7010 ML/year. The investigation suggested that this level of extraction was probably not sustainable. The conclusion of background investigation was that "*slight falls in groundwater levels ... evident in all aquifers indicate that some reduction ... in current rate of extraction is required.*" (OCWMB, 2000, p.8).

As a result the OCWMB was given the responsibility of developing a McLaren Vale Prescribed Wells Area Water Allocation Plan that would include water allocation rules for individual irrigators extracting groundwater. The plan was to be consistent with achieving an overall maximum annual quantity of water extractions less than 7063 ML prior to July 2003, and 6600 ML after July 2003.

4.2. Current MVPWA Water Allocation Approach

Prior to prescription, groundwater allocation had been described on a per hectare basis with no explicit limit on the quantity of water per hectare that could be withdrawn. Groundwater extraction was not metred in all parts of the MVPWA prior to prescription, so installation of meters by all irrigators who wished to extract groundwater was the first requirement of the plan. In an attempt to develop an equitable set of rules for sharing the groundwater resources in the area and limiting extractions to a sustainable level, the Board developed a set of rules describing water allocations on a volume per hectare per year basis. These water allocation rules are summarised in Table 1. As inspection of the table shows, allocations will be reduced after 2003. Effectively, the Board has moved to first cap groundwater use in the MVPWA and then reduce the size of this cap.

In order to allow groundwater extractions to be relocated within the area from lower to higher value uses, the Board included provisions in the MVPWA Water Allocation Plan to allow the transfer of water allocations. However, it was deemed necessary to include restrictions on trades that could harm existing water licence holders. Specifically, rules prohibit allocations being traded into the area east of the Willunga fault line. Uncertainty of aquifer connectivity east of the fault line means that additional withdrawals in the area can harm existing licence holder interests seriously and irreversibly (Barret, 2001). Box 4 summarises the details of provisions prohibiting water trade that could harm existing licence holders.

Table 1 Water Allocations by Crop Type

Crop and Plan Dates	Water Allocation	
	Metered Area	Non metered area
Prior to July 2003		
Grapevines	Lesser of 1.5 ML/ha or 3 year avg. volume/ha*	1.28 ML/ha
Other crops	Lesser of 2.98 ML/ha or 3 year avg. volume/ha*	2.98 ML/ha
Areas planted with a mixture of grapevines and other crops	Lesser of 1.5 ML/ha or 3 year avg. volume/ha* for each ha in area planted to grapevine and lesser of 2.98 ML/ha or 3 year avg. volume/ha* for each ha in area planted to other crops	1.28 ML/ha for each ha in area planted to grapevine and 2.98 ML/ha for each ha in area planted to other crops
After July 2003		
Grapevines**	1.1 ML/ha	Not applicable
Other crops**	1.1 ML/ha plus amount by which 3 year avg volume/ha* exceeded 1.2 ML/ha up to a maximum additional 1.6 ML/ha	Not applicable
Areas planted with mixture of grapevines and other crops**	1.1 ML/ha for each ha in area planted to grapevine and 1.1 ML/ha plus amount by which 3 year avg volume/ha* exceeded 1.2 ML/ha up to a maximum additional 1.6 ML/ha for each ha in area planted to other crops	Not applicable

*3 year avg. volume/ha refers to average volume of water used per hectare over the three year period commencing 1 July, 1996

** Growers with 3 year average annual volume/ha less than 1.1 ML/ha for each ha in grapevine and 2.7 ML/ha for each ha in other crops may be eligible for an additional amount to bring their total up to 1.1 ML/ha for each ha in grapevine and 2.7 ML/ha for each ha in other crops respectively.

Box 4 Provisions of the MVPW Area Water Allocation Plan to Protect Third Party Water Rights (sections 3 and 4 of the Plan)

" ...

- 3) *Where there is a change in the proposed location of the point of extraction, groundwater may only be transferred where:*
- a) *the location of the proposed new point of extraction does not move to a stressed area; and*
 - b) *the taking of water from the proposed new point of extraction will not result in a level of aquifer stress greater than the level of aquifer stress caused by the taking of the same amount at the original point of extraction; and*
 - c) *the taking of water from the proposed new point of extraction will not lower the level of underground water to a level that will detrimentally affect the ability of other persons to lawfully take from that underground water, or detrimentally affect any ecosystems that depend on that underground water; and*
 - d) *the taking of water from the proposed new point of extraction will not cause a decrease in the amount or duration of discharge from the underground water to streams or springs and will not detrimentally affect any ecosystems that depend on that discharge; and*
 - e) *the taking and use of water from the proposed new point of extraction will not cause degradation of the land from under which the water is taken or on which it is used by way of increased soil salinity, soil erosion or any other means; and*
 - f) *the location of the proposed point of extraction does not move from a point east of the Willunga Fault line to a point west of that line.*
- 4) *For the purposes of clause 3, "stressed area" means*
- a) *an area where underground water salinity has increased at an average rate of 100 mg/L (TDS) over the previous 3 years; or*
 - b) *an area where the depth (below ground level) to underground water has increased at a rate of at least one metre over the previous three years."*

Source: OCWMB 2000, p.22

4.3. The First MVPWA Groundwater Water Allocation Plan

The Board may wish to consider modifying MVPWA water allocation rules if future aquifer monitoring results reveal that groundwater levels in the MVPWA are continuing to decline. The recommendations in the following section include a suggested method of adjusting allocations based on periodically updated information on the rate of groundwater extraction that is sustainable.

This section evaluates whether the Board may want to consider updating MVPWA water allocation and trade rules because the private costs of complying with the rules can be reduced without reducing resource use sustainability or imposing costs on third parties.

Tension between goals of maximising groundwater resource based economic development and maintaining resource sustainability are addressed in the current MVPWA Water Allocation Plan in a number of ways:

- the volume of water that irrigator can extract is limited;
- surplus water allocations resulting from both retirement of irrigated land and increased efficiency of irrigation are tradeable; and
- water trade east of the Willunga fault line is prohibited because additional withdrawals might seriously and irreversibly harm existing licence holder interests.

Effectively, water use has been capped and all changes in water allocations must now occur via market processes. To test whether the cap on groundwater supply resulting from prescription adversely affected water based economic activity in the MVPWA, water prices in the area before and after prescription were compared. All other things being equal, rules that successfully cap use at its current level should result in minimal price change.⁵

The results of this test support the hypothesis that plan implementation did not increase water price appreciably. Specifically, water price data showed that the price of the basic right to irrigate a hectare of grapes remained very nearly constant before and after groundwater prescription. Prior to the Water Allocation Plan, water rights were expressed in area terms and sold in the \$5,000 to \$6,000/acre (\$12,400 to \$14,800/ha) range. Following the approval of the Water Allocation Plan, water began trading on a per ML basis. Market prices appear to have settled in the range of \$11,200 to \$14,800 per ML.⁶

⁵ Market water prices used in this evaluation are based on personal communications with Martin Stokes, DWR and Duncan McDonald, a water trader/broker.

⁶ This finding is based on the assumption that irrigators continued to view the basic commodity being traded as the water allocation required to grow a hectare of grapes. This is a reasonable assumption because reduction to a 1.1 ML/ha allocation probably did not limit yields for most growers. Some who increased irrigation

The main conclusion is that to date the restrictions on water use imposed on irrigators through the MVPWA Water Allocation Plan have not had significant adverse economic consequences. This, however, does not mean that aquifer use is now sustainable. Ongoing monitoring is necessary and, at some date in the future, it may be that further changes will be necessary.

In anticipation of the need to signal that allocations may be changed in the future **the OCWMB may wish to consider denominating future allocations as a share of Permissible Annual Volume (PAV)⁷** in parallel with a definition in volumetric terms. Water allocations based on a share of PAV would be potentially advantageous as a mechanism for automatically adjusting allocations in future water allocation plans. The approach is consistent with the *Water Resources Act, 1997* allowance for adjustment of water allocations in a non-capricious manner. The main advantage is reduced licence holder uncertainty regarding the process by which water allocations will be adjusted in the future. The approach is being introduced in the Eyre Peninsula Catchment of South Australia and has been recommended to the South East Catchment Water Management Board.

efficiency as a result of reduced allocation may actually have experienced increased returns (Black and McCarthy, 1998).

There is some anecdotal evidence that most of the higher prices observed may have resulted from geographic restrictions on trade that made it difficult to move water into areas such as Blewitt Springs and locations east of the fault line. As a result, sellers in these locations realized that allocations in these areas can sell at a premium as "new" water can not be moved in.

Of course, the Water Allocation Plan water use restrictions may have some adverse economic impact on landholders with an interest in expanding production of water intensive row and pome fruit crops. To the extent that such crops require more than 1.1 ML of irrigation per hectare, new plantings will require purchase of more expensive water rights than would have been required in the past. However, the plan protects landholders who had water intensive crops in production prior to prescription by allowing them greater water allocations on water intensive crops. One likely consequence is acceleration of the already rapid rate of conversion to wine grape production in the region.

⁷ Permissible annual volume is the total annual volume of allowable aquifer withdrawal in a groundwater allocation plan. PAV is based on what the best science suggests is a sustainable withdrawal rate, though the truly sustainable withdrawal rate is not known with certainty.

5. FARM DAMS POLICY IN THE MT. LOFTY RANGES

The question of the impact of farm dam development is an issue of current interest to the Board, catchment boards in other parts of South Australia and at least two other states. Recently, both NSW and Victoria have introduced significant policy initiatives in this area.

Conceptually, each dam that is installed in the catchment reduces the amount of water available to others. As more dams are installed, less water flows into rivers and there is less aquifer recharge. In addition, most small dams release water only after they fill. Generally, this means that stream-flow in summer and the early part of winter is less than it otherwise would be. Over the last 10 years, it has been estimated that there has been around a 10% increase in the total capacity of farm dams storage in the Onkaparinga and Torrens catchments (DWR, 2001).

In some, but not all parts of the Onkaparinga Catchment, dam construction is now thought to be limiting the amount of water that can be taken from the catchment for consumptive purposes. Moreover, even where this is not yet the case, it is foreseeable that this may be a significant concern in the future.

This section of the report explores opportunities to use market-based instruments to improve the management of farm dams.

5.1. Recent Initiatives in Other States

Two states have recently introduced new arrangements to manage farms dams. Both states have essentially moved to “cap” dam construction and manage the remaining resource as a scarce resource of limited capacity. NSW has taken a regulatory approach while Victoria is taking a path that involves the use of market-based instruments. In NSW, all landholders are entitled to harvest only a fixed percentage of water running across or falling on their land. In Victoria, all water stored in dams used for irrigation is capped and tradeable. For small dams this will be achieved via off-set policies where a new dam is not approved unless an existing dam is removed. For larger dams, the introduction of metering and trade in water is being provided for in the policy. These recent initiatives provide examples of how the Onkaparinga Catchment Water Management Board could manage the effects of farm dams on water supplies and environmental water requirements in the catchment area.

5.2. Current legislative arrangements

Conceptually, the impact of farm dam development in the Onkaparinga Catchment area, and elsewhere, can be controlled via two mechanisms.

The *Water Resources Act 1997* allows for management of farm dams in two ways:

- prescription of water resources in an area and the requirement for drawing up subsequent water management plans for the prescribed resource area; and
- permits for water-affecting activities.

Additionally, farm dams development is controlled through *Development Act 1993* provisions requiring that:

- a permit be obtained for a dam that will have "a wall, levee or mound greater than 3 metres in height or is greater than 5ML in volume or has a retaining wall over 1 metre or is located within the Hills Face Zone or a Flood Zone." (DWR 2001); and
- in instances where development approval is not required, a permit for dam construction is required.

5.3. Onkaparinga Catchment Farm Dam Policy Recommendations

In an ideal world, the entire Onkaparinga Catchment area would have been prescribed and dam construction brought under the Board's direct control. It is recommended that the Board once again approach the Minister and the Department for Water Resources with a recommendation that the entire catchment area be prescribed. Once this is achieved, it is suggested that an off-set policy be put into place for dams above a certain size and run-off ratio similar to that recently introduced in Victoria. Effectively, a moratorium would be placed on dam construction.

In parallel with a recommendation for full prescription, it is also suggested that the Board work with local government councils. As summarised above local government councils have a wide range of control over farm dam impacts through the *Development Act, 1997*. For example, under the *Development Act, 1997*, councils have powers to make new dam development subject to conditions. **In particular permits to build new dams could be subject to off-set (tradeable development right) provisions.** Under such an arrangement, in order to obtain a permit to construct a dam, an aspiring dam developer would have to first show that they had provided for removal of another dam of equal or greater size in the same sub-catchment. The advantage of off-set provisions is that they provide some flexibility for economic development in the future while maintaining controls on how the resource is accessed.

6. VOLUNTARY ENVIRONMENTAL MANAGEMENT ARRANGEMENTS

In recent years there has been emerging interest in voluntary environmental management arrangements (VEMAs) to encourage businesses to improve and prove their environmental credentials. Some VEMAs involve labelling and certification that allows firms to demonstrate compliance against a specific environmental standard and benefit by doing so.

Clearly the OCWMB has an interest in promoting businesses in the catchment area that pursue good environmental management practices. This section of the report describes what voluntary environmental management arrangements are, how they can be used to improve environmental management and opportunities for the OCWMB to promote the use of voluntary environmental management arrangements.

There are at least three good reasons to believe that OCWMB support for voluntary programs can yield significant improvements in catchment resource management sustainability that other approaches might not.

1. Information/education based voluntary programs show businesses and households ways to make “eco-efficiency” management changes—management changes that both enhance environmental performance and save costs. The households or businesses that participate and realise eco-efficiency gains generally would not in the absence of a voluntary program, because they would not make the necessary information/education investment on their own.
2. Many of the businesses and households who participate in voluntary programs are first movers who are willing to undertake environmental action beyond regulatory requirements when the information that is prerequisite to such actions is offered through voluntary programs.
3. Voluntary programs can be a good way of inducing environmental performance improvements in the small business sector which is often not subject to the stringent environmental regulations that big industry is.

6.1. What are Voluntary Environmental Management Arrangements (VEMAs)?

Voluntary environmental management arrangements, or VEMAs, include a diverse set of arrangements in which businesses, and in some cases other organisations, voluntarily enhance environmental management. As their name implies, all VEMAs share two common features—they are concerned with environmental management and they are undertaken voluntarily. Thus, ‘VEMA’ is an umbrella term embracing many very different types of arrangements including environmental management systems (EMSs) such as ISO14001, as well as various production protocols that may be part of environmental certification schemes and environmental labelling initiatives.

Some but not all VEMAs result in certification or labelling. VEMAs are 'voluntary' in the sense that participation in them is not prescribed by law. However, the uptake of VEMAs including verifiable compliance against specific criteria and standards may be a precondition of entry to some markets (Mech and Young, 2001). Individual VEMAs are distinguished from one another by differences in their key design features. Key design features are denoted by terms such as 'standards', 'auditing', 'certification' and 'labelling'. The design specifics of different VEMAs, notably the standards they incorporate as well as the ways in which these are audited, certified and/or labelled, and by whom, define the differences among VEMAs. Also, the design specifics determine how much environmental outcomes are actually enhanced by the implementation of a given VEMA (Mech and Young, 2001).

6.2. Types of VEMAs

The key to understanding VEMAs lies in understanding the standards or criteria that are audited in different environmental certification and labelling schemes. A typology for classifying VEMA standards is presented in Box 5 below. These standards determine the nature of the green claims that can be made in the event of a successful third party audit. Also, the nature of the audit, that is to say whether it is conducted internally or externally or both, and the nature and identity of the body or authority conducting external auditing and making labelling recommendations and decisions, convey different messages in the marketplace regarding the levels of certainty, even trustworthiness, associated with the environmental claims made. Thus, the design specifics determine the level of consumer confidence and marketplace recognition associated with different schemes (Mech and Young, 2001).

Box 5 Types of Environmental Standards in VEMAs

Standards are "accepted specifications or codes of practice which define materials, methods, processes and practices that, when effectively implemented, ensure that consistent and acceptable levels of quality, performance, safety and reliability are achieved." (Standards Australia, 2001).

Different types of environmental standards exist, and according to Ure's (1999) categorisation, there are two groups of environmental standards:

- organisation-oriented standards, also called process standards; and
- production-oriented standards, which may be product standards or performance standards.

Process standards specify management processes and procedures to be followed by an organisation for the purposes of environmental management. Product standards may define specific features of a final product and may also define how that product must have been produced. Performance standards specify acceptable or required levels of performance to be met. Environmental performance standards may relate to the production process, as well as to environmental externalities stemming from the production process.

Source: *Mech and Young (2001)*

In general terms there are four types of VEMAs that may result in some form of environmental certification and labelling.

1. VEMAs based on organisation-oriented standards, or process standards. These are environmental management systems (EMSs) such as the European Union's Eco-Management and Auditing Scheme (EMAS) and ISO 14001.
2. VEMAs based on production-oriented standards, or product and performance standards, such as the Integrated Fruit Production (IFP) protocols.
3. VEMAs based on a blend of organisation-oriented and production-oriented standards including EUREP-GAP, Organic Standards, the Marine Stewardship Council's (MSC) scheme, the Forest Stewardship Council (FSC) and the Finnish Forest Certification Scheme (FFCS).
4. A group of environmental labelling and eco-labelling schemes in the ISO 14020 series of standards that allow for three environmental labelling possibilities known as Type I, Type II and Type III labelling.
(Mech and Young, 2001).

An example of a VEMA that is well recognised in Australia and internationally is the ISO 14001 standard explained in Box 6 below.

Box 6 ISO 14001

The International Standards Organization (ISO) 14001 standard is an internationally standardised guideline for design of environmental management systems (s). A firm that is ISO 14001 certified has an EMS in place that adheres to five principles:

1. **An EMS Policy is in place** that includes a commitment to prevention of pollution and complies with all relevant environmental legislation and regulation.
2. **A planning procedure is in place** that sets environmental objectives to address all of the firms activities, products and services that can have significant environmental impact and programs are in place to achieve the objectives.
3. **Implementation and operational procedures are in place** including clearly defined environmental management responsibility to meet all environmental objectives, and full documentation of all environmental management actions and outcomes.
4. **Systems for checking, measuring and monitoring environmental performance are in place** that include periodic environmental auditing, and procedures to implement corrections in cases of non-compliance.
5. **A system is in place to review the EMS** including procedures to ensure changes are made to guarantee continuous improvement.

Source: Heinze, 2000

6.3. Existing VEMAs in the Onkaparinga Catchment Area

Both the OCWMB and the SA Environmental Protection Agency (EPA) already have voluntary programs in place to promote environmental management by Catchment businesses. While none of the existing program result in environmental certification or labelling, they do contribute to improved environmental management. Most notable among VEMA programs in the Catchment area is the "Aware 2000 Sustainable Industry" initiative sponsored by the OCWMB and the City of Onkaparinga.

The "Aware 2000 Sustainable Industry" program involves a full-time officer who visits local small businesses such as auto repair shops to review current business practices and make suggestions for improvements to minimise potential for adverse water quality impacts of business practices. The program emphasis is on:

- storm water drain placement;
- waste water management;
- hazardous waste management;
- hazardous waste spill control; and
- water and energy conservation.

In addition the program co-sponsors EPA small business eco-efficiency workshops and is developing a reference group of area small business leaders who will mentor other area businesses in environmental management.

Another innovative EPA initiative is the Greener Business Alliance Project.

"A chief aim of this project is to improve the environmental performance of businesses along a supply chain through a series of cooperative agreements between the EPA, a medium to large sized business that acts as a mentor, and a select number of its suppliers. The term 'supplier' refers to a company providing goods and/or services.

It is the suppliers that the project is looking to influence because they are typically smaller enterprises, environmentally unlicensed and potentially less eco-efficient. While the environmental impact of each individual supplier may be small, the accumulated effects across the supply chain can be significant.

The EPA has recently selected the Yalumba Wine Company to be a mentor. Eight suppliers to Yalumba have entered into a three-way eco-efficiency agreement with Yalumba and the EPA. The eco-efficiency agreements contain a commitment to develop an action plan with set negotiated environmental goals for the suppliers. They also establish a commitment on the part of suppliers to allow the benefits achieved to be promoted."⁸

⁸ Source: SA EPA Eco-Efficiency Web site
<http://www.environment.sa.gov.au/epa/ecoefficiency.html>

6.4. VEMA Opportunities for Viticulture and Horticulture

Viticulture and horticulture are the most important irrigated agricultural activities in the catchment area. A total of nearly 14,000 ha of irrigated cropland were reported in the catchment area in 1999, with 9,294 ha in vineyards and 3,798 ha in horticultural crops and orchards. There are several compelling reasons to believe that the timing is right for developing VEMA opportunities for viticulture and horticulture within the Onkaparinga Catchment area.

1. Discussion with the Adelaide Hills Grape Growers (AHGG) representative Michael Bove suggests that community acceptance of viticultural production practice is the single most important force driving the environmental regulatory agenda. The group would like to move from a reactive to a proactive position on the issue.
2. International experience suggests that there are excellent opportunities to address community and market concerns related to the environmental impacts of viticulture using voluntary approaches. Many techniques to address environmental issues in horticulture and viticulture can save growers money. Successful voluntary orchard and viticulture initiatives are outlined in the Boxes 7 and 8 below.

Box 7 Economic Evaluation HRDC/AAPGA Program

Existing research confirms that voluntary environmental programs in agriculture can be expected to lead to "eco-efficiency" gains that save growers input cost and reduce the environmental impact of farming. For example, a report to the Horticultural Research and Development Council (HRDC), evaluated the impact of the \$3.55 million invested in voluntary integrated pest management (IPM) programs by HRDC and the Australian Apple and Pear Growers Association (AAPGA) between 1991 and 1999.

The study found that the growers participating in the IPM program reduced average sprays by 23% and achieved an average 15% (approximately, \$150/ha) savings in pesticide input costs. Estimated financial benefits to growers alone exceeded the cost of the investment by a ratio of 1.5:1, and significant public and private environmental and health benefits also resulted.

Source: Anon, 1999

Box 8 The Oregon Wine Advisory Board LIVE Program

The Low Input Viticulture & Enology Program (LIVE) is a peak industry group program providing Oregon, U.S.A. vineyards and wineries recognition for adopting sustainable agricultural practices. It is an example of a viticulture-focused VEMA without third party certification that can be locally adopted and implemented at relatively low cost. Initial program development was a grower effort funded by a small government sustainable agriculture grant. On-going costs of program administration are financed through peak industry group membership dues of US\$100/year and the volunteer auditing efforts of a retired wine grower. The strength of the program is its focus on provision of guidance regarding best ecological practice in wine production and a framework that growers can use to evaluate self-improvement. The certification program involves providing participants with a list of vineyard prohibited practices, required practices and ecologically desirable practices in six areas.

- **Biodiversity** practices include requirements and options for botanical diversity of cover crops, and untreated biological compensation areas on vineyards.
- **Cover cropping and weed control** practices include requirements and options for % of vineyard floor in crop cover, setback from streams and wetlands, % of vineyard sprayed with herbicide, and non-herbicide weed control.
- **Disease and Pest Control** practices include requirements and options for sprayer inspection and calibration, rates of specific pesticides applied, and cluster exposure and canopy density
- **Fertility Management** practices include requirements and options related to soil and plant tissue nutrient testing, quantities of specific nutrients applied, and application timing.
- **Irrigation** practices include requirements and options related to irrigation and soil moisture monitoring, quantities of water applied, and application timing.
- **New Planting** practices include requirements and options related to stock type (certified and resistant varieties, and rootstock), soil testing, and pH adjustment at planting.

Evaluation is based on a three page score card growers submit that summarises fertility, and pesticide input use, as well as cultural management practices. To be certified a grower must:

1. adhere to all required practice guidelines (i.e. have vineyard in cover crop over winter); and
2. obtain at least one half of the possible 280 points for good ecological practices (i.e. in disease control -10 points if 0% of cluster is visible, +10 if >30% is visible, +20 if >50%).

The group does not see the scorecard as an endpoint or a way to exclude growers but rather as the beginning of a process of continuous management improvement. Thus, the scoring system often gives negative points for less desirable practices rather than prohibiting the practice altogether. Participants are inspected at least once a year at unannounced times to verify self-reporting accuracy.

Sources: LIVE web site - <http://www.liveinc.org/index.htm>, and personal correspondence with Dai Crisp, Oregon Wine Advisory Board Member

6.5. VEMA Recommendations

The OCWMB is well positioned to participate with Commonwealth and State agencies that are currently developing policies relating to VEMAs and relevant businesses and other organisations within the catchment that could adopt VEMAs. In this way, the OCWMB may promote VEMAs in viticulture, and other agricultural and horticultural activities, within its boundaries.

An opportunity for the OCWMB exists because while interest in VEMA development is high, peak industry organisations like AHGG probably will not take initiative without some support. In part, this is because developing a successful voluntary approach requires significant work to:

- develop local best management practice (BMP) guidelines;
- develop environmental standards and criteria, promote their implementation, and review them on an on-going basis; and
- design certification procedures that are recognised in the marketplace and by the community.

Where such initiatives are arising (the Margaret River region of WA and the Yarra and Golden Valleys of Victoria), local or state governments have committed limited funding to development in the recognition that required work is beyond what industry groups are likely to provide on a volunteer basis in committee work.

The OCWMB may wish to encourage VEMA adoption within its boundaries by partnering with emerging State and Commonwealth initiatives in this area and by offering incentive to businesses that adopt voluntary environmental management on their own.

In line with the Coalition's new policy on EMSs, the Commonwealth Government has committed to funding 15 pilot projects for developing EMSs in agriculture and allied rural industries across Australia. The Board may wish to consider submitting a proposal to undertake such a pilot VEMA initiative within the Onkaparinga Catchment area in partnership with relevant State and Commonwealth agencies. Essentially, the aim of such a regional pilot project would be to foster on-farm development of EMSs, with relevant environmental performance guidelines, on enough farms within a catchment to investigate the potential of EMSs to meet catchment natural resource management goals.

As an incentive to participate in VEMAs, the Board may wish to consider catchment levy and/or Council rate rebates for businesses, and/or other organisations, that adopt systems of environmental management consistent with ISO14001. It is proposed that having served the purpose of an implementation incentive such rebates would be phased out. This incentive would be in addition to the Commonwealth's proposed income tax rebate of \$3,000 for low income farmers who implement EMSs.

7. CONCLUSIONS AND RECOMMENDATIONS

The result of this report is a set of recommendations about how the OCWMB, other state agencies and private business can improve ecological, economic and social outcomes in four areas of strategic interest to the OCWMB:

- conservation Incentives
- urban water conservation
- groundwater and farm dam water allocation policy and
- voluntary environmental management arrangements.

Conservation Incentives

The largest single expenditure category in the 2001 Onkaparinga Catchment Water Management Plan is rehabilitation and management of waterways through incentive payments to private landholders. Between 2000 and 2003, \$3.15M (or 36% of the entire \$8.75M three year budget) is earmarked for spending in this category (OCWMB, 2001). Consequently this is a very important policy area for the Board to consider.

Perhaps the most significant limitation of the current approach is that the return per cost-sharing dollar is less than could be achieved. This is because, at the present, cost-sharing payments are the same, irrespective of landholder willingness and capacity to contribute conservation effort.

This report describes an OCWMB opportunity to adopt a tendering system to conservation investment similar to the Victorian Bush-Tender approach. The approach provides a mechanism enabling landholders who are willing to undertake conservation works at less than the current rate the opportunity to do so.

Evaluation of the first year of experience with the Victorian Bush-Tender approach found that the agency attained approximately 33% more environmental protection effort for its \$400,000 cost-sharing expenditure than it would have had it cost-shared at a single pre-set rate (Stoneham, Chaudhri, Ha and Strappazon, 2002). Realising similar improvements in the Onkaparinga Catchment is possible.

Opportunities may exist to fund, at least partially, development of such a tendering system through Commonwealth grants. Pilot programs to demonstrate cost saving environmental program design are a high priority of the emerging National Action Plan for Salinity and Water Quality - Market Based Instruments initiative.

Urban Water Conservation

Several policy changes and programs can be pursued by the OCWMB and other government agencies to enhance urban water conservation including:

1. **Expanding informational materials describing “best bet” household water conservation measures.** At the present, the Board sponsors two voluntary information programs in the catchment area—“Water Care” and the “Aware 2000 Sustainable Industry” program. Incorporation of information explaining financial returns to “best bet” conservation practices into these programs is likely to increase adoption.
2. **Leading an effort to develop a “five frog” water efficiency program similar to the five star energy efficiency rating scheme used in the Australian Capital Territory.**
3. **Developing a landscape water demand management program in partnership with local government Councils or Utilities.** Such a program would involve an officer visiting businesses and public institutions with large irrigated grounds, performing an irrigation system hardware and management evaluation, making recommendations, and perhaps offering water saving technology investment financing or incentives.
4. **Encouraging water and energy performance contractors to focus on the Onkaparinga Catchment area.** This relatively new type of business involves private companies identifying areas where water use is inefficient and then entering into a shared savings agreement with water and energy users. Typically, a water and energy performance contractor identifies ways to install water saving equipment, pays for all or part of the installation costs and then receives part of the value of the savings in energy and water consumption costs.

Groundwater in the McLaren Vale

Research carried out for this report concluded that, to date, the restrictions on water use imposed on irrigators through the MVPWA Water Allocation Plan have not had significant adverse economic consequences. This, however, does not mean that aquifer use is now sustainable. Ongoing monitoring is necessary and, at some date in the future, it is likely that further changes will be necessary.

One improvement in water allocation rules the OCWMB may wish to consider is denominating future allocations both as a share of Permissible Annual Volume and as a water volume. This approach would put in place a mechanism for adjusting allocations in future water allocation plans. If monitoring shows that PAV has been overestimated then the share system facilitates adjustment of everyone’s allocation on a pro rata basis.

Farm Dam Policy

Reduction in environmental flow in certain sub-catchment streams as the result of farm dam water capture is an increasing concern in the Onkaparinga Catchment.

To reduce potential adverse impact of farm dams, one of the simplest approaches is to cap farm dam development and make the issuance of new dam permits subject to off-set provisions. Under such an arrangement, in order to obtain a permit to construct a dam, an aspiring dam developer would have to off-set their proposed development by arranging to have another dam of equal or greater size in the same sub-catchment removed. Off-set provisions provide some flexibility for economic development in the future while maintaining controls over potential adverse impacts of development.

There are two ways of achieving this outcome. The first is by recommending to the Government that they prescribe the entire Onkaparinga Catchment area. The second is to work with local government councils to achieve the same outcome via development controls.

Voluntary Environmental Management Arrangements

There are good reasons to believe that OCWMB investments in voluntary approaches may yield significant improvements in catchment resource management outcomes. There are at least two opportunities that the OCWMB may wish consider as means of promoting voluntary environmental management efforts in the catchment.

1. As an incentive to participate in voluntary environmental management arrangements (VEMAs), the Board may wish to consider catchment levy and/or council rate rebates. For example, rebates could be offered to businesses that initiate voluntary environmental management systems that comply with the internationally recognised ISO14001 standard. It is proposed that having served the purpose of an implementation incentive, such rebates would be phased out. This incentive would be in addition to the Commonwealth's proposed income tax rebate of \$3,000 for low income farmers who implement EMSs.
2. The OCWMB may wish to consider participation in Commonwealth-funded pilot projects for VEMAS in agriculture and allied rural industries. The Commonwealth Government has committed to funding 15 pilot projects for developing environmental management systems (EMSs) in agriculture and allied rural industries across Australia. The Board may wish to consider submitting a proposal to undertake such a pilot initiative within the Onkaparinga Catchment area in partnership with relevant State and Commonwealth agencies. Essentially, the aim of such a regional pilot project would be to foster on-farm development of EMSs, with relevant environmental performance guidelines, on enough farms within a catchment to investigate the potential of EMSs to meet catchment natural resource management goals.

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