Property:
Rights and Responsibilities

Current Australian Thinking

Land & Water
AUSTRALIA
research • development • innovation

Property:
Rights and Responsibilities

Current Australian Thinking

Land & Water Australia 2002

Published by: Land & Water Australia

Postal address: GPO Box 2182
Canberra ACT 2601

Office location: 91 Northbourne Avenue
Turner ACT 2612

Telephone: 02 6257 3379
Facsimile: 02 6257 3420
Email: public@lwa.gov.au
Website: www.lwa.gov.au

ISBN 0 642 760 92 6
WEB 0 642 760 780
Product code PR020440

Designed by arda www.arda.net.au
printed by lasercolour

Table of Contents

FOREWORD

Over the past year Australia has had to confront a number of events which have impacted on how we view ourselves, our institutions and our environment. Ranging from the Murray River mouth closing, to major dust storms, soil loss, and failing agricultural systems requiring considerable public subsidisation, to national security concerns, they have all contributed to increased debate and the need to find solutions. The heightened public awareness of the condition and fragility of our natural resources presents a major opportunity for the Australian community and policy makers to carefully consider and work through the complex set of issues we face. The nature of property rights and responsibilities for sustaining our environment is a case in point. We have the chance now through the knowledge that we have accumulated to make the changes in our policy settings and institutions that are needed to help us attain a more sustainable Australia during this century.

To inform this process, the Social and Institutional Research Program of Land & Water Australia has brought together a set of papers from leading researchers and analysts on natural resources property rights and responsibilities. The authors include Paul Martin, Miriam Verbeek, Poh-Ling Tan, John Marsden, Mike Young, Jim McColl, Megan Dyson, Robin Connor, Stephen Dovers, Tony Gleeson, Kirstie Piper, Jennifer McKay and Henning Bjornlund.

Each of the papers was written as part of a broader research project or for another purpose and the papers acknowledge sponsors and contributors. The collection commences with a discussion of the notion of private property and what the author believes are common myths in the property rights' debate. This is followed by analyses of applied legislative and economic approaches to property rights. These papers include an historical overview of property rights in the common law and Australian water legislation; an economic perspective on water entitlements and property rights which defines criteria for optimal water right regimes; a search for a generic, robust and economically efficient approach to the definition of interests, rights and use obligations within a trading system; and a detailed review of the legal aspects of reducing consumptive water rights for environmental flows.

The remaining papers examine broader philosophical issues relating to property rights and markets as policy instruments. These include an exploration of property rights issues (equity, economic efficiency and ecological integrity) that the authors believe are necessary to understand the broader complexity of property rights change. A further paper explores the need for focus on the broader institutional environment (including an objective appraisal of the changing role of agriculture in the Australian economy and society) rather than on the selection of specific policy instruments such as property rights. The final paper argues that social justice considerations have received little concerted study and examines the social and distributive effects of the introduction of markets for tradeable water and their rules and operations.

Land & Water Australia believes these papers, as a collection, represent the leading edge of Australian thinking on property rights and associated institutional issues. We commend them to readers for their value in informing the further policy and institutional development that is required as national, state and regional programs and reforms are put into place.

Catherine Mobbs & Ken Moore

Social and Institutional Research Program

Land & Water Australia

December 2002

Property Rights and Property Responsibility

Paul Martin and Miriam Verbeek[1]

This article is an extract of a larger report prepared for the Social and Institutional Research Program of Land & Water Australia which considers the institutional arrangements necessary to give effect to concepts of sustainability[2].

Summary

The word "property" has acquired a mystical political importance. This is understandable given the dynamics of resource use behaviour, but it adds little value in dealing with the very substantial underlying problems of resource conservation and the balancing of public and private interests.

Taking a view of property from the perspective of behavioural fundamentals suggests that many of the absolutes that are proposed politically are far more usefully understood as negotiable options. The focus needs to be on the detail of the situation, and the details of the potential instruments to resolve that particular issue.

It is the case that every instrument that is used has the potential to adversely impact someone. That is unavoidable in a world of declining resource availability. Equity issues deserve to be debated as serious concerns involving many people. Resource owners who lose some or all of their interests diminished by society have a cause for complaint, and deserve to have their interests respected. They deserve not to have to bear an unfair share of the costs of the social challenge of sustainability. Attaching paramount importance to a slogan "property right" may assist some, but it will not achieve this equitable and principled sharing.

Maturity in dealing with these issues will serve us better than resorting to simplistic models of ownership, which emerged at a time when resource constraints and interdependence were less pressing concerns.

Box 1.1: Four types of property regimes

State Property: Individuals have a duty to observe use/access rules determined by controlling/managing agency. Agencies have right to determine use/access rules

Private property: Individuals have the right to undertake socially acceptable uses, and have duty to refrain from socially unacceptable uses. Others (called "non-owners") have duty to refrain from preventing socially acceptable uses, and have a right to expect that only socially acceptable uses will occur

Common property: the management group (the "owners") have right to exclude non-members, and non-members have duty to abide by exclusion. Individual members of the management group (the "co-owners") have both rights and duties with respect to use rates and maintenance of the thing owned

Nonproperty: No defined group of users or "owners" and benefit stream is available to anyone. Individuals have both privilege and no right with respect to use rates and maintenance of the asset. The asset is an "open access resource"

The term "property right" is a political one that spans an enormous range of legal interests through which rights-holders have the ability to exclude others. Whilst the term raises expectations of enforceability, transferability, and that any reduction in these interests will be compensated, the legal extent of any of these interests can vary widely.

Property rights exist whenever there is a legally defensible interest in some thing, even when that interest is not complete. A right to use but not transfer, or a right to share use, is also a property right.

Property rights and property beliefs

Property responds to social changes, as is evident in property concepts like moral rights for artists, intellectual property in plants, and the call for ownership of one's genetic information. Property is always a matter of degree (Becker 1977; Reeve 1987; Staves 1995; Becker 1997; Dragun 1999). The term is mistakenly but commonly taken to refer to "full blooded ownership", with compete rights of exclusion, transfer and use. This reflects the social myth, rather than a legal or historical or philosophic truth. Because property rights are central to capitalism, they are often seen as optimal policy responses to environmental problems (Bromley 1991).

In political usage the concept is overlaid by the expectation that property rights should be or are un-attenuated (complete and beyond direct political interference). This is true neither in practice nor historically. All ownership concepts are constructs of society, constrained by society through government. The same political structure which defines and protects property also constrains it. This poses no insurmountable problem in markets, provided that there are sufficient perceived gains from trading to overcome any political uncertainty.

Property rights are powerful because of the beliefs that support them. There is a shared expectation that property will be respected, and there is a more-or-less shared understanding of what is the content of these rights. These beliefs, rather than the law, make day-to-day use of property efficient and relatively harmonious.

Beliefs about property do not always align with legal definitions. Legally property rights are defined by whatever legal instruments create and govern that right. Typically this will be a mixture of contracts and statue.

In the case of land in particular this would mean that the property-owner's interest is defined by their purchase, coupled with any use regulations and zonings that exist from time to time. As these instruments change, the property owner's right shifts. This is analogous to a property boundary being defined by a river – as the river shifts its banks, the property boundary also shifts.

Since the value that the rights holder has depends on the extent of their interest, and the absence of uncertainty, there is a pressure to extend the boundaries of that interest, and to remove uncertainty about rights to exploit. This desire for a fixed unchanging interest flies in the face of changes in societal demands and economic activity. It is an attempt to "freeze" one set of interests as paramount.

Traditional real property rights covered the natural attributes of the land, transferred through contract and specified through the crown. Jurisprudence reflects a history of explosion of transaction types and tradeable interests, and the fragmentation of bundles of rights into distinct enforceable interests. Entitlements such as riparian rights attached unwritten qualifications to the freeholder's title. Subsidiary interests such as leases and options emerged, subordinate to freehold but reflecting not dissimilar structures and obligations.

The extension of economic activity into intangible things (such as ideas or representations of concepts) led to an expansion of categories of property right, with Queen Anne's Statute and the granting of letters patent, and then copyright and the laws of trade secrets.

Leases, licences, exploration permits, options and transferable contractual interests all embody propriety interests and are mechanisms of an effectively functioning property rights institution.

Rights to other forms of property, such as cultural rights, followed a different path, being largely the creature of treaties and Common Law. The rights of Aboriginal people, or artist "moral rights", reflect newer ideas about property.

The current property rights system is made up of rights created by contract and the crown, by Common Law and by international treaty. It is continuing to evolve as the transactions we do with respect to things also evolves. This overlapping of interests and rights and competing legal system requirements is a source of complexity and conflict. It is also central to the increasingly politically powerful idea of using markets to support sustainability.

Box 1.2: Property beliefs

"(property) belief systems may be counter to other major aims such as sustainability and equity. These beliefs emerged under conditions of resource abundance, which may not prevail today. *Until some shortage or conflict develops with the use of the resource, it is effectively valueless in trade and in no danger of direct overuse; it would be pointless to specify and police a system of rights with respect to allocation.* Part of the problem is that the degrading use, if profitable, usually entrenches the powers of those who cause the degradation, making change difficult. In addition, ecosystems may be sacrificed in the interest of short-term economic aims.
(Berkes, 1989, p43-44)

Misconceptions about property rights and environment

The incentive for private conservation of resources, and the pursuit of innovation to reduce demands on resources lies in the expectation of future profit. The greater that expected profit, and the greater the likelihood of it being secured, then the greater is that incentive. This is an argument for strong private rights to resources.

Rights-holders have an interest in strong legal mechanisms to protect or extend their rights, to control resource access by those who do not have formal rights, and to limit other peoples' entitlement (thereby increasing the value of their rights). That behavioural fact lies at the heart of the argument for property rights, and the pressure for the extension of these.

However misconceptions are common about property rights and the environment. Two need to be addressed: the supremacy of private property in controlling degradation of the environment; and the need for unattenuated property rights to provide incentive for innovation and resource conservation.

Box 1.3: Common property and open access

Common property is sometimes confused with "open access", which is really non-property. There is a belief that common property results inevitably in the destruction of the property because of the inability to control over-consumption by users – described by the "Tragedy of the Commons" (Hardin, 1968). Based on this belief, advocates argue that only private property (or effective regulation) can work to protect the Commons.

The failure to protect the Commons lies not in the form of property ownership, but in the inability to detect or exclude use. There are many societies where property is held in common which have been able to develop effective mechanisms to regulate use, and have been able to maintain sustainable resource use for centuries (Larmour, 1997). Indeed there is evidence that to displace a common property regime with a private property regime, without embedding the social values that made ownership an effective form or stewardship, can be destructive of that resource (Ojwang, 1996).

Non-property is a different problem. It can exist even when there is a legal property right, if that right cannot be applied to exclude others. If no one has the power to prevent over consumption then it takes little insight to realize that property (whether common or private) is at risk. The Tragedy of the Commons is not a failure of property right, it is a failure of technology, regulation and/or values.

The common property myth

Common property regimes are said to lead to degradation of the commons because those using the commons will maximise their gains without regard to the needs of others, including future users (see Box 1.4). This argument confuses common property with an open access regime[4]. We explain the difference in Box 1.3. Common property is demonstrably effective in some societies. Even in our own, the corporation is a common property structure that is highly effective for resource management and wealth production.

A well-functioning common-property regime is distinguished by (Berkes, 1989, p27).

- A minimum (or absence) of disputes and limited effort to maintain compliance: the regime will be efficient;
- A capacity to cope with changes through adaptation, such as the arrival of new production techniques: the regime will be stable;
- A capacity to accommodate shocks: the regime will be resilient; and
- A shared perception of fairness with respect to inputs and outcomes: the regime will be equitable.

Common property regimes (unlike open access) are able to define:

- Members of the group;
- The rules of agreement – unanimity, consensus or majority;
- The basis of right over time, i.e. annual or seasonal rights;
- Transmission of rights between generations;
- The unit of control – is it vested in a community board, in village, district elders, in households or other entity?
- Means for maintaining compliance with agreed rules and conventions;
- How departures from rules are to be corrected and sanctions imposed; and
- How disputes are settled.

Common property can be an effective means for allocating and conserving resources. It offers many potential benefits over private property, when interdependence is a fact of social existence and resource use. Its disadvantage lies in the potential for high transaction costs unless strong social self-sanctions exist.

Box 1.4: The mythical tragedy of the commons

The total loss of trees on Easter Island, and the extinction of large land birds on New Zealand with the coming of the Maori and then European settlers highlight the danger of sharing a resource without effective rules to limit harvesting. The behavioural effect, unless other structures are in place, is increased competition to consume rather than conserve – a dynamic referred to as 'the tragedy of the commons".

Hardin (1968) explained the "tragedy of the commons" as the situation where each person has an incentive to exploit the resource more rapidly than any other, to obtain the maximum of what is available before it runs out.

Solutions to the potential for tragedy include:

- **Ethical codes or religious practice, which limit exploitation; or require resource sharing by those who exploit;**
- **Rules and sanctions against over-exploitation or inequitable allocation;**
- **Private or group property rights to provide the capacity to exclude, and an incentive to maintain the resource for future exploitation.**
- **The creation of specialized functions, where the role (such as hunter or harvester or wise man) carries with it the capacity to control exploitation, coupled with custodianship skills and beliefs.**

In western capitalist societies, many of these elements are embodied in private property, including belief systems of respect for property, sanctions for breach of these beliefs, the capacity to exclude for longer term use, and specialized functions which go with ownership and exploitation rights. It is for this reason (rather than because of any magic associated with property right per se) that private property is a powerful tool for resource management under conditions of scarcity.

The non-attenuation myth

The second misconception is that for market instruments to work, property rights must not be subject to conditions that may reduce the ability of the owner to deal freely with that property. If the rights holder feels that their share cannot be protected, or that in future what they conserve will be taken away from them, their incentive is to maximize short-term use and to discount the value of future use. The result is harm to the resource

These arguments fly in the face of reality in a world where "derivatives" such as options, futures, swaps and the like are happily traded. All such instruments are conditional on preconditions for the owner to obtain value (other by transferring to someone who has a different view of that same risk). The doctrinaire argument against attenuation also flies in the face of history – the fact that the crown could at will take away any property interest does not seem to have prevented the development of the institution of property, nor to have prevented active markets, resource conservation, and all of the other behaviours

Box 1.5: Options

"Options" are a market tool where an entity acquires the right today to acquire ownership over some asset in the future. Option-holders take the risk that that the resource will be of less value than the exercise price when the time comes to pay. If the resource is less valuable than the exercise price, then the options-owner will either have to forego their opportunity to exercise, or lose money in exercising. This kind of risk is justified if the gamble has a high potential return relative to the risk.

There are also options where the exercise is contingent on some event outside the control of the parties, such as an option to purchase a property subject to rezoning.

which are said to follow only from un-attenuated property interests.

Market instruments will provide an incentive (to trade or conserve) when the perceived degree of opportunity to win resources, factoring in the perceived risk of not being able to realise that opportunity, is greater than the total cost (including the transaction costs), bearing in mind other opportunities. Because political risk (the risk that government will prevent the entrepreneur from realising their profit) is sometimes perceived more highly than other risks, it may be desirable to reduce the possibility of government intervention, but this is far from a precondition to the operation of market instruments.

This theoretical discussion has practical implications:

- Agencies with the responsibility for creating market instruments tend to be influenced by theoretical arguments about the need to create absolute certainty. This pushes the debate towards full property right, rather than triggering a (more complex and uncertain) debate about relative incentives and costs of different forms of attenuation; and
- The challenge of sustainability is about inter-dependence. Western property theory evolved under conditions of resource abundance where individuals could exercise their interest with (relatively) little impact on their neighbours. The modern challenge is to manage resources where impact on others and future generations is a real concern. Attempts to embed un-attenuated rights may inhibit innovation in recognising and managing that collective responsibility and interdependence.

The HSS model highlights that when looking at decision-making within society, we are not dealing

with fixed rules and principles. The game is fluid, and the ways in which it can be played infinitely variable. To restrict innovation by creating further constraints will not be to our advantage.

The pressures of property expectations

Property rights are a political institution to regulate the balance between the interest of owners and society's need to restrict activities that diminish the common wealth. As the social context changes and new resource challenges emerge, pressures will be reflected in the politics of property.

For example:

- In the pursuit of equity, the balance between the rights of Aboriginal people and non-indigenous landowners is contentious. From all sides of this issue there are claims that the property right system and the institutional frameworks are less than effective. However, it is likely that no outcome would be acceptable to everyone.
- In the management of rural lands, particularly where there is a fine balance between the economics and environmental costs of production, there are significant questions about the effects of rigid property rights on the possible redeployment of capital and labour to (arguably) environmentally better uses.
- There is ongoing debate about the suitability of rights attached to rural leaseholds, and to mining exploration or exploitation rights. Obligations to protect the environment are rarely central to these interests, and since the holders of these interests have limited tenures there may be a weak economic incentive to protect long-term values.

Things which are the subject to rights are in themselves not constant, as we find increasingly sophisticated ways of using and managing our environment. This poses challenges for the concept of property:

- The "fraction-ing" of natural values for market transactions is necessary for market solutions for environmental problems. Carbon credit trading, tradeable water rights, fibre futures, SO2 and NOX emission rights, fishing quotas and licenses, and other property like developments are emerging as solutions for otherwise intractable natural resource management problems. The process of creating tradeable fractions of the natural system will increase, as governments seek to create solutions that are not dependent on public funds.
- The growing awareness of the inter-dependence of natural resources. For example, barriers like dams prevent fish swimming upstream to spawn, reducing the sustainability of marine fish resources. Increasing awareness of the interrelatedness of nature creates a need for more complex rights structures, to protect overlapping and often conflicting sources of wealth.
- A growing emphasis on custodianship, sometimes attached to land and sometimes to cultural property. Payments to landowners for rehabilitation or custodianship allow them to care for resources. Payments to refrain from uses that pollute or damage resources reflect a different dimension to rights to exploit.
- The reconsideration of the duties of property owners that attach to rights. As the concept of environmental responsibility has taken hold, it has become important for rights owners to present themselves as responsible. This makes it easier to resist restrictions on their use, or to argue for compensation where restrictions arise[5].
- Cultural values are economically significant. Whilst the most obvious of these are indigenous values, the intangible economy (such as the market for recreation, art, or image) creates different meanings for the environment. It is possible to attach economic value to views, birds,

Box 1.6: New property rights

...full exercise of private property rights is now virtually impossible in an ecosystem setting. Air, water, inorganic and organic substances, and biota simply cannot be prevented from moving onto, off, or across one's property. Ecological 'neighbours', some as far as thousands of kilometres away, adversely affect these migrant ecosystemic components that in turn affect what is ostensibly private property in some locale, The more intense and/or numerous such adverse systemic interconnections, the less complete will be the package of property rights in practice, if not in theory. Thus the 'dimensionality' of the domain of private property/closed access is caused to shrink with ecosystemic degradation. ***(Berkes, 1989, p115)***

fish, whales, the absence of noise, and many natural elements that have cultural meaning. Increasingly these meanings are the subject of legal and economic contests (Brubacker, 1995). The intersection between intellectual property and natural property is likely to be of greater significance in the future, as a result of these developments.

- Overlaid on this is the impact of international treaties and markets, and the development of international standards such as ISO 14000 and consumer environmental standards. International treaties include those covering special areas (World Heritage Areas), migratory birds and wetlands (RAMSAR) and the interests of indigenous people (International Convention on Civil and Political Rights).
- Significant wealth is generated by tourism, Australia's second largest export industry. Cultural exports such as art or performance add to this wealth. A substantial component in these economic activities is our natural environment.
- With the decline of unexploited natural areas, interest in the non-exploitation of natural resources is growing. Non-use values include beauty, protection of biodiversity, some recreational opportunities, and value of services like air and water cleansing. Non-use values are important, but property law does not generally reflect these (though other areas of law may, such as environment planning legislation).

Owners of interests in natural resources will naturally seek certainty, and as the context becomes less certain they will value this highly. Counter to this, as the pressures on the resources become more intense, society will value its flexibility more highly.

There is also a contest between those with a legally recognised interest, and those without. Resource users who are not rights-holders have an interest in thwarting legal mechanisms that limit their access. Creation of a rights-holder class has the effect of creating an interest in effective control, simultaneously creating a class who have an interest in its subversion. The intensity of this competition will depend upon the price of access, perceived value to the excluded users, and the ability to effectively implement exclusion.

Property is the battle-ground on which these economic, social equity and sustainability contests are being acted out. The desire to fix certain interests and to take them outside of this volatile arena is understandable, but from a systems perspective is both unrealistic and potentially dangerous. Freezing one part of a dynamic system under pressure will always result in increased pressures and unexpected, undesirable results elsewhere in the system

Property rights, and compensation claims

At the heart of the debates about property rights is an argument about the extent of the exclusion that is provided to the owner. It is expected that the courts will support owners to exclude non-owners (unless they hold some other legal right to use), and that if non-owners cause harm then they will have to provide compensation. What is more problematic is the question of compensation for actions of the government which impinge on the owner's interests.

Property compensation arguments have high status in America, with its history of compensation within the framework of its unique constitution. The arguments lack this status in most other jurisdictions (Becker 1977; Brubacker 1995). Even if such arguments have a limited legal basis in Australia, they do have political power[6].

The strength of belief gives rise to political pressure to protect the perceived right, which is translated into political action demands that a particular state of interests be entrenched, and not be changed without compensation. Compensation will increase the public costs of change and innovation, but decrease some private costs.

Advocates for compensation argue is that this is desirable and necessary, in the interests of providing incentives for private conservation, and also because of the need for fairness. They argue that a failure to compensate means that individuals bear an undue share of the cost of the collective good if they lose interests without full compensation.

This argument of social equity needs to be evaluated as such. Compensation for acts of the state comes from the pool of taxation revenues. Any claim on this pool competes against all others, including other equity claims such as health, education, or pensions. It also competes against claims like support for economic growth (including infrastructures and subsidies for resource use) and national interests like defence. There is a strong argument for compensation,

but it cannot be debated properly except as a claim against the common purse. To frame it as a rights issue is to distort it.

Compensation does provide an incentive for cooperation, and may reduce some adverse economic impacts of adjustments towards sustainability. This is particularly important when trying to reconcile the competing policy aims of supporting the rural economy whilst imposing costly restrictions to protect the environment from the effects of that economic activity (Berkes, 1989).

The risk of over-reliance on rights

The rights approach which is being promoted can be summarised in three propositions.

1. Resource users should have their interests designated as property right whenever possible;
2. Property right owners should have the extent of their right clearly designated, typically with specification of the owner's obligations to society; and
3. Diminution of any property rights should attract compensation (presumably to the degree that there is any economically value-able loss to the property owner).

What is wrong with this approach[7]? It is possible that overburdening the concept of property in this way will result in higher transaction costs, less resource use flexibility, and probably less economic incentive to many resource owners. This view needs some explaining.

The expectation that one may be able to change the extent of ownership privileges through rezoning has not been considered as a right, though it always remains an entrepreneurial opportunity. Different societies treat 'betterment' and 'takings' from changes (increase or decrease) in owner rights in widely different ways. In many jurisdictions a gain in value is shared by the community rather than appropriated by the property owner (Bryant, 1973). Every society applies its concepts of property within a complex cultural, legal and political framework. It is through these that property right is used to manage the shifting balance between individual and collective interests in resources.

Misunderstanding the US example

American political history elevates property ownership to a paramount value (Meltz, 1995; Tully, 1980). It is assumed by advocates of better specified property rights in Australia that the adoption of these concepts will rectify problems of balancing individual and collective interests and ensuring equity. There is little evidence to support this. The same challenges in balancing the interests of the individual and society over resources are occurring in the USA (Rowley, 1993; Pilon, 1995; Meltz, 1995). Different states have different philosophic and practical responses to managing these conflicts (Cupit, 2000). The key to the differing outcomes is not property as the organising principle, but rather differences in beliefs, institutions and management strategies.

Part of the case for strong property rights is the belief that better specification must lead to more generous payments for loss of use of a resource, or constraints on that use. This view reflects a misperception of legal compensation. Compensation is based on valuing what is lost, and requiring payment of this amount to the loser of this interest. The low economic returns achieved by many Australian resource managers suggests that compensation may be less than could be obtained from a political adjustment. If the political value of votes is higher than the economic value of resource use activities, then moving to an economic valuation of loss of use rights may reduce payments obtained.

Will a change in venue from the political arena to the courts assist those who are seeing "property" and "rights" as the key to a better deal? It seems likely that it will provide more work for lawyers, but it is far from certain that it will make the situation better for resource users. Only if the advocates believe that the courts will value their interests far more highly than the political system does the pursuit of more rigid right definition make sense.

We stress these issues not to downplay the importance of ownership, trading and compensation, which are all associated with property rights and the use of markets to support sustainability. Rather, we wish to highlight that this association is not the same as causation. "Property" and "rights" (the words) do not by themselves bespeak any necessary improvement in the mechanisms or outcomes of the constant adjustments between private and collective interests in society. Placing too heavy an emphasis on property right

specification may result in at least disappointment, and possibly make the achievement of some of the outcomes desired by its advocates more difficult.

The public interest problems

Concepts of property work within a legal and economic institutional framework. These frameworks are slow to develop, and do not transfer well (and certainly not immediately) from one jurisdiction to another (Pilon 1995; Ojwang 1996). There are risks associated with attaching too much importance to imported concepts.

- There will be legal and administrative uncertainty and confusion whilst institutions and understanding develops. This will be reflected in transaction costs, and variability in outcomes. As learning develops, these problems will be resolved but the evolution may take decades.
- Litigation is the mechanism for property right protection. We have seen with the explosion of liability actions, the inefficiencies associated with litigation as a means of achieving desired social outcomes. There is no guarantee that the use of property right litigation will serve us any better

A further policy goal in institutional arrangements for natural resource management is to minimise the drain on the government pocket, and to reduce bureaucratic intervention. This is an interest that is dear to many who own property and manage resources. Entrenching some resource use interests above others, freezing the status quo, will create greater difficulty in reorganising interests and responding to changed circumstances. A more legalistic approach to such adjustments may result in delay, and higher total cost (including legal costs as well as compensation) whenever administrative changes to natural resource access are needed. Taxation and administrative action may increase.

It is important that the approach to sustainable resource use is fair, flexible and that it provides strong incentives. Overloading the property concept with the expectation that it will provide us with the 'magic bullet' solution is a mistake which will embed higher transaction costs and inflexibility, without necessarily benefiting those who have such faith in its power. Property rights are important, and they should not be lightly interfered with. Neither should they be elevated as a simple solution to issues of sustainability and equity, which they are not.

Property obligations and sustainability

Property owners often accept a moral obligation to the environment, and to future generations. This is quite different from a legal responsibility going beyond the traditional concept of not causing harm to identified other right holders.

The common laws of negligence and nuisance require environmental accountability, to the extent of one owner is obliged not to create environmental harms that affect other rights owners. The common law does not however create an overarching responsibility to avoid harming the environment *per se*, nor any obligation to generations affected in the future. This will be discussed in the following chapter.

Custodial roles like "elders" or "keepers of place" are a cultural response to the problems of sustaining common property, but in Western society these tend to be overturned in favour of private property. Custodianship obligations on behalf of future generations, or all of humanity, or perhaps on behalf of the environment itself, are slowly being grafted onto the Western legal system. The re-emergence of custodianship concepts reflects the growing awareness of resource inter-dependence, and the limits of self interest in protecting shared interests.

A paradigm shift[8] in how society deals with resources will cause conflict and confusion. It involves adjustments in economic interests, and challenging previously unquestioned concepts of rights, driven by what will always be (in the early stages) not the most powerful in society.

Farmers are particularly affected by the paradigm shift in resource management. Their emotional and economic commitment to the lands they work is strong. They have a resource ownership ethic, and are under increasing pressure to further embrace a custodial duty - balancing the needs of income production and environmental conservation. This can be particularly difficult when incomes are low. Policy and regulations designed to enforce a custodianship ethos have triggered anxiety and political action and can be a further drain on incomes.

The political movement for compensation where lands have been subject to increased restriction, such as requirements for streambanks to be fenced off (to protect waters), or areas to be protected from clearing (to protect biodiversity)[9] has been discussed. The

response from many advocates of ecological responsibility is that it is the moral obligation of the landowner to preserve the environment, and that increased constraints are merely the putting into practice of this obligation. Under this view, demands for compensation are disguised subsidies for doing what one is already obliged to do.

In recent times, groups like the National Party and the National Farmer's Federation have sought to restructure this debate by suggesting that with the redefinition of landholders' rights should come clearer definition of environmental responsibilities, setting the boundaries for compensation for loss of rights. This is a constructive attempt to find a workable balance. What is in the process of being resolved is who should bear the costs of environmental sustainability on private lands.

This social negotiation over the boundaries between traditional rights and emerging responsibility, and over who will bear the costs of environmental responsibility, is strategic for sustainability. Once custodial obligations are redefined, what will follow is:

- Frameworks for compensation for any additional custodial roles and use responsibilities, beyond those defined as basic property owner responsibility;
- Gradual adjustments to the common law, incorporating standards accepted by the community in resolving right/responsibility disputes. This process will begin through factual evidence of these agreements becoming a de facto standard, and over time acquiring legal recognition;
- Eventually, new institutional frameworks will emerge to give effect to these decisions. Alongside this political movement, there are consent-based arrangements which follow the trend towards economic recognition of property owners providing resource management.
- Custodial payments: A balance between the interests of resource owners and the community interest in sustainability can be accommodated by custodial payments. The resource owner is paid a fee by the community (typically through government, but sometimes through private agreement) to preserve particular values of that resource.

  These payments can be fee-for-service, compensation for expenses or foregone value, or lease/license of the resource, frequently on commercial terms. They can also be in the form of resource swaps (offsets)– exchanging the non-use of an environmentally sensitive resource for the freedom to use another that is less sensitive. To illustrate, around 10% of US rangelands are under voluntary conservation agreements, and the demand for inclusion is strong. Voluntary conservation and custodianship has become part of the mix of land uses for many farmers.
- Resource banks (notably land): Private conservation reserves have existed, since the times when kings set aside tracts for their private use, or when early plutocrats purchased estates for their exclusive enjoyment. The practice of transferring large areas into protected catchments, or the creation of national parks and reserves, are later versions, for public good rather than private purposes.

  With growing concern for conservation, these concepts have been refined as conservation trusts and land banks. A fund purchases (either on the market or via private treaty) lands for protection or rehabilitation. These are held permanently, or later sold as rehabilitated lands or as lands protected by covenant or zoned restriction. The eventual owners of the lands purchase them with full knowledge of the constraints, at a market price that reflects this constraint. Reselling also allows the fund to move on to other sites. Variations on this approach include:
- The purchase of contaminated lands by an agency (either private sector or government) to rehabilitate under a shelter from liability. The lands are rehabilitated, perhaps developed, and then sold as uncontaminated sites free of liability risk. An example is the US "Superfund Sites" program. There are purely commercial arrangements of this kind, where the developer provides insurance based risk-management, which achieve similar effects to legislated protection.
- A variation is the private conservation reserve. A well known version is Earth Sanctuaries Limited. This company issued shares to purchase substantial areas as habitat for endangered

species. It has taken the unique approach of pricing and reporting the value of the rare animals on its lands (Craik, 2001). This is the public face of a gradually evolving network of voluntary conservation reserves, where private owners protect their lands either by locking them up, by the imposition of caveats, or the creation of trusts for nature conservation.

- The provision of a special custodial status by the crown to environmental protectors. In both the USA and the UK, environmental groups have been granted special ownership status for the protection of sensitive lands. This takes these lands out of public ownership, and puts them in private ownership of organisations whose purpose is conservation. This offers the advantage of removing the conflicts of purposes that can arise for publicly owned lands (like demands for multiple use management of national parks).

Indigenous custodianship

The relationship between indigenous people and the resources of the land and sea often involves a ritual custodial system, evolved to institutionalise common control. The alienation of lands from traditional ownership has broken this relationship, or perhaps more accurately has stopped it from being the practical basis of resource management.

The political movement to reinstate, to at least some degree, Aboriginal control of natural resources has the potential to re-establish some of the protective custodial rights and roles of indigenous people. Many resource management agencies are building on land right recognition with programs to engage traditional owners in the management of lands and waters. Coupled with this, Aboriginal people are creating careers as resource managers, with National Parks services, local government, and other agencies with a custodial role.

Aboriginal rights in biodiversity have been expressed through the United Nations Convention on Biological Diversity signed by over 180 nations, including Australia. Domestically these rights are articulated through the National Strategy for the Conservation of Australias Biological Diversity, and the Environmental Protection and Biodiversity Conservation Act 1999. The international developments in indigenous custodianship provide some leads to the extension of this approach. In Canada, in particular, arrangements for co-management and more extensive Aboriginal ownership (in a legal framework very close to our own) have provided economic and environmental benefits, and assisted to redress claims of justice for Aboriginal people (Usher 1997).

Liability tracing and owner obligations

Those who purchase goods[10] have the rights to enjoy that purchase but do not have a right to interfere with others' enjoyment of their property. Pollution is an externality that is a consequence of the use of goods by property holders. Others have a duty to allow the property holder to enjoy the benefit stream from that property, but do not have a duty to accept consequences that affect their own enjoyment. In the latter case, the property holder would hold a *privilege,* not a *right* (Bromley 1991, p17). There is a correlation of rights and duties. However having rights and obligations in principle does not necessarily mean that they exist in practice.

The problem of proving who is legally responsible for some harm, particularly when dealing with companies where many people may be involved creates a significant transaction cost in environmental regulation and the use of the common law to protect the public interest. Liability tracing removes impediments to accountability for environmental and other impacts.

The main forms of this approach are:

- Technical tracing, such as indelible stamps of origin, or chemical "signatures", or documentation systems which ensure that as a potentially harmful product moves from one

Box 1.7: Custodianship and reconciliation

Reconciliation is often seen as a different agenda than sustainability. However, the very heart of the challenge of sustainability is a problem of belief systems. Civilisations which found ways of living within a natural system resource base without the use of powerful technologies often did so by developing systems of responsibility to the land and to future generations. If through reconciliation our society can become re-attuned to caring for natural resources, this may have a significant systemic effect.

There is ample evidence, ranging from the elevation of the intellect through the Cartesian revolution in philosophy, the French revolution fuelled by Voltaire, and the rise of modern views of the world fed by thinkers like Darwin or Keynes, that ideas, and beliefs based on ideas, feed through into how man interacts with his world. A greater role for resource management based on indigenous world views may be one of the paths shifting the Western mindset towards sustainability.

custodian to another, there is a clear trail of transfers through to final certification of proper disposal. Vehicle registration is and everyday example.

- Liability tracing, through which artificial barriers to liability such as interposed companies or trusts, or the use of agents, are made ineffective. The most common form of this is the requirement that directors of companies which have caused harm or breach of an environmental regulation will be personally liable for that harm.

Tracing can be powerful, through changing the risk-weighted cost of causing harm. If an individual director will potentially carry multi-million dollar costs of harm caused by a staff member, and that director only achieves a small benefit from taking that risk, but will bear little of the cost of prevention, it is likely they will be strong advocates of avoiding risk. Their capacity to create markets for environmental compliance systems, or for goods or services that reduce the risk of environmental harm, can be a powerful driver of demand. Liability tracing is as much an environmental industry development tool as it is a policing or private litigation support.

REFERENCES

Ackerman, F. (1997). *Why do we recycle?* Washington, Island Press.

Allen Consulting Group (2001). Repairing the Country: Leveraging Private Investment, Prepared for the Business Leaders' Roundtable.

Becker, L. C. (1977). *Property Rights: Philosophic Foundations.* London, Routledge and Kegan Paul.

Becker, L. C. (1997). *Property Rights.* London, Routledge & Kegal Paul Ltd.

Berkes, F., Ed. (1989). *Common Property Resources: Ecology and community based sustainable development,* Belhaven Press.

Bivona, E. (2000). *How to define a profitable and sustainable growth policy in a changing market? A case study: a small publishing company.* 18th International System Dynamics Conference, Bergen, Norway.

Bromley, D. W. (1991). *Environment and Economy.* Oxford, Blackwell.

Brubacker, E. (1995). *Property Rights in Defence of Nature.* London, Earthscan.

Bryant, R. (1973). *Land: Private Property and Public Control.* Montreal, Harvest House.

Burtraw, B, K. Palmer, R. Bharvirkar and A. Paul (2001). The effect of allowance allocation on the cost of carbon emission trading. Resources for the Future. Washington.

Clinch, J. P., F. J. Convery, et al. (1999). Economic Instruments for Sustainable Development: Improving the External and Working Environment, European Foundation for the Improvement of Living and Working Conditions.

Coase, R. H. (1960). "The Problem of Social Cost." *Journal of Law and Economics* 3(1).

Conacher, A. and J. Conacher (2001). *Environmental Planning and Management in Australia.* Melbourne, Oxford University Press.

Craig, W (2001). Markets and the Environment. Conference Proceedings: The Future of Market Regulation. NCC:Australian Museum: Sydney.

Cupit, M (2000). Games teach emissions trading lessons. *Environmental finance.* (April). pp25-27.

DLWC (2001). Ofsetts, Salinity, and Native Vegetation. Sydney, NSW Department of Land and Water Conservation: 28.

Dragun, A. (1999). Environmental Institutional Design: Can Property Rights Theory Help?, Department of Economics, University of Queensland.

EPA (2000). State and Local Government Pioneers: How state and local governments are implementing environmentally preferable purchasing practices. Washington, US EPA: 68.

EPA, N. (2002). Green Offsets for Sustainable Development. Sydney, PlanningNSW: 16.

Greene, D. (2001). A Capital Idea: realising value from environmental and social performance. Carlton, Environment Australia: 56.

Hawken, P., A. Lovins, et al. (1999). *Natural Capitalism,* Little Brown.

Kuhn, A. (1974). *The Logic of Social Systems: A Unified, Deductive, System-Based Approach to Social Science.* San Francisco, Jossey-Bass.

Lino Grima, A. P. and F. Berkes (1989). Natural Resources: Access, Rights-to-Use and Management. *Common Property Resources: Ecology and community-based sustainable development.* F. Berkes. London, Belhaven Press.

Lovins, A. B., L. H. Lovins, et al. (1999). A Road Map for Natural Capitalism. *Harvard Business Review*(May-June): 27-29.

Luhmann, N. (1984). *Social Systems.* Stanford, Stanford University Press.

Martin, P. and M. Verbeek (1998). National Materials Accounting Strategy: A path to competitive advantage for Australian industry, Profit Foundation Pty Limited.

Martin, P. and M. Verbeek (2000). Cartograpahy for Environmental Law. Sydney, The Profit Foundation Pty Limited.

Meltz, R (1995). The Property Rights Issue. The Committee for the National Institute for the Environment. Washington.

National Centre for Environmental Economics (2001). The U. S. Experience with Economic Incentives for Protecting the Environment, Office of Policy, Economics, and Innovation, U.S. Environmental Protection Agency: 254.

National Institute of Economic and Industry Research (NIEIR) (1996). Subsidies to the use of Natural Resources - Executive Summary, Department of the Environment, Sport and Territories.

Nelissen, N. J. M. (1998). Environmental Policy Instruments in the Netherlands: Comments on Three Decades of developments. *Greener Management International*. Summer (22). 30-45.

Ojwang, C. J. a. J., Ed. (1996). *In Land We Trust: Environment, Private Property and Constitutional Change*. ACTS Environment Policy Series. Nairobi, Initiatives Publishers.

Palmer, K and M. Walls (1999). Extended Product Responsibility: An Economic Assessment of Alternative Policies. Resources for the Future (January). Washington.

Pejovich, S. (1996). Property rights and technological innovation. *The economic foundations of property rights: Selected readings*. S. Pejovich, Edward Elgar Publishing: 193-205.

Pigou, N (1928). A study in public finance. London: Macmillan & Co. Ltd.

Pilon, R. (1995). Protecting Private Property Rights from Regulatory Takings. Centre for Constitutional Studies, Cato Institute, Subcommittee on constitution Committee on Judiciary United States House of Representatives..

Price Waterhouse Coopers. (2001). The role of Australia's financial sector in sustainability. Environment Australia: Canberra. May.

Reeve, A. (1987). *Property*, MacMillan.

Rosen, R. (2001). The history of ethical investment in Australia. (Private correspondence)

Simons, K. L. (2000). *Technology Benchmarks for Sustained Economic Growth*. 18th International System Dynamics Conference, Bergen, Norway.

Snowy Mountains Engineering Authority and others. (2000). Public Environmental Reporting: An Australian Approach. Environment Australia: Canberra. March.

Staves, J. B. a. S., Ed. (1995). *Early Modern Conceptions of Property*. London, Routledge.

Stavins, R. N. (2000). Experience with Market-based Environmental Policy Instruments. Washington, Resources for the Future: 63.

Tierney, J. (2000). A Tale of Two fisheries. *The New York Times Magazine*.

Tietenberg, T. (1995). Transferable Discharge Permits and Global Warming. *Handbook of Environmental Economics*. D. Bromley: 317-352.

Usher, P. J. (1997). Common property and regional sovereignty: relations between aboriginal peoples and the Crown in Canada. *The Governance of common property in the Pacific region*. D. D. Silva. Canberra, NCDS and the Resource Management in Asia-Pacific project.

von Weizacker, E., A. B. Lovins, et al. (1997). *Factor 4: Doubling wealth - halving resource use: A new Report to the Club of Rome*. Sydney, Allen and Unwin.

NOTES

1 The Profit Foundation, PO Box 744 Sutherland, NSW 1499. Ph: 0416 015161, Fax: 02 9523 3680, email: Paul_M@profitfoundation.com.au

2 Land & Water Australia, which provided grant funds that enabled us to conduct this study under LWRRDC project reference no. TPF2: Options for reform in Australian natural resource property rights, land tenure and land management institutions and arrangements.

Professor Bob Marks, from the Australian Graduate School of management, and Dr Frank Gelber, from Bis Shrapnel, both of whom provided invaluable critical review, and good ideas which we joyfully appropriated.

3 Whilst widely accepted there are strong critiques of Hardin's observations of the Tragedy of the Commons, both in terms of historical validity (Berkes, 1989) and practical implications. (Ojwang, 1996)

4 This is in addition to the ethical sense of duty which can inform landowner obligations.

5 The Australian constitution does give a limited version of a right to compensation for Commonwealth acquisition under S51(xxxi) which requires acquisition on just terms. This limited right has been supported by a broad interpretation of the legal meaning of property. Smith v ANL Limited [2000] HCA 58 but falls well short of the US constitutional protection of private interests.

6 Apart from the critique that this approach makes the artifice (legal right) superior to the reality (competing resource use demands, obligations as a basis of right, and the natural reality of a continuing contest over resources that is never resolved).

7 When a fundamental and unquestioned understanding of how the world works changes unexpectedly. An example is the Copernican revolution, when the understanding that the universe revolved around the earth was overturned. Paradigm shifts encounter strong resistance as they overturn entrenched beliefs and power structures (Kuhn 1974).

8 Similar calls for compensation arise for foregone development opportunity through zoning prohibitions, but this is a different category of concern from custodial constraints on resource use within zoning.

9 Goods and to some extent services may be considered as property of the purchaser, who has a right to enjoy the benefit stream from that purchase.

Legal Issues Relating to Water Use

Poh-Ling Tan
Faculty of Law, Queensland University of Technology

Issues Paper No 1
Murray-Darling Basin Commission Project MP2004:
Agriculture and Natural Resource Management in the Murray-Darling Basin: A Policy History and Analysis

Preface

Government policy for agriculture and natural resource management (NRM) has a profound influence on the ways in which natural resources are utilised. There is broad acknowledgment that agriculture will have to be practised differently from now on, in order to reverse the trend towards environmental degradation in many parts of the Basin. There is a need for new policy directions, especially considering the urgent need to address dryland salinity and related issues.

This report is part of a project instigated by the Human Dimension Program of the Murray-Darling Basin Commission and was undertaken by the Institute of Rural Futures based at the University of New England in NSW.

The project initially produced an Overview Report which is a description of the broad trends in 20th century government policy which impacted on land use practice in the Basin. A Workshop was then held to debate and agree upon the four most significant areas where a shift in policy could, in the long term, encourage and facilitate sustainable farming practices. Each of these four areas is the subject of an issues discussion paper. These papers are designed to be a broad canvassing of ideas which will contribute to the debate about the direction NRM will take in the future. Authors were asked for suggestions to move the agenda forward, and the ideas contained in the papers are not necessarily endorsed by the Commission.

Summary

In a dry continent, water resources policy and law is one of the most important areas of natural resource management. Water law in Australia, and particularly in the States within which the Murray-Darling Basin lies, has experienced many changes since the mid-19th century. The last few decades of the 20th century have seen major reforms in water law, and water resources policy is likely to remain in a state of flux for some time to come. Policy debate has sometimes proceeded from perceptions of what the law is, and from expectations of what the law might offer. However, these perceptions may not accurately reflect the legal position itself.

Written for the general reader, this report offers an overview of the historical development of water law up to the present day in the four Basin States in which there are major irrigation developments — Queensland, New South Wales, South Australia and Victoria.

It is written in four parts. First, it outlines key principles of the common law relating to water resources, examines the reasons for the introduction of a regulatory regime, and describes key aspects of administrative arrangements that were in existence in the mid 1970s. The second part of the report describes the major changes to water management that took place from the late 1970s to 1995. Then, in the broader context of the COAG initiatives of 1994-95, the report considers reform to water legislation from 1995 to 2001. Among the features examined are water management planning, environmental flows and water trading. Lastly, shifting from a description of legal provisions to a discussion of policy, the report makes a number of recommendations for an improved legal framework for water resources. Legal provisions relating to compensation are also discussed briefly.

The report concludes that there have been significant improvements to made to water law, particularly as part of the Council of Australian Governments water reform process. These improvements include: the provision for ecologically sustainable management of water resources; the management of the whole of the terrestrial phase of the hydrological cycle; specified rights for both consumptive users and for ecosystems; and consumptive rights to be tradeable provided reasonable conditions were met.

The report also finds that there are several areas that require continued policy and legal development. A number of recommendations are made in this respect, including: legislating for more accountability by water agencies to ensure good management of environmental water provisions; the mandatory use of independent scientific reports in the making of water plans; open standing for groups representing the public interest; and increased public involvement in the remedy or restraint of offences against water legislation.

1. Introduction

> *Surface water is the Murray-Darling Basin's critical resource. The overall quantity is limited. The vagaries of Australia's weather mean that its availability varies from year to year. It is a resource to be used and managed with care if its long term sustainability is to be ensured.*[1]

The Murray-Darling Basin covers most of inland south-eastern Australia. The major river system running through the Basin, the Murray-Darling, is Australia's largest and one of the world's major river systems. Its associated rivers and creeks are extremely variable in nature and many only carry water at times of flood. Large areas of floodplains have recently been recognised as an important part of the resources of the Basin. In addition to the surface waters, the groundwater resources of the Basin form an important water resource.

Surface water is the most critical resource of the Basin. A distinction is often made between consumptive and non-consumptive uses of this resource. The former term refers to water which is either wholly or partially processed, contaminated or transformed and taken out of the hydrological process for a period. Irrigated agriculture consumes the largest amount of water in the Murray-Darling Basin – between 1988 and 1993 about 96% of diversions from surface water were for irrigation.[2] Across all of Australia, New South Wales (48%), Victoria (25%) and Queensland (16%) account for 90% of irrigated agriculture.[3]

The most important example of this type non-consumptive use is for the general support of ecosystems through conservation of biodiversity, habitat protection and maintaining environmental

values. Non-consumptive uses include use of water bodies for amenity and recreation.

As parties to the Murray-Darling Basin Agreement, six governments participate in the planning and management of land, water and environmental resources of the region. They are the Commonwealth, New South Wales, Victorian, South Australian, Queensland and to a limited extent, the ACT governments.[4] Legislation that actually governs the resources is mainly the concern of State Governments because of arrangements under section 100 of the Commonwealth Constitution.

The Agreement contains specific obligations of the parties and rules according to which the Basin must be managed. The Murray-Darling Ministerial Council (MDBMC) exercises general oversight and makes decisions relating to major policy issues while responsibility for the operational management of the scheme lies with the Murray-Darling Basin Commission (MDBC). The present Agreement dates from 1992 but its genesis is found in the River Murray Waters Agreement signed by the Commonwealth, New South Wales, South Australia and Victoria in 1915.

The scope of this paper is limited to a consideration of legal issues relating to the allocation of water to, or the provision of access for, consumptive and ecological use[5]. Its first section adopts an historical approach, while later sections provide a more contemporary analysis of law reform in the period 1980 to 1995, then from the period 1996 to the present. Lastly the paper makes recommendations for further reforms.

2. Common Law and the First 100 Years of Water Legislation

In the early days of the Australian colony, and prior to the legislative change in the 1880s which brought in administrative grants giving access to water by the state, water law was based on English common law. No description of Australia's water law is complete without an explanation of the common law and the principal features of water law in the first 100 years under legislation.

2.1 The Common Law

The common law had two different schemes to allow access to water. The first scheme related to surface water flowing in a river and the second to all other types of water. For surface water in a river, 'riparian' rights were restricted to those who occupied land immediately next to rivers. These rights had certain limitations.[6] Riparian owners and occupiers could use the water for all ordinary and domestic purposes[7] provided the quality of the water in the river was not substantially affected. Provided upstream riparian users were using water only for ordinary or domestic purposes, lower riparian users had no legal remedy, even if the others' use exhausted the supply of water.[8] If water was taken other than for ordinary and domestic purposes (for example, manufacturing or irrigation for commercial gain) use needed to be reasonable. Water was to be returned to the watercourse substantially undiminished in quantity and quality.

The other scheme for access to water under the common law applied to all other categories of surface or ground water that flowed in an undefined manner over or under land, or was collected artificially on the land. In contrast to the limitations placed on riparian rights, in these instances of surface and ground waters the owner of the land had an unrestricted right of access to the water. This was based on policy considerations in 19th century England, as well as the legal doctrine that owners of land would have unrestricted discretion over the soil, subsoil and resources in the subsoil.

Three other points should be noted about the common law relating to water resources. First it was derived from European notions of rivers. A 'watercourse' or river was judicially defined as water that flowed in a defined channel. It needed to flow within banks, which were the sloping margins at both sides. The European concept of a river differed from Australian rivers – where sometimes rivers had no banks, or were only a series of shallow depressions, and often intermittent.

Secondly, in 19th century England, water was in plentiful supply and its quality was not a major concern. Many of the decisions by courts related to flood protection. Because the common law restricted access to rivers to riparian occupiers of land (and only for certain purposes), it only indirectly restricted consumptive use of water and therefore indirectly

protected the waters of rivers. However the riparian doctrine relied on downstream users challenging upstream use. If the upstream use was not challenged within a certain period of time, it acquired the status of a 'prescriptive' right. This was the reason why some weirs and millstreams came to be beyond challenge by downstream riparians. Many people did take and use large amounts of river water, simply because their use was not disputed within time. [9]

Thirdly, the common law was concerned with the ability to take and use river water — it was not about property in the water itself. These rights to water were attached to the land and could not be bought or sold apart from the land. Under common law no one 'owned' or had any property in the water itself while it was in the state of flow. Only after water was abstracted, was it capable of being owned.[10]

2.2 Water legislation

The immediate concerns of the early colonists were water supply and sewerage disposal. Early water legislation in Australia focused on municipal, domestic and stock water supply, and drainage.[11] This changed when drought conditions in the 1870s and early 1880s in Victoria made the public conscious of the need for dams. Private investment in dams was risky and so, public money was required. When it was recognised that common law principles were not suitable to fulfil the colonies' needs for secure water supplies for town use, mining, pastoral and agricultural pursuits, legislation was introduced to allow control of water resources by the state.

The change was based on findings of the Victorian Royal Commission on Water Supply in 1884, headed by Alfred Deakin. The Commission studied water management in several countries and the *Irrigation Act* 1886 (Vic) enacted nearly all of its recommendations. The Act allowed the State of Victoria a supervening right to the use, flow and control and certain water. The English law of riparian right to surface waters was substantially replaced by a system of administrative grants giving access to water with limited recognition of riparian rights in statute. Because Deakin noted that land in the western states of America was plentiful but almost worthless without water, Victorian legislation tied grants of water to specific allotments of land.

The 1886 Act and the later *Water Act* 1905 gave effect to the policy of moving away from small, local water supply trusts and provided the State with the power to establish large public works to store and distribute water. In 1905 several legislative measures were taken to further strengthen State control.[12]

The most significant was that the property of beds and banks of water courses forming the boundaries of Crown grants were expressly stated not to have passed with any grant of land. This legislatively enshrined an earlier administrative practice to reserve stream beds and banks of major watercourses when making Crown grants.

As a result of the findings by the Lyne Royal Commission (1885-1889), New South Wales adopted similar legislation in 1896 to vest the right to use and control the water in all rivers and lakes in the Crown. There were some doubts about whether the approach succeeded in abolishing all riparian rights. With some variations, other states including Queensland followed the model of state control provided by New South Wales and Victoria.[13]

However legislation in South Australia limited state control over the taking and use of water only to a portion of the River Murray and such other watercourses and parts of the state which were proclaimed by the Governor in Council. Subsequent proclamation extended state control to the whole of the River Murray but throughout the remainder of South Australia, common law riparian rights still prevailed.[14]

2.3 State control after federation

When Australia became a federation in 1901, inland rivers had already been used for decades as highways for getting produce to markets. They were also very important to the States for irrigation. To reflect the States' concerns, the Constitution was silent on the issue of water resources therefore according to common law principles about sovereign legislative power, this power remained with the States.[15]

The only explicit reference to water resources is found in s 100 which reads:

> *The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation.*

Thus the Commonwealth's powers over water resources came from its power to legislate for

defence, trade and commerce, and external matters.[16] Few other provisions of the Commonwealth Constitution had direct impact on internal water resources.

In practice, the Commonwealth assumed an important role in the management of the internal waters of Australia through policy formulation and the provision of financial assistance for schemes related to water resources. The pattern was one of co-operative federalism with Federal government support of State action.

2.4 Administrative arrangements

As a broad generalisation, major urban supply and mining needs were granted water by specific Acts of State Parliament, whilst grants of water for irrigation took place under the administrative system established by general water legislation. The administrative system categorised water depending on its source: water from regulated sources was differentiated from water from unregulated sources. A regulated stream was one in which natural flow was augmented by releases from storages (dams or weirs) to meet water supply needs. Unregulated streams (or sections of streams) were those where supply was mainly dependent on natural flows and climatic conditions, either because no storages had been built upstream, or because releases from any storages would not be able to reach that particular section.

Water allocation arrangements were, and remain, complicated. This section of the paper sets out key features of the administrative framework as they developed in the 20th century. For consistency across States, when particular features are described, the position is that existing in the 1970s. Key features of the system were:

- statutory riparian rights for certain uses;
- water rights in irrigation schemes;
- licences and permits.

The term 'water entitlements' was occasionally used when referring to these features.[17]
This term became popular in discussion over Transferable Water Entitlements in the early 1980s.[18] But apart from in New South Wales in 1986, this was generally not defined.

2.4.1 Statutory riparian rights

In all States, water was permitted by legislation to be diverted, without a licence, for stock and domestic needs and small garden irrigation, provided users had riparian access. Works could also be constructed for such usage without a licence.

2.4.2 Allocation in irrigation schemes: water rights

In this paper the term irrigation scheme is used to describe Irrigation Districts, Irrigation Areas, Trusts and other similar schemes. Many of the schemes were owned by the State but a few were privately owned. Each farm in public irrigation schemes had water allocated to it in the form of a water right. State irrigation authorities had a policy of creating a stable minimum water requirement on which planning of water deliveries and construction of storages could rely. As a result of this policy, water rights were usually only sufficient to meet minimum requirements for crops in a 'normal' season. Irrigators paid for water whether they used it or not. The rate of charge, calculated on the amount of land they held which was suitable for irrigation, differed in each scheme. The levy of compulsory water charges encouraged consumption of water and provided little incentive to irrigators to be efficient in their use of water.

Victoria adopted the water right system in 1909 and it evolved to take into consideration different farm sizes and a variety of crops. Subsequent amendments to the system meant that, by the 1970s, four different types of water rights were found in that State. What made the system even more complicated was that the actual amount of water guaranteed under each water right varied according to the type of crop which was planted in the scheme.[19] Water rights were a common feature in Victorian irrigation and the model was generally followed in other States including Queensland with varying degrees of importance and different aspects of complexity.

Consider the extent water rights were important in some States but not others. For example, in the 1970s, about three quarters of water supplied for irrigation was through water rights in Victoria. In comparison, only about one quarter to one eighth of water supplied for irrigation in New South Wales took place through water rights. The balance of water supplied was often supplied through 'sales' water - an expression used in

Victoria.[20] Supply of water through 'sales' water, as the next few paragraphs discuss, was far less reliable than water supplied through water rights. As a result, water for irrigation in New South Wales was subject to more flexible legal arrangements compared with Victoria. Additionally, in practice, the volumes of water made available for irrigation fluctuated from year to year.

2.4.3 Allocation in irrigation schemes: sales water

'Sales' water, a term used predominantly in Victoria, was made available (and usually quantified) as a proportion of the water rights held by individual irrigators, rather than by volume. Its availability depended on the amount of water in storage. Because the supply of water rights was given priority, 'sales' water would only be supplied in any particular year after ensuring that there was enough water in storage to deliver water rights in the following year. Therefore the amount of water supplied as sales was variable and irrigators were charged at a volumetric rate.

For historical reasons, New South Wales's water was mostly supplied under annual sales agreements. In many irrigation schemes fully developed by the State, the charge for water rights was fixed in perpetuity for each farm from the time it was first made available. Water authorities thus constrained, preferred to supply additional water through annual sales agreements. In the 1970s Davis commented on the supply of water in New South Wales compared with Victoria thus

> *In NSW, the minimum amount of water an irrigator can expect to receive in wet years and dry years will be determined more by reservoir design policy and government distribution policy than by the formal guarantee in the form of water rights.* [21]

2.4.4 Licences

The licensing system mainly operated outside irrigation schemes. On regulated sections of streams, riparian landholders were required to obtain a licence before pumping from streams for uses apart from domestic and stock use. They installed their own works for doing so. Non-riparian landholders could also apply for licences. Licences were issued for specified annual volume, pump size, and other conditions such as the re-use of irrigation water.[22] The specified annual volume was referred to as the base or nominal allocation. The licensing regime was most complex in New South Wales where there were seven different types of licences for surface water.[23]

Variation in the term of licences occurred across States. For example, in Queensland licences were generally issued for three years for irrigation and 10 years for stock use. In Victoria, licences on regulated streams were issued for 15 years and on unregulated streams for one year. In New South Wales, most licences had five year terms, but ten year licences were granted for town water supply. Generally a licence was granted for a short initial period. Upon the expiry of the first period, there was an expectation that the licence would be renewed if works were constructed. Water agencies had power to amend or cancel licences but this power was not exercised. In practice, water licences in all States were routinely renewed and were regarded by their holders almost as rights in perpetuity.

Licences in *unregulated* streams were granted on similar conditions except that, instead of a specified annual volume, water use was conditional on area of land irrigated and minimum height of the river at which pumping was allowed. Generally licences allowed diversion at any time of the year. Extractions were small because of unreliability of flows. Again licence periods differed from State to State. The terminology also differed. In all States there were no charges for water itself taken from unregulated streams but by the 1970s there were sometimes low charges for management services.

2.5 The 1880s to the mid-1970s: An assessment

The States introduced the control of certain elements of water resources in order to promote consumptive use of water. The tie between land and water use was seen as the key to sound public policy. Irrigation needs played a significant role in shaping that policy. Initially both public intervention and private enterprise played a part in the development of water resources, but eventually large sums of public money were spent on infrastructure, such as dams and channels for water supply.

Administrative grants for access to water evolved to suit different types of water supply systems.[24] At first, water supply systems were usually based on a weir and a weir pool near the point of consumption. Simple arrangements established by early legislation reflected

the management practices for these simple systems. Aspirations for greater density of agricultural settlement in the Basin resulted in large dams. These took several years to fill completely and were more expensive to build, but provided a more reliable supply. These dams were more complex to operate and legislation was amended to cope with changed management practice. As rural areas were settled, water supply was managed by local bodies that were often set up under special legislation. As development took place, more legislation was enacted which, in some States, was spread over many Acts. Although legislation in the period between 1950 to the mid 1970s retained many of the features of the earlier statutes, it became increasingly complex because the Acts overlapped, and were often unclear, imprecise and inconsistent.[25] Across the States, this was the first main weakness in the body of legislation relating to water resource management.

The legislation was dependent on administrative discretion, but did not prescribe either mandatory or discretionary deliberative criteria that may have helped to ensure that administrative discretion was exercised consistently. In hindsight, this was the second main weakness in the legal regime. To use an analogy, water users in irrigation schemes were treated as members of an arguably privileged club. The club was run by a manager (often State water agencies) but club rules were not well written or in most cases were not reduced to writing because operating water storages was considered too complex to be written into law. Instead, the operating manager was given the power to make complex judgements as to what water could be released. This differed from year to year depending on climatic conditions.

Little was in place in the legal regime to stop the club membership from growing. When the club membership grew, the demand for water inevitably outstripped supply. The security of each user became uncertain, in the sense that it was subject not only to total water available for use, but also to the use patterns of others. If other users were profligate in previous years, then the total available for sharing was smaller. The privileges of club members were uncertain and could not be enforced. In addition, club membership had many classes, all of which had uncertain rights when there was over-commitment of resources. For example, as discussed in section 2.4, four different types of water rights (and 'sales' water) had developed in Victoria by the 1970s.

The third weakness was that the legal and management regime itself was based on common law concepts like the watercourse, that were ill-suited for Australian conditions. Legislation mostly changed the common law ability to take and use river water, but the legislation was still based on the same European concepts of rivers.

In time, the overall approach represented by the body of legislation became fragmented — the fourth weakness. Groundwater was subject to other legislation and its management was not integrated with surface water. In addition, water which did not flow in rivers but in floodplains, or in upper catchments before it reached the river was not subject to legislation.

The fifth weakness of the legislation of this era, and the most significant in the present day context, was the lack of consideration of the environmental impact of the consumptive use of water. This issue will be considered next.

3. Reforms to Water Law: From the Late 1970s to 1995

By the late 1970s it became evident that water was over-allocated in several States and this prompted reforms, particularly in New South Wales and Victoria. This chapter reviews a number of the more important reforms, including volumetric allocation schemes, embargoes and temporary and permanent trade of water entitlements.

3.1 Introduction

In the first 100 years of water legislation, management of rivers concentrated on consumptive demand. This resulted in a preoccupation with building dams and other irrigation infrastructure, apportionment of water between individual competing interests, the orderly extraction of water and the use of rivers as supply channels. There was scant understanding of the fragility of the ecosystems that were dependent on water. A comprehensive study of the country's water resources in 1983 confirmed that there were serious issues to be dealt with.[26]

Environmental issues included salinisation of land and a deterioration of water quality. The management

of rivers as supply channels changed their natural flow patterns and thereby adversely affected aquatic ecosystems. Economic issues also had to be dealt with. These included aging infrastructure for water supply which needed costly repairs or replacement, a questioning of the value of further dam building, and the vexed issue of subsidising water for irrigation.

Additionally, by the late 1970s to the early 1980s, it became evident in several States that water was significantly over-allocated. This meant that if all users requested delivery of the volumes indicated in their licences, the demand would exceed the water in storage. The right to take water under a licence or other means, often referred to simply as 'allocation', differed from actual use.

Amongst other reasons, over-allocation occurred because water agencies approved allocations on the assumption (based on then existing practice) that irrigators consistently failed to use their allocations.[27]

By the mid-1980s, reviews in several states had led policy makers to realise that major organisational and legislative changes were needed. This part of the paper describes the law reform in the period from the late 1970s to 1995. Because much of the law reform in this period occurred in New South Wales and Victoria, discussion concentrates on these two states.

3.2 Schemes for volumetric allocation

Initially, water licences in all States were defined in terms of irrigated land area. No restrictions were placed on the amount of water used. Volumetric allocation schemes were introduced around 1977 in New South Wales.[28] When an area was declared to be subject to volumetric allocation, there were only two necessary steps required under legislation. The water agency would:

- assess the total quantity of water likely to be available from the water source in each year; and
- determine in respect of each licence or water right holder, the maximum quantity of water to be taken.[29] This was commonly referred to as the base allocation. (But the actual amount of water allowed to be taken in any one season was different to the base allocation and determined according to the process outlined below).

In practice another step was taken and it was likely that it was done in conjunction with the two steps outlined above. In converting entitlements from area based criteria to those based on volume, the water agency needed to affix different quantities of water per hectare according to the type of irrigation that was authorised.[30] In taking this step, consumptive users were consulted, bi-partisan support was received for the conversion, and few complaints were received.

However new licencses could be granted[31] and, if this was done, then it would reduce the amount of water available to already existing licencse holders.

The schemes apportioned water within an 'irrigation season', usually a 12 month period which varied from location to location, and from State to State. The actual amount of water available each water year in volumetric allocation schemes (referred to as announced allocations) was dependent on announcements by district managers in consultation with landholders. The amount of water available for diversions meant estimating the amount of inflows from tributaries and the volume of water in storage. After losses to the system were estimated and a decision made on the volume to be held in reserve for the next year, the amount available for consumptive use was calculated.[32] Announcements were made at the commencement of each water year, based on the worst-case inflow scenario and expressed as a percentage of base allocation. Depending on weather forecasts, the announcement was generally set conservatively at the beginning of the water year. Resources and water usage were monitored throughout the year and the announced allocation levels were usually raised as the year progressed. Because of climatic conditions, announcements could vary greatly throughout a State.

In New South Wales announced allocations were relevant only for general security licences.[33] High security licences in New South Wales had all of their allocated water delivered each year and were not subject to announced allocations.

Besides their volumetric allocations, irrigators might also be supplied with off-allocation water. An off-allocation period was declared when rainfall resulted in river flows considered surplus to water requirements. This generally occurred where dam capacity was reached during high rainfall events. Water thus diverted was not debited from the volumetric allocations. In some catchments, significant amounts of off-allocation water were pumped by irrigators and stored in farm dams. This practice resulted in a reduction of small and medium-sized floods.

3.3 Embargoes

Volumetric allocation schemes were used in conjunction with administrative and, later, statutory embargoes on new licences. In catchments that were particularly over-allocated, administrative embargoes were introduced. This meant that applications for new licences were accepted but not processed. An administrative embargo was introduced in the Namoi catchment in New South Wales in 1976, where as early as 1966, water users had expressed concern about over-allocation.[34] Amendments to legislation in New South Wales in 1982 confirmed the freezing of new licence applications. Both volumetric allocation schemes and embargoes resulted in very strong competition for water resources particularly in the northern New South Wales rivers. This resulted in a number of cases being fought over fairly technical matters regarding the provisions of the *Water Act* 1912 (NSW).[35]

3.4 Shortage powers

Both volumetric allocations and embargoes could not effectively deal with over allocation that had already occurred. As a result, the New South Wales Water Resources Commission was formally empowered in 1977 to suspend extraction rights during periods of 'water shortage'.[36] An order of priority for imposition of restrictions was set out with highest priority for domestic and town supplies. The levels of priority, from the lowest (the first to be affected by cut-backs) to highest were:

- permits for purposes other than domestic and town supply;
- authorities and licences, whether group or individual, for irrigation;
- water for stock supply and other uses of water other than for irrigation and domestic/town/village supply; and
- water for domestic/town/village supply.

Irrigation water had low priority. It appears these 'shortage' powers were to be used only in times of emergency, and cut-backs would be temporary although this was never expressly stated.[37]

3.5 New water legislation

In 1984, an audit of water agencies in New South Wales, comprising the Water Resources Commission and 16 other public bodies involved in the administration of water-related issues, led to new legislation.[38] *The Water Administration Act* 1986 (NSW) and *Water Supply Authorities Act* 1987 (NSW) jointly restructured administration of rural water services. The *Water Administration Act*, 1986 (NSW) was significant in three other respects:

- the legislation stated the objects of water administration;[39]
- it also tied 'environmental considerations' to allocation and management of water;[40] and
- it 'vested' all elements of the terrestrial cycle of water resources in the State.[41] Previously, as in other jurisdictions, the vesting provision related only to waters in rivers that passed through two or more properties, lakes etc. The new provision vested in the State the right to the use, and flow, and to the control of water occurring naturally on the surface of the ground and sub-surface or groundwater.

But while the 1986 Act stated the objects of management it did not give much guidance as to how to manage objects that could be in conflict or in tension with others. In other words, the Act did not prioritise objects of management. Similarly while the Act referred to 'environmental considerations' there was little guidance as to what these considerations were. Also, it did not specifically allow water to be allocated for ecological use.

In the meantime, after a comprehensive review of water law which started in 1985, Victoria enacted the *Water Act* 1989 (Vic). This overhauled all legislation on water resources, administered both surface water and groundwater in one statute, and enacted a better defined structure of private rights to water. The 1989 Act had a long list of purposes which referred to:

- sustainable use of water resources for the benefit of present and future Victorians,
- provision of formal means of protecting and enhancing environmental qualities of waterways and their instream uses, and
- the protection of 'all public and private rights to water existing before the Act.'

Like its New South Wales counterpart, it failed to give guidance as to how potential conflict between consumptive and non- consumptive purposes would be resolved.

3.6 Trading water

Perhaps the most significant of the reform measures in this period was to allow trading of water. This was a radical step but the idea of transferring water was not altogether new. In Victoria during the drought years of 1939-44, a limited system of water transfers (called grouping) was allowed between land in common ownership.[42]

Before reform most persons wanting more water had to buy additional land to gain additional water.[43]

Covert trade in water took place in Victoria, New South Wales and other States through 'licence stacking'. The practice involved one person gaining ownership of two land holdings that had water licences attached. Then the licence was administratively transferred from one land parcel to the other. It was a costly method.

In New South Wales, the imposition of embargoes had made water a scarcer resource. Therefore short term 'renting', or temporary transfer, of water entitlements was permitted by legislation in 1983. Renting was limited to the period of a year and the rights reverted to the original owner at the end of year. It was gradually extended to a maximum of 5 years.[44]

Amendments in 1986 allowed permanent transfers[45] within volumetric water allocation schemes.[46] Transfers were subject to the approval of the Water Administration Ministerial Corporation which could take into account potential social, economic and such other matters as it thought fit. This requirement included environmental factors.[47]

In Victoria, trading was allowed a little later. After a trial, temporary and permanent transfers were allowed in 1989 on terms to be later prescribed by regulations. Initially permanent transfers were viewed with misgivings by farmers and bureaucrats, and regulations were only made in 1991 to allow transfers within some irrigation schemes.[48] In 1994, limitations were relaxed to allow permanent trading within more schemes, and to allow trading between, as well as outside, schemes. The regulations provided for maximum and minimum water rights to be attached to land.[49]

As in New South Wales, water trading in Victoria occurred mostly in temporary transfers of water rights. All temporary transfers (those for one irrigation period only) were subject to by-laws made by the supplying authority.[50] The by-laws generally provided for procedures and fees, set limits on transfer of sales water into or out of any part of the irrigation district, having regard to drainage and salinity criteria, and considered the need to protect the water rights of the other holdings in the district and possible environmental impact.[51] Permanent *interstate* transfers of water rights were first allowed in 1997.

4 Reform to Water Legislation: 1995 - 2001

By 1994, State and Federal governments agreed that concerted efforts needed to be taken to address the complex issues of water reform. Two particular issues were paramount: riverine ecosystems were badly degraded, pointing to a need to allocate water for ecosystem use. Because consumptive water use had increased, competition for water meant that the irrigation industry was concerned about security of its water supply. Policy documents developed with the oversight and leadership of the Council of Australian Governments provided a strategy for water reform and principles for provision of water for ecosystems. After this important preparatory work, new water legislation was enacted by several states. This section offers an overview of important aspects of the new legislation.

4.1 Introduction

Although there were a number of significant reforms to water legislation in the period from the late 1970s to the mid-1990s, these did not adequately address the two main problems of water use. These were the opposing demands of security for consumptive users, and the growing awareness that water needed to be allocated to ecosystem needs. In 1994, the Council of Australian Governments (COAG) adopted a strategy for the efficient and sustainable reform of the water industry.[52] It noted 'widespread natural resource degradation' of water resources and called for new measures to be taken. The payment of the full cost of water use by consumers,[53] and an integrated approach to water management and institutional change, [54] were both important components of the strategy. However, as the focus of this paper is on legal issues, these components are not dealt with in any detail. The following sections do, however, briefly consider the

international and national context of law reform and also other areas of legislation which impact on consumptive and non-consumptive use of water.

4.2 International and national context of the reforms

International treaties and conventions place obligations on the management of water resources. Perhaps our most important international obligation is the Ramsar Convention on Wetlands of International Importance 1971. This is often referred to as the Ramsar Convention.[55] Participating countries are required to designate wetlands[56] for listing, based on their international importance. Criteria for listing relate to either the sites' uniqueness, rarity or representativeness, or the flora, fauna or ecological communities they support. Countries are also obliged to promote the conservation and wise use of wetlands and their species by several methods including establishing nature reserves on wetlands whether or not they have been listed.[57]

Besides binding legal obligations, Australia has signed policy instruments also referred to as 'soft law' that guide the way that we manage our resources.[58]

In 1987 the United Nations adopted the *Brundtland Report*. It called for sustainable development to ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs.[59]

Although the Brundtland Report did not result in any formal international obligations for Australia, by 1992, actions by the United Nations did begin to have implications for Australia. The UN Conference on Environment and Development (UNCED) held in that year formulated several conventions including the UN Convention on Biological Diversity. This aimed to conserve ecosystems and natural habitats, and promote the recovery of threatened species in their natural surroundings. Under this convention Australia was obliged to make plans and strategies to carry out rehabilitation and restoration of degraded ecosystems and their habitat.

Following UNCED, an action plan referred to as Agenda 21 was formulated. It noted a lack of understanding of the effect development and use of water resources had on aquatic ecosystems and set out specific provisions for the protection of the quality and supply of fresh water resources.[60]

In line with international concerns, in 1992 the Australian Commonwealth, States and Territories entered an Intergovernmental Agreement on the Environment (IGAE). All levels of government accepted that principles of ecologically sustainable development (ESD) would guide development and implementation of environmental policy and programs. These four guiding principles were:

- Decision-making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations;
- Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the precautionary principle);
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognized;
- Decisions and actions should provide for broad community involvement on issues that affect them.[61]

4.3 Issues for reform

In 1994, the Council of Australian Governments (COAG) commissioned and accepted a report for the efficient and sustainable reform of the water industry, now known as the National Water Reform Framework. Key elements of the Framework included:

- pricing based on principles of full cost recovery and removal of cross subsidies,
- providing an integrated catchment management approach to water resource management, and
- institutional reform.

A raft of reforms was needed. Those that particularly impacted on the legal aspects of consumptive and non-consumptive use of water were:

Water entitlements

- implementing clearly specified water entitlements which separate water property rights from land title;

Environmental needs

- allocating water for the environment, and where river systems were over-allocated, aiming for 'substantial progress' to provide a better balance in water resource use;
- allocating water for environmental contingencies, reviewable every five years;
- carrying out environmental studies before constructing significant new irrigation schemes or dams;
- improving land management especially for rivers with a high environmental value;

Trading

- trading water entitlements, both intra and interstate, through arrangements that are consistent and socially, physically and ecologically sustainable;

Public consultation

- consulting the public where new initiatives are proposed especially in relation to pricing, specification of water entitlements, and trading in those entitlements.

Because reform in water resource policy was seen as an integral part of the wider microeconomic reform and natural resource and environmental agendas,[62] a decision was made in 1994 to tie water reforms to a package of payments by the Federal government under the National Competition Policy.[63]

The implementation of COAG policy was seen to be contentious. Important questions included:

1. How would existing statutory entitlements to take and use water be converted to new rights?
2. How would water be allocated to the environment?

There were other implicit questions that followed:

3. If there was not sufficient water for ecosystems, how would water be re-allocated from consumptive use?
4. Would compensation be payable if re-allocation was to take place?

The first question, above, was addressed in 1995 by the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) who proposed a strategic framework for converting existing statutory entitlements into property rights.[64] This report (referred to as the *Strategic Framework*) established principles accepted as a plan of action by all States. Based on hydrological assessment, comprehensive planning systems were to provide for consumptive and non-consumptive water uses before a property rights regime was implemented. This basin-wide planning approach which considers non-consumptive use was the report's strongest point.[65] Ecological needs[66] and the involvement of the community in planning processes were recognised.[67] There were other strengths. In determining sustainable flow regimes, the Framework recommended that best available scientific information be used.[68]

The second question, how water would be allocated to the environment, was addressed in 1996 by the *National Principles for the Provision of Water for Ecosystems*. The *Ecosystem Principles* were developed jointly by ARMCANZ and the Australian and New Zealand Environment and Conservation Council (ANZECC).[69] The report recommended that tensions between consumptive and non-consumptive use of water be resolved as far as possible, by providing water to sustain ecological values of aquatic ecosystems, whilst recognising the existing *rights* of other water users. However where systems were over-committed, action including reallocation should be taken to meet environmental needs. Any future allocation should be on the basis that natural ecological processes and biodiversity are sustained.[70] It could be argued that the *Ecosystem Principles* established that where ecological needs and private rights intersect, the former should have priority, because unless the primary needs of aquatic ecosystems are met, human use of resources cannot be maintained over the long term.

The third question, where resources were over-allocated, how was water to be reallocated from consumptive use, was extremely contentious. This and the fourth question — the issue of compensation for reallocation from consumptive use — will be considered in part 5 of this paper.

4.4 Water allocation under the new State legislation

Following the guidelines of these two documents, South Australia, New South Wales and Queensland enacted new water legislation after 1995. Victoria has not enacted new legislation as its *Water Act* 1989 had already set up a new framework for tradable rights in water. State legislation attempts to provide comprehensively for water allocation and management. It is not possible to discuss all aspects of water law reform in this paper — what it offers is an overview of certain important areas:

- objectives of water management;
- planning, adaptive management and allocating water for consumptive use;
- allocating water for environmental flows; and
- trading water.

4.4.1 Water management objectives

South Australia, which relies on its one major river, the Murray, is acutely aware that its own use and use by others upstream affect the sustainability of the river. The *Water Resources Act* 1997 (SA) provides for sustainable use of water. It reads:

> *s. 6(1) The object of this Act is to establish a system for the use and management of the water resources of the State -*
>
> *(a) that ensures that the use and management of those resources sustain the physical, economic and social well being of the people of the State and facilitate the economic development of the State while*
>
> *- ensuring that those resources are able to meet the reasonably foreseeable needs of future generations; and*
>
> *- protecting the ecosystems (including their biological diversity) that depend on those resources; and*
>
> *(b) that, by requiring the use of caution and other safeguards, reduces to a minimum the detrimental effects of that use and management.*

In addition, all persons and bodies involved in the administration of the Act, including the Minister, must act consistently with, and seek to further, the object of the Act and must specifically have regard to a range of matters, including the protection and enhancement of ecosystems that depend on naturally occurring water.(Comment 26)

Water legislation in Queensland and New South Wales also provides objectives of water management consistent with principles of ESD.[71] Queensland's Act recognizes that efficient use of water includes water recycling.[72] The Act however limits the duty of sustainable management only to Chapter 2 of the Act which concentrates on setting up a planning system.[73] It is therefore uncertain whether Queensland's Act goes far enough to ensure sustainable management for all aspects of water management. For example chapter 3 of the Act that relates to matters such as the provision of water and sewerage services, regulation of referable dams and flood mitigation responsibilities, is not subject to the duty of sustainable management.

Arguably the *Water Management Act* 2000 (NSW) goes further than other States in implementing the ARMCANZ/ ANZECC *Ecosystem principles* in its objects clause. Its objects clause emphasises long term sustainable management rather than consumptive use, and refers specifically to protection, enhancement and restoration of water sources, their associated ecosystems, ecological processes, biological diversity and water quality.[74] In particular management principles for water sharing state unequivocally that:

> *(a) the sharing of water ... must protect the water source and its dependent ecosystems; and*
>
> *(b) ....the basic landholder rights of owners of land; and*
>
> *(c) sharing or extraction of water under any other right must not prejudice the principles set out in paragraphs (a) and (b).*[75]

Basic landholder rights are defined to include domestic and stock rights,[76] harvestable rights[77] and native title rights.[78] Water for other consumptive use, for example for irrigated agriculture, is provided through access licences. These management principles provide a *clear priority for water sharing* between consumptive and non-consumptive use.

At the other end of the spectrum, Victoria's statement of purposes in its *Water Act* 1989 may be implemented in such a way to give priority to

consumptive use.[79] Amongst other purposes, the Act sets out:

- to provide for better definition of private water entitlements and the entitlements of water authorities,
- to foster the provision of responsible and efficient water services suited to various needs and various consumers; and
- to continue in existence and protect all public and private rights to water existing before the Act.

As for non-consumptive use of water, the Act sets out only to provide *formal means* for protecting and enhancing environmental qualities of waterways and their instream uses. There is no substantive duty to provide for ecosystems' requirements. While there may be an argument that the reference to protection of public rights may include protection of ecosystems' need for water, this argument is weak given that private rights are specifically defined, but public rights are not.[80] It may be said that the Victorian Act is equivocal about supplying water for the environment.

4.4.2 Planning, management and water for consumptive use

The ARMCANZ *Strategic Framework* accepts that comprehensive planning should take place before allocating tradeable rights in water for consumptive use. It also provides for a periodic review of plans. All States accept that planning is the cornerstone of the new generation of water legislation. A brief analysis of State provisions follows.

Queensland

Queensland's water planning process most closely follows the ARMCANZ *Strategic Framework*. Water Resource Plans (WRPs) have been in progress since 1995 for priority catchments in the State but few have been completed to date. The WRPs are to establish broad objectives for consumptive and environmental use. Environmental flow objectives with stated ecological outcomes are to be provided.[81]

Planning is to take place with a community reference panel which includes local representatives of cultural, economic and environmental interests. However the role of such panels is not specified by legislation except that the Minister is to consider their advice in preparing draft WRPs.[82] The use of expert technical reports in the planning process is discretionary but the Minister is required to state before the process begins, what arrangements are to be available.[83] Public notice of draft plans is mandatory and all 'properly made submissions' must be considered by the Minister before a final plan is made.[84]

The WRPs are to be implemented by Resources Operation Plans. This step will lead to conversion of existing licences to water allocations in conformity with water allocation security objectives in the WRP.[85] The water allocation security objective is defined as 'an objective that may be expressed as a performance indicator and is stated in a water resource plan for the protection of the probability of being able to obtain water in accordance with a water allocation'.[86] A priority grouping, for example high security, will attach to all water allocations supplied from dams.[87] Reviews of WRPs will occur every 10 years.[88]

New South Wales

New South Wales has also adopted a planning model. The model is based on a 10 year planning process structured around the issuing of access licences.[89] These licences will be linked to a share component and/or an extraction component established after the planning process.[90] The licences are subject to water management plans based on a 10 year period and a review of the plan after 5 years.[91] Management committees are established in each declared catchment-based area to carry out specific planning tasks. For example preparing a draft plan for water sharing. Public consultation of draft plans is mandatory.[92]

Of all the States, New South Wales has the clearest provisions for monitoring and accountability:

- the Minister is responsible for ensuring an audit of the plan takes place at intervals of not more than 5 years to ascertain whether the provisions of the plan have been given effect;[93] and
- in setting out the terms of reference for a new management plan, the Minister must have regard to the results of the latest audit.

In practice, either an independent scientist or an Expert Panel has been made available to most management committees entrusted with making water management plans,[94] but the new Act does not make this a legislative requirement. However the representation on these management committees is legislatively prescribed to ensure that they reflect local community interests[95] and includes at least one person nominated by the Minister for the Environment.[96]

South Australia

South Australia has a hierarchical statutory planning arrangement. At the top of the hierarchy is the State Water Plan (SWP).[97] State Water Plans are to be amended whenever the Minister considers it necessary in order to achieve the object of the Act.[98] Specific periods of review are not stated. The next tier of planning is primarily at catchment-level through Catchment Water Management Plans (CWMP), with provision for optional local water management plans which must be consistent with the CWMP for that area.

The scope of CWMPs are defined in the Act but no methodology or outcomes are specified. [99] Financial provisions for implementation of a CWMP are for a 3 year period[100] which imply a similar period for reviews but no specific period is provided.

For some areas of South Australia planning is the only legal mechanism to regulate the taking and use of river water. Until recent law reform riparian rights were still available but all common law rights have now been abolished. However, water may continue legislation still allows water to be taken for domestic or domestic stock use without a licence in some circumstances.[101] Regulation of other consumptive uses depends on whether the water resources are prescribed. If the water resource is prescribed by regulation under the *Water Resources Act* 1997,[102] consumptive users in South Australia must not take water from a prescribed water resource unless they have licences or authorization from the Minister.[103] Water resources in many parts of the State are not prescribed and in those areas licences are not required — persons are constrained in their consumptive use only by conditions of a water management plan if one is in place.

There is no provision in the South Australia Act for the establishment of independent scientific advice about environmental requirements, targets or benchmarks in plans. There is however a requirement that the peak water advisory body in the State is chaired by a person who in the opinion of the Minister has knowledge of water management and of the ecosystems that depend on it.[104] The Minister may appoint additional persons with special expertise to assist the body in any particular matter.[105]

Victoria

No formal planning process exists in Victoria although semi-exclusive rights to water have been allocated under its 1989 Act. It was the first State to convert the poorly specified bulk annual average volume allocated to irrigation schemes to new Bulk Entitlements (BE).[106] Two important aspects of the specification of new BEs are volume (or share of flow or storage), and security of supply, defined as 'the statistical probability of being able to supply a given volume of water in a year'.[107] Additionally, obligations such as passing flows, measurement, reporting and financial responsibilities are specified.[108] Before granting the BE, the Minister for Conservation and Natural Resources is obliged to consider an extensive list of matters, including the environment, but is not under any substantive duty to provide for ecologically sustainable management of water resources.[109]

At present the scope of planning in Victoria is limited to the management of water *licences* within areas managed by a water authority. This is a fragmented approach because planning does not exist for other consumptive use within any given area.[110]

The *Water (Irrigation Farm Dams) Bill 2001* allows for a planning process for areas which are declared to be water supply protection areas.[111]

Undermining of planning

However sound the planning process under the new Acts, provisions which allow for the switch from the previous legislation to new legislation (called transitional provisions) may undermine the outcomes and processes of plans. For example in Queensland, the Fitzroy Water Resource Plan is deemed to comply with all the criteria of s46 of the *Water Act* 2000 (Qld) thus silencing any legal challenges that its environmental flow objectives fail to protect the health of ecosystems.[112] There are other examples of transitional provisions that undermine standards. In these ways decisions on the approvals of final plans may be susceptible to the influence of shorter term political objectives and so fail to provide for long term sustainable ecological objectives.[113]

Planning may be undermined in yet another form, for example, legislation enacted to over-ride water plans. A recent example is found in Queensland. A Water Resource Plan was completed in 2000 for the Burnett Catchment. A year later the Minister for State Development introduced a bill into Parliament to over-ride the Burnett WRP by amending environmental flow objectives established under the plan. The object of the *Water Infrastructure Development (Burnett Basin) Amendment Act* 2001 (Qld) was to allow for the

building of Paradise Dam and other storages in the basin.[114] During parliamentary debate over the bill, Mr Seeney, National Party member and shadow Minister for National Resources said

> *This legislation does not correct the Burnett water resource plan properly, and it does not give the Burnett water plan any credibility. In fact this legislation destroys whatever credibility the Burnett water resource plan may have in the eyes of some, until now. This legislation adjusts those politically derived environmental flow objectives set by Mr Welford [the then Minister for Natural Resources] to restrict irrigation development in the Burnett just enough to allow the Premier's political promise to be delivered to the Bundaberg area…Let there be no mistake or misunderstanding about that. This legislation sets a precedent that we [the National Party] will follow. When that time comes, as it one day must, let there be no hypocritical opposition from Labor members of the Beattie Labor government who will support this legislation today.*[115]

4.4.3 Environmental flows

The best outcome for non-consumptive use in Victoria has been an increased allocation of 25,000 ML for the Barmah-Millewa Forest.[116] But this is not an outcome repeated throughout the State. Water for environmental purposes in Victoria was generally made available by capping all abstractive uses through the Bulk Entitlement process. Minimum passing flows were imposed as conditions on the BEs granted to rural supply authorities. For example new and improved flows were available at a few points in the Goulburn river system, but it has been suggested that in this particular case the provisions for passing flow were influenced more by supply of water for irrigation than environmental concerns.[117] As the BEs granted are perpetual, it is unlikely that minimum passing flows will be adjusted without a legal challenge by consumptive users.

The only BE for non-consumptive use in Victoria was for 27,600 ML and issued in 1999. The water has been allocated since the early 1980s for specific wetlands in response to duck-hunters' demands for water for duck nesting and breeding. In 1999 the BE allocated this volume of water for all ecosystem needs along the Murray, and in that respect the provision was an improvement. However use of the BE is expensive – if channel and supply systems owned by Goulburn-Murray Water are used to supply this water, a substantial delivery cost is incurred.

New South Wales has taken a different, more innovative approach to providing water for the environment. The new *Water Management Act* 2000 (NSW) enacted environmental water rules for the identification, establishment and maintenance of three types of environmental allocations:

- environmental health water that is committed for fundamental ecosystem health at all times and may not be taken or used for other purposes;
- supplementary environmental health water which is for specified environmental purposes at specified times or circumstances; and
- adaptive environmental health water held under access licences. [118]

In his second reading speech, the Minister for Agriculture, and Minister for Land and Water Conservation explained that

> *Environmental health water would include all current environmental flow rules on the regulated rivers … including any existing environmental contingency allowances …*
>
> *[S]upplementary environmental water is principally allocated for environmental purposes but subject to critical events, such as bird breeding or fish passage. If the pre-set triggers are not activated, the water may be allocated to extractive use… Adaptive environmental water is a normal access water entitlement that a licence holder has decided to use for agreed environmental purposes. It is made available at the discretion of licence holders, so it can be converted back to consumptive use or traded at their discretion. It will be subject to normal access rules and water use approvals… This water can only be used where it is consistent with the water management plan or ministerial agreement*[119]

None of these types of allocation is as yet available because WMPs have not yet been made, but interim provision for ecological needs was made in 1998-99. In the lead up to the new New South Wales Act, catchment-based river management committees (RMCs) on inland rivers determined allocations in the

form of Environmental Contingency Allowances (ECAs). They made flow rules and restricted access to off-allocation flows. In doing so, the RMCs had to negotiate reallocation of water from consumptive to ecosystem use. Flow rules allow for translucent/variable flows in order to mimic natural flow regimes. Monitoring of the rules was to be carried out. This meant even if a particular management decision failed, there would be valuable lessons learnt from that failure. The statutory provisions for review of management plans were referred to earlier.

In some respects the ECAs were similar to the Victorian BE for flora and fauna use. A specific volume of water was allocated, and some of the wetlands watered had management plans. But current New South Wales ECAs also provided benefits for consumptive uses in addition to ecosystem needs. For example, in the Lachlan River, specific portions of the ECA could be used to flush algal blooms and also to dilute salinity.

Environmental flows in both South Australia and Queensland are also to be provided within the planning process. The process for providing these flows follows a similar two-step process – first the South Australia catchment water plan (or Queensland WRP) provides a general goal or environmental flow objective, then the South Australia water allocation plan (or Queensland Resource Operation Plan) provides details on how the flows will be provided. Queensland's environmental flows must, by statute, be based on the best available scientific evidence.[120] South Australia's legislation is silent on this point. In both States environmental flows are only available for certain catchments. In South Australia, controls relate only to prescribed surface water areas, large areas lie outside of these. In Queensland the planning process has started only in priority areas.

4.4.4 Trading

The COAG decision in 1994 required that arrangements for trading water entitlements, both intra and interstate, should be consistent and socially, physically and ecologically sustainable. In 1996, the Murray-Darling Basin Ministerial Council approved an initial pilot project for permanent interstate trade for high security licences in the Mallee region of New South Wales, South Australia and Victoria. Subsequently changes were made a Schedule was added to the Murray-Darling Basin Agreement by the Ministerial Council to allow for such trade.[121]

A survey of State legislation finds that arrangements for trade are not consistent. The units of water which are able to be bought and sold is different in each of the States. Further the allocation framework is also different in each State. Consequently, these differences may result in increased transaction costs that discourage trading across State boundaries. Further, the procedures and limitations or otherwise for transfers vary between States. State provisions are far too complex to describe in detail. A table in Appendix 1 gives a concise summary of provisions.

As mentioned above, the COAG decision required that arrangements for trading water also needed to be socially, physically and ecologically sustainable. Queensland and South Australia require that the 'public interest' is to be considered by the relevant decision-makers before transfers of water are approved, but legislation is silent as to what is the public interest. In the absence of a definition, judicial guidance becomes necessary but this option of litigation is not only expensive but leaves administrators with a lack of specific criteria when making their decisions.

There are three different approaches to ensure that trading arrangements are socially, physically and ecologically sustainable: first, one that relies on planning instruments, secondly one that relies on widely circulated general principles and, thirdly a legislative approach. All require prior approval of individual transfers which may have a significant impact.

The approach relying on planning instruments and regulations is found in South Australia and Queensland. In both States transfers may be for an absolute (or permanent) or limited (temporary) period.[122] For example, in Queensland, to ensure that transfers of water allocation are ecologically sustainable, they are allowed if:

- permitted under the transfer rules of a resource operations plan;[123] or
- if transfers are not provided for under a resource operation plan, then they should be compatible with environmental flow objectives; in the public interest; and will not affect natural ecosystems in an adverse way.[124]

If trades in licences occur in areas of Queensland where no resource operations plans are available, then they need to comply with regulations.[125] At the time of writing, no resource operation plan has been finalised. The regulations at the present time allow trading only for the Mareeba Dimbulah water supply scheme, and is likely to extend to other areas at a later date. Under the regulations, the effect of the proposed transfer on the sustainability of land and water resources in the area must be considered before the proposed transfer is approved.[126]

Under the *Water Act* 2000 (Qld), a more cautious approach is provided only if transfers fall outside the rules of a resource operations plan. In that situation, public notice and the right of the public to make objections are available. The Chief Executive in Queensland (or the Minister in South Australia) is to consider the 'public interest'. This term is not defined, but most would regard it as encompassing social, physical and ecological factors.

New South Wales has yet to implement the transfer provisions of the *Water Management Act* 2000 (NSW) and is not expected to before mid 2002. In the interim, the provisions of the *Water Act* 1912 (NSW) apply. Both under the old and new provisions, fairly detailed guidelines, legal and administrative requirements apply. These guidelines are to guide the making of water trading rules by management committees in each catchment and are to be incorporated into each WMP. This is the most prescriptive approach, but one that suggests that a high level of consistency should be found throughout the State. It also suggests that officers in the regions who will be responsible for the making and implementing of trading rules will be acquainted with the relevant general principles.

A third approach is found in Victoria. This does not rely on planning instruments or general principles. Instead legislation, regulations and by-laws provide for a whole range of transfers. Detailed requirements in the Act provide for transfers of bulk entitlements. It is the Minister who approves these, and the interstate transfers of s 51 licences. Where Ministerial approval is needed, s 40 of the *Water Act* 1989 (Vic) requires the Minister to have regard to a range of matters, including the report of a specially convened panel if so required by the Minister, availability of water, needs of other water users, and environmental factors. The safeguards imposed by legislation constrain the process of the Ministerial decision — it imposes a *procedural* duty on the Minister to consider all these factors, but does not impose a *substantive* duty to ensure trade is socially, physically and ecologically sustainable.

Temporary transfers of water rights within an irrigation district in Victoria are regulated under detailed by-laws. Permanent transfers of water rights are subject to regulations.[127]

Each of the three approaches has its strengths and limitations. However, the general principles espoused in the guidelines referred to above in New South Wales are notable for the strong emphasis placed on education to facilitate the implementation of the legislation by water managers and users in regional areas.

In order to strengthen the transfer provisions in each State:

- arrangements for trade should be consistent across across the sStatess;
- general principles should be developed to give substance to the test of sustainability; and
- specific criteria should be developed for the test of the 'public interest'.

4.5 Other legislation impacting on water use

Each State has legislation which indirectly impacts on water use. Generally this is in the areas of development/planning, environmental protection, catchment management and soil conservation.[128] Only Victoria has heritage rivers protection.[129] Draft management plans have been made for some 18 key areas in Victoria and 26 relatively undisturbed river catchments.[130] These areas and catchments are one of the matters required to be considered when the Minister is making a decision on the grant of a bulk entitlement or its transfer.[131]

Besides other legislation within the States, Commonwealth legislation also impacts indirectly on water use. The first generation of federal environmental legislation comprising mainly the *Environment Protection (Impact of Proposals) Act* 1974 (Cth) focused on regulating the indirect environmental impacts of granting government licences and approvals and the activities of the Commonwealth government itself.[132] That legislation was considered largely ineffective because Commonwealth environmental legislation in the 1970s and 80s relied

on non-environmental issues for constitutional validity.[133]

The Commonwealth has now relied on its power to legislate for external affairs,[134] to enact the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth). Under this Act, the Commonwealth assumed responsibility for activities that may have significant impact on matters of national environmental significance (for example Ramsar wetlands, nationally endangered or vulnerable species, migratory birds and endangered ecological communities), on Commonwealth actions and on Commonwealth areas. Biodiversity protection has been improved under the Act[135] as has protection for Ramsar wetlands.[136] The building of a new dam triggers the need for approval assessment, but there are no provisions that trigger control of significant water allocation decisions. However, there is scope for adding further triggers over time. [137]

5. Recommendations for an Improved Legal Framework

> *Public debate over policy and law reform has challenged expectations about water use. Many issues raised are contentious on political, scientific and social fronts. It must be acknowledged that the economic prosperity of inland irrigation has been bought at considerable environmental cost. River systems have suffered much degradation in the two centuries since colonial occupation. In this comparatively short period, water resources have become fully committed, wetlands have been drained, natural habitats destroyed, and native species have dwindled under the burden of highly modified flow regimes and spreading exotic pest species. Our knowledge about resource use is as yet incomplete, and ecosystems may react in a manner which is entirely unexpected. In these circumstances it is essential that management decisions do not entrench the mistakes of the past.*
>
> *State legislation in the last few years has made vast changes to the legal framework. Generally, these changes have significantly improved the capacity of State Governments to respond to the resource management issues that have emerged. However there are still areas where improvements are needed. Some of these involve clarifying the legislation. Others are needed to ensure that, as much as possible, the full potential of the legislation is realised through the effective implementation of its provisions. Although some recommendations for reform are made in this part of the paper, the task here is to define the challenges for legal reform more sharply rather than to propose neat solutions. Hence, instead of focusing on a description of the law, the following sections shift perspective to a discussion of policy matters.*

5.1 Managing all of the terrestrial water cycle

If the ARMCANZ Strategic Framework and the ARMCANZ/ ANZECC *Ecosystem Principles* are to be given effect in the Murray-Darling Basin, the principles of ecologically sustainable management need to be incorporated into legislation for the management of water resources. Not all States have fully provided for these principles in their Water Acts' water management objectives. The New South Wales legislation has provided an example of how this may be achieved by providing clear management principles (see, for example, section 4.4.1 above).

If the water resources of the Basin are to be used in an ecologically sustainable way, it is necessary for the States to have the power to plan and manage these resources across the main terrestrial phases of the hydrological cycle. This includes water in upper catchments and floodplains. In 1986, New South Wales vested all water resources in the State, including diffuse surface flows (that is water flowing over land and not contained within a watercourse). As a result of recent legislation, South Australia and Queensland now have the power to allocate and manage diffuse surface flows.[138]

Victoria, in its explanatory memorandum to a 2001 Bill to amend its Water Act, acknowledges that there is a gap in the State's water allocation framework because irrigation and commercial dams built away from a waterway are not regulated under the *Water Act* 1989 (Vic). The new Victorian Bill is aimed at regulating the *building of dams*, which is different from managing the water resource itself. Compare this to the approach in New South Wales, where a proportion of rainwater run-off is considered a

'harvestable right' of the landholder. Although both approaches may achieve the same objective, the New South Wales approach is more consistent with the principle of the State exercising control over all terrestrial phases of the hydrological cycle.

Present legislation in all States extends to groundwater, but in practice an integrated approach for surface and groundwater has yet to be reflected in management practices.[139] Management plans continue to be made separately for surface and groundwater use. While this may be appropriate in regions where there is relatively little water movement between surface and sub-surface waters, the need of ecological sustainability and for greater efficiencies in the use of a limited resource in the future will require consideration of the interaction and interdependencies between surface and groundwater systems. This is essential if the terrestrial phases of the water cycle are to be managed in an ecologically sustainable way. The enormous scope of the challenge of this management task is all the more apparent in the light of the incompleteness of data and understanding of our water resources that for managing conjunctive use.[140]

5.2 Improved specification of consumptive entitlements

Specification of private access to water has not followed a uniform pattern. In at least three ways the specification of consumptive entitlements may be improved. Firstly , specification of these entitlements should be made capable of regular review at time periods which are clearly stated (see for example the Queensland and New South Wales models as discussed in section 4.4.2). Unless consumptive access to water is able to be reviewed, adaptive management is made extremely difficult and water resource use is less likely to be ecologically sustainable. If one accepts that the principles of planning and sustainability guide water management and allocation, then it is logical to provide for periodic review of consumptive and environmental entitlements. Instead, this has become an intensely political issue.[141]

Secondly, legislation in most States provides for types of new water entitlement. In Victoria and Queensland the specification of the new entitlement includes a reference to security of supply levels.[142] The term 'security' is used in these two States to refer to the frequency and severity of shortfalls between the quantity of water desired and the quantity of water that could be supplied.[143] It is often indicated as a statistical probability. For example urban users in the Goulburn catchment, Victoria, have 99% security[144] whereas irrigators received 97% security for water rights.[145]

In New South Wales the concept of statistical probability is now referred to as a reliability factor. This is not a component of access licences. Instead, the 10 year life of the WMP provides for security, subject to payment of compensation where adjustments are made. It is suggested that to enhance the trading of entitlements and to achieve consistency across the States, security of supply (or a reliability factor) should be an element of specification. If this is not yet predictable in some States using present computer modelling, future planning may be able to fulfil this.

Thirdly, the calculation of security of supply (or a reliability factor) is dependent on good data collection to support computer modelling of the resource. Data relating to unregulated streams and surface water may be insufficient in many States to support accurate computer models predicting the probability of delivery or availability of water. This is further justification for careful attention to provisions for periodic review in water legislation.

5.3 Better provision of water for ecosystems

The allocation of water for ecosystems may also be improved. Firstly, a legislative duty should be imposed on all persons involved in the allocation and management of water resources to comply with ecologically sustainable management as it is understood by the ARMCANZ/ANZECC *Ecosystems Principles*. As section 4 of this paper shows, at present this duty has not been imposed in several States. In particular a duty should be imposed to rehabilitate degraded aquatic ecosystems and to protect representative freshwater ecosystems.[146]

Secondly, the allocation of water for ecosystems should be made using best scientific evidence. This is not yet a legislative requirement in all States. Neither is it a requirement that this type of allocation be made on the basis of independent scientific reports. This is a weakness that needs to be addressed as soon as possible. This recommendation overlaps with the next recommendation.

The third area of improvement relates to accountability. The *Ecosystems Principles* stress that

accountability is essential to environmental water provisions. In this context accountability means that use of the allocation should be clearly demarcated, holders of environmental allocations should be clearly defined, and they should give an account of their performance.[147] Why is accountability a good thing? Historically water agencies have been given such wide administrative discretion that they were often not liable for their actions.[148] Accountability of water agencies is vital and needs to be legislatively provided. The following aspects are in need of attention.

- One problem of water provisions, particularly in the past, is that they are difficult to understand. While it is difficult to completely rid water legislation of technical jargon of water managers — water management undeniably *is* complex and for decades management has been the domain of engineers — legislation and planning documents should be written in plain English to be, as far as possible, understood by those with the task of implementation and members of the community.
- Unless measurable standards relating to provision and management of water for ecosystems apply, governmental agencies, when under pressure both from their political masters and their customers who are consumptive users, may continue to allow unsustainable practices.[149] Enforceable standards should be provided for scientific data to be effectively incorporated into the law. These standards should also include ecological outcomes to be achieved and must stand up to a how, when and where level of scrutiny.
- Accountability is unachievable unless a clear plan exists for using water for ecosystems. This plan should be made in consultation with community stake-holders, preferably on an annual basis, with a detailed report as to usage or non-usage of water. Details should include agreed measures, indicators of sustainability, and mechanisms for monitoring and review. An independent audit of the use of allocations should be carried out at least once during the tenure of a water management plan. The audit's findings should be made public and be taken into consideration in the making of the next water management plan.
- The usage of environmental allocations may be dependent on financial considerations instead of ecological ones. For example the Bulk Entitlement for all ecosystems use along the Murray has been traded, and there are concerns that profit from trading is needed to pay for substantial delivery costs incurred in using the water.[150] If allocations are tradable, there needs to be clear principles governing trade and also how the money from the sale of environmental allocations is to be used.[151]
- Members of the public may find it difficult to obtain data and sensitive reports. Public access to data, plans and reports should be available at no cost. Freedom of information legislation may provide access, but it is costly, time- consuming and not always effective in public interest matters.[152]

5.4 Public involvement in regulation

The idea of accountability raises the question who are water managers accountable to? For instance, currently in Victoria the legal owner of Victorian BEs for the environment is the Minister administering the *Conservation, Forests and Land Act* 1987. It may be difficult to persuade the Minister to enforce provisions of the BE because of the strict rules of having 'standing' to sue.

If the BE for flora and fauna is expressly vested in the State *on behalf of the people of the State of Victoria*, the public acquires an explicit interest in the environmental flows.[153] If this is done, it would follow that legislation should provide that any member of the public should be able to claim a right to access information, and with the appropriate safeguards, be able to enforce public rights.

The public now plays a crucial role in planning through membership of committees and in consultation. Their much increased responsibility in planning should allow them increased opportunities in enforcement of planning and other provisions. Generally under previous water legislation, members of the public had limited rights of objection to proposals and even more restricted rights of appeal against administrative decisions. This has changed in some States, for example New South Wales and Queensland new measures which have been introduced include increased rights of objection to proposals and appeals from decisions.[154] It is significant that in New South Wales any person may now bring

proceedings either to remedy or restrain a breach of the water legislation.[155] A slightly narrower provision exists in Queensland.[156]

5.5 Explicitness of re-allocation and compensation

Re-allocation of resources occur in mainly three phases: (1) when area-based licences are converted to volumetric form; (2) when water is re-allocated, through the water planning process, from volumetric licences, to a share of the resource allocated for consumptive use through entitlements; (3) if the share of the resource allocated for consumptive use is adjusted.

The issue of compensation arises at each of these phases. Some general principles regarding compensation apply. First, there is no general right to claim compensation when a State acquires a property right of an individual. In contrast, compensation must be paid when the Commonwealth acquires property.[157] Secondly, pre-reform mechanisms allowing access to water, for example licences, are not proprietary interests because they were not secure. As discussed earlier, these rights to take and use water could be amended, varied suspended, cancelled or revoked under previous Acts.[158] Thirdly it is doubtful that these rights would fulfil a strict test of property because they were not widely transferable.

Historically consumptive users have not received compensation in the 1st phase. In the past the rates for conversion have been fairly generous. New South Wales is in the process of converting licences on unregulated streams to a volumetric basis. General principles have been formulated. For example, sleeper/dozer portions of licences are given a lower conversion rate than those portions in active use.[159]

As for the 2nd phases, re-allocation has not been explicitly dealt with. In over-allocated catchments, for example groundwater licences in the Namoi catchment of New South Wales, water has to be 'clawed-back' from consumptive use before a sustainable level of use is achieved.[160] How water is clawed back, which type of users should be affected, and whether the reduction should be uniform for all types of access regardless of a history of use, have been extremely difficult questions. For the most part, river management committees in each catchment have to make recommendations on these issues. This fragmentation of decision-making while allowing for consideration of local interests also gives rise to an inconsistent approach.[161]

It is suggested a consistent policy model for reduction in consumptive use should be formulated and made known to the public.[162] In New South Wales at least, it appears that a decision has been made that groundwater licences will be reduced by an across-the-board percentage. This is based on the estimated sustainable yield of each aquifer zone within the catchment.[163] Whether or not these licences had been in use is not considered relevant.

Irrigators have asked for compensation to be paid in Phase 2 if their existing water use is reduced upon conversion to new entitlements. If the general principles regarding compensation were to be applied to existing water rights *before plans were made*, it is unlikely that consumptive users are entitled to compensation. There were no provisions in any of the previous State legislation allowing users any right to compensation.

Queensland and New South Wales have explicitly dealt with the main issues regarding re-allocation of water resources during the 3rd phase. A right to compensation has also been expressly provided in specified circumstances. If adjustments to water allocations occur during reviews of Water Resource Plans in Queensland, no compensation will be payable. It is expected that if the total allocatable resource in the plan needs to be reduced upon review, then every entitlement holder will have a correspondingly smaller share of the resource. Reduction is expected to occur at the same rate regardless of use. If changes to water allocations occur during the scheduled review, then no compensation is payable to the holder. On the other hand, reasonable compensation is payable if changes occur at any other time.[164] The same principles apply in New South Wales but South Australia and Victorian legislation is silent on the matter.

Consumptive users are capable of exerting considerable lobbying power on both politicians and bureaucrats. In contrast, ecosystems have no voice and those interested in protecting the environment are a diffuse group who do not derive direct benefits from its protection. If re-allocation and the principles of compensation are not made explicit in all three phases of re-allocation of resources, the danger exists that the introduction of private tradable rights in water will continue the historical pattern of elevating consumptive over environmental use.

From the perspective of consumptive users, clear principles will introduce some certainty and consistency in re-allocation of resources. Answers to the issues raised in this section of the paper are particularly difficult. Even if entitlements issued after plans are made are considered 'property rights' it is open for a statutory regime that creates these rights to also create a statutory framework for re-allocation, and to prescribe any rights to and limits for compensation.

6. Concluding Comments

Because our understanding of the role of fluctuations in flow in the maintenance of riverine ecosystems are relatively recent in origin, both the common law and the previous legal framework naturally did not provide for ecosystems needs. Water legislation, when it was first introduced in the 1880s promoted consumptive use, particularly irrigated agriculture, because of the needs of that era. It was enacted for two purposes, firstly to create a system of administrative rather than judicial apportionment of rights to use water. Secondly, legislation sought to do away with the vagaries of the riparian doctrine. However legislation was still based on common law concepts that were inappropriate for application to Australian conditions, for example the notion that water flowed within a defined watercourse.

Changes in legislation over the next 100 years were incremental and implementation of the law relied on administrative discretion. . The legislation became fragmented, difficult to apply and did not reflect ecological values that were becoming more accepted nationally and internationally in since the 1970s.

Law reform adopted by some of the States at the turn of the 20th century made radical changes to that legal framework. The main gains for water reform were that in some States it allowed for:

- ecologically sustainable management of water resources;
- for management of the whole of the terrestrial phase of the hydrological cycle;
- specified rights for both consumptive users and for ecosystems; and
- consumptive rights to be tradeable provided reasonable conditions were met.

However despite incentives under the National Competition Policy, not all States have fulfilled the objectives of policy documents, particularly the ARMCANZ/ANZECC *Ecosystems Principles*.

From the discussion on law reform in this paper, it is apparent that several areas require continued policy and legal development. Recommendations made in this paper include:

- legislating for more accountability by water agencies to ensure good management of environmental water provisions;
- the mandatory use of independent scientific reports in the making of water plans;
- open standing for groups representing the public interest; and
- increased public involvement in the remedy or restraint of offences against water legislation.

Issues about water allocation and management are inherently political. For most of the history of the Murray-Darling Basin, water politics has been about making 'a bigger cake' rather than dividing a 'cake' that is finite or getting smaller. The last few years have seen rapid changes in the institutional stage on which the politics of water allocation is played out. The new politics of water allocation in the late 20th and early 21st century is essentially a phase of institutional experimentation in which we are yet to understand what works well and what does not. It is important the Murray-Darling Basin Commission continues to support efforts to learn from the current phase of experimentation and ensure that the partner State Governments incorporate the new understandings in their water legislation.

Appendix 1

State provisions regarding transfers of entitlements are found in the:

- *Water Management Act 2000 (NSW);*
- *Water Act 2000 (Qld);*
- *Water Resources Act 1997 (SA); and*
- *Water Act 1989 (Vic).*

This table highlights the differences in the allocation framework between States and the complexity regarding transfers of entitlements. For that reason some of the terms used in the first column may not easily fit descriptions of either the entitlements or the procedures within a particular state, and are to be read as an attempt to search for a generic reference that will allow some comparison between States.

	NSW	Qld	SA	Vic
Bulk allocations	Referred to as a bulk access regime under a management plan: s 45. The regime is not an allocation to a particular person or corporation. It may not be traded.	The Act is silent regarding bulk allocations, instead it provides for a licence to operate water infrastructure: s 109. Provisions allow the trade of whole or part of this licence: s 114(1).	The Act does not differentiate between personal and bulk water allocations/licences. See below	Referred to as Bulk Entitlement (BE). Various types of BEs may be traded temporarily or permanently: s 46 Minister to approve based on list of criteria: s 46(5) May be traded to irrigators: s 46A. Interstate trade may not exceed 12 months: s 46 B.
Licences	Access licences are to be issued. Trade is to be subject to WMPs and transfer principles which have yet to be published: s 71. The whole or part of the water allocation may be transferred for the whole of part of the term of the licence: s 72. Interstate transfers may be allowed by agreement between State Ministers: s 74. Currently because	The Act does not differentiate between one type of new entitlement and another. All new entitlements are called 'water allocations' and may be 'dealt with' or sold or leased: ss 128-137. Transfer rules apply: s 129. If the proposed transfer does not fall within the transfer rules, ss 130 - 134 allow for additional safeguards eg. public notice and additional information. The Chief Executive approves,	The Act differentiates between a licence and the water allocation assigned to that licence. One may be transferred without the other, although commonly both will be transferred at the same time. Similar provisions apply to transfers of both licences and water allocations: ss 38-41. Transfers of a licence may be absolute or for a limited period: s 38(2). The water allocation may be wholly or partly transferred, and may be	ss 51 and 52 licences may be traded temporarily or permanently: s 62. s 51 licence may be traded interstate with Ministerial approval: s 62(2A). Minister to approve based on list of criteria: ss 62 and 53.

	NSW	Qld	SA	Vic
Licences	access licences are not yet in place, trade takes place under the Water Act 1912. Approvals are required. There is a distinction between temporary and permanent transfers.	based on statutory criteria which include ''public interest': s 134. Transfers for a water season are subject to a lesser degree of scrutiny ss 142-145.	for an absolute or limited period: s 38(1)(b) and (4). All transfers are subject to Ministerial approval and Statutory criteria apply: s 39, 41.	Temporary transfers are limited to a maximum of one irrigation period: s 224(4) and are subject to by-laws made by authority: s 225. Interstate transfers may be temporary or permanent: ss 224A, 226A. Interstate transfers should be subject to ministerial guidelines: s 224B. Permanent interstate transfers are subject to regulations made under s 228.
Entitlements within irrigation schemes	Access licences are to be issued to all types of irrigation schemes: ss 118, 141, 222. For an irrigation corporation, a single access licence will be issued to the corporation and the provisions for transfers described above will apply. The Act is silent regarding transfers within the scheme. At present transfers are subject to the trading rules of the corporation.	See information for licences.	See information for licences.	
Other relevant provisions	Basic landholder rights are available. They include riparian domestic and stock rights (s 52) harvestable rights for capturing rainwater run-off (s 53) and native title rights (s 55).	Water for riparian domestic and stock use does not require a licence: s 20(3). Licences not subject to a water resource plan may be transferred only if a regulation provides: s 223. Amalgamation or sub-division of licences are permitted: s 224-5.	All licences and water allocations attached to them are personal property: s 29(5). Water for domestic and stock use does not require a licence if that user is a riparian or takes surface water from land: s 7(5).	Water for domestic and stock use does not require a licence provided that user has access to a waterway or land on which a bore is located: s 8(1).

Overview Report: Agriculture and Natural Resource Management in the Murray-Darling Basin – A Policy History and Analysis

Issues Paper 1:	Legal Issues Relating to Water Use
Issues Paper 2:	Resource Governance and Integrated Catchment Management
Issues Paper 3:	Regional Development Issues
Issues Paper 4:	Human Dimensions of Structural Change

Please note that these are a linked set of documents and are fully referenced in the bibliography at the end of each component report.

Acknowledgments

Each of the papers has been reviewed by one or more external reviewers, as well as by the members of the project Steering Committee. The papers have gained significantly from the helpful comments and suggestions provided by these reviewers and their assistance is gratefully acknowledged.

7. End Notes and Bibliography

papers in this series

Reeve, I. Frost, L., Musgrave, W. and Stayner, R. 2002. *Agricultural and Natural Resource Management in the Murray-Darling Basin. A Policy History and Analysis.* Report to Murray-Darling Basin Commission. Institute for Rural Futures, University of New England, Armidale.

Tan, P.L. 2002. *Issues Paper No 1: Legal Issues Relating to Water Use.* Report to Murray-Darling Basin Commission. Institute for Rural Futures, University of New England, Armidale.

Reeve, I., Marshall, G. and Musgrave, W. 2002. *Issues Paper No 2: Resource Governance and Integrated Catchment Management* Report to Murray-Darling Basin Commission. Institute for Rural Futures, University of New England, Armidale.

Frost, L., Reeve, I., Stayner. R. and McNeill, J. 2002. *Issues Paper No 3: Issues in Regional Development.* Report to Murray-Darling Basin Commission. Institute for Rural Futures, University of New England, Armidale.

Reeve, I.. and Stayner, R. 2002. *Issues Paper No 4: Human Dimensions of Structural Change.* Report to Murray-Darling Basin Commission. Institute for Rural Futures, University of New England, Armidale.

** This paper reflects the law as at 31 December 2001*

1 P Crabb, *Murray-Darling Basin Resources,* Murray-Darling Basin Commission, Canberra, 1997, 9.

2 P Crabb, *Murray-Darling Basin Resources*, Murray-Darling Basin Commission, Canberra, 1997, 26.

3 *Australian Water Resources Assessment 2000*, National Land and Water Resources Audit, Canberra, 2001, 56.

4 The ACT government has since 1998 participated in the Murray-Darling basin Initiative via a memorandum of understanding. This allows the ACT to take part in the planning and management of Basin environmental resources but not to be involved in the water management of the river system: Murray-Darling Basin Commission, *Annual Report 1997-98*, MDBC, Canberra, p 17

5 The emphasis in the report is on the legislation of the States of Queensland, New South Wales, Victoria and South Australia. To keep the report within the size limit set for it, the legislation of the Australian Capital Territory has not been included.

6 For a full discussion of riparian rights see generally W Howarth, *Wisdom's Law of Watercourses*, 5th edn, Shaw & Sons, Kent, 1992.

7 These have been held to include drinking and cooking, cleaning and washing, feeding and supplying water to an ordinary quantity of cattle and the production of water power. See *Halsbury's Laws of England*, 4th ed, London, Butterworths, 1984, Vol 49, para 401-402.

8 *Embrey v Owen* (1851) 6 Exch 353, 155 ER 579.

9 The riparian doctrine allowed a downstream riparian to sue to prevent any 'extraordinary' upstream use by another person. If the upstream use was not challenged it would ripen into a prescriptive right against a lower riparian landowner. This is how many weirs and mill streams came to be unchallengeable by downstream riparians.

10 *Embrey v Owen* (1851) 6 Exch 353, 155 ER 579; *Mason v Hill* (1833) 5 B & Ad 1, 110 ER 692; *Williams v Morland* (1824) 2 B & C 910, 107 ER 620.

11 The *Water Conservation Act* 1881 (Vic.) and earlier legislation created waterworks trusts. Each trust would be locally organised and given power over the surface water supplies within its jurisdiction (generally within the shire boundaries). The trusts would be empowered to divert water themselves and license the diversion of water by others.

12 *Water Act* 1905 (Vic) s 5. Section 8 provided that no-one after the enactment of the 1886 Act could acquire any prescriptive right on the basis of long user. This section was based on legal advice given to the Victorian Government that riparian rights were based on long user concept of prescription: PN Davis, *Australian Irrigation Law and Administration: Development and Analysis*, SJD thesis, U University of Wisconsin, 1971.

13 See *Rights in Water and Water Conservation and Utilization Act* 1910 (Qld); *Rights Water and Irrigation Act* 1914 (WA); *Control of Water Ordinance* 1938 for the Northern Territory. Tasmania and South Australia preserved limited riparian rights.

14 *Control of Waters Act* 1919 (SA) s 4(1) and PN Davis, *Australian Irrigation Law and Administration: Development and Analysis*, SJD thesis, U University of Wisconsin, 1971 p 1018.

15 See SD Clark and IA Renard, 'Constitutional, Legal and Administrative Problems' in HJ Firth and G Sawer *The Murray Waters: Man, nature and a river system*, Angus & Robertson, Sydney, 1974, 265-6.

16 See DE Fisher, *Water Law*, LBC, Sydney, 2000, 37-42.

17 See for example A Gardner, 'Administration of Water Entitlements', _in RH Bartlett, A Gardner and S Mascher, *Water Law in Western Australia*, Centre for Commercial and Resources Law, University of Western Australia, Perth, 1997.

18 See J Pigram and B Hooper, *Transferability of Water Entitlements: Proceedings of an International Seminar and Workshop*, Centre for Water Policy Research, UNE, Armidale, 1990, 14.

19 See PN Davis, *Australian Irrigation Law and Administration: Development and Analysis*, SJD thesis, U University of Wisconsin, 1971 pp 1164, 1171.

20 As above, p 1182.

21 As above, p 1182.

22 NSW Water Resources Council, Our Water, 2nd edn, NSW Resources Council, Paramatta, 1994.

23 For details see D Farrier, R Lyster and L Pearson, *The Environmental Law Handbook: Planning and land use in NSW*, Redfern Legal Centre, Sydney, 1999, 461.

24 The assessment is in part derived from Department of Water Resources, Victoria, *Report No 8, Security for Major Water Allocations: Background Report*, Water Resource Management Report Series, Victoria, 1987, 6-10.

25 For Victoria, see Hon D White MLC, Minister for Water Supply, in his speech advising parliament of the government's intention to comprehensively overhaul water law, Victorian Legislative Council, *Parliamentary Debates*, 2 December 1983, cited in *A Scarce Resource*, 1992, 8; for NSW, see Task Force to Review Reforms in the Water Industry, *Review of Reforms in the water industry - 1988: Report to the Minister for Natural Resources*, vol. 2, Background Paper No 1, Sydney, 1988, 3 which stated that as at 1984, 37 major Acts and 17 public bodies were involved in water administration.

26 It identified 8 major issues which fell into 3 categories: (1) environmental - protecting water quality and instream uses; (2) management - regarding issues of efficiency, pricing, co-ordinated management of water and land resources, data collection; and (3) funding of research and continuing Commonwealth government involvement: K.D. Green, *Water 2000: A Perspective on Australia's Water Resources to the Year 2000*, AGPS, Canberra, 1983, vii-viii.

27 NSW Legislative Assembly, Hansard, 21 September 1977, 8170.

28 Water Act (NSW) 1912, Division 4 B.

29 *Coulton v Holcombe* (1990) 20 NSWLR 138, 149.

30 AK Dragun, V Gleeson and WF Musgrave, *The economics of water use in the Hunter region*, CRES Monograph 13, CRES, ANU, Canberra, 1986, pp 89-90.

31 *WaterAct* (NSW) 1912, s 20 AB.

32 A water audit confirmed that water managers on the Murrumbidgee, Murray and Goulburn were making large allowances for under-usage when announcing allocations: Murray-Darling Basin Ministerial Council, *An Audit of Water Use in the Murray-Darling Basin*, MDBMC, Canberra, 1995, 29 (hereafter Water Audit, 1995).

33 The term 'security of supply' referred to the frequency and severity of shortfalls between the quantity of water desired and the quantity of water that could be supplied: See Murray-Darling Basin Ministerial Council, *An Audit of Water Use in the Murray-Darling Basin*, MDBMC, Canberra, 1995, 29. Security ranged from a very high level, where water demands would be completely met every year, and low, where irrigators might not have their full requirements met every year and some years might not receive any water at all. The level of security that irrigators required depended on crop requirements.

34 J Pigram, *Issues in the Management of Australia's Water Resources*, Longman Cheshire, Melbourne, 1986, 188.

35 The cases are *McCrae v Coulton* (1986) 7 NSWLR 644 (Court of Appeal); *Coulton v Holcombe* (1986) 162 CLR 1 (High Court); *Holcombe v Coulton (1*988) 17 NSWLR 71 (Supreme Court); and *Coulton v Holcombe* (1990) 20 NSWLR 138 (Supreme Court). For a summary of the cases and the background events see *Coulton v Holcombe* (1990) 20 NSWLR 138, 165-168.

36 *Water Act*, 1912 (NSW), s 22B(4), amended in 1977.

37 *Water Act*, 1912, s 22B(4).

38 The audit by Dr John Paterson was not into water use but the administration of NSW's water resources. The audit itself was not published: see Task Force to Review Reforms in the Water Industry, *Review of Reforms in the water industry - 1988: Report to the Minister for Natural Resources, vol. 1*, Sydney, 1988.

39 *The Water (Central Management Restructuring Act)* 1984 (Vic) also provided objectives for water management.

40 *The Water Administration Act*, 1986 (NSW) s 4 provided for management:

(a) to ensure that the water and related resources of the State are allocated and used in ways which are consistent with environmental requirements and provide the maximum long-term benefit for the State and for Australia; and

(b) to provide water and related resources to meet the needs of water users in a commercial manner consistent with the overall water management policies of the government.

41 *Water Administration Act*, 1986 (NSW), s 12.

42 KJ Langford and BE Foley, 'TWE: Victorian Perspectives' in *Transferability of Water Entitlement: An International Seminar and Workshop Proceedings, July 1990*, Armidale, Centre for Water Policy Research, 1990, JJ Pigram and BP Hooper (eds), 202-3.

43 G Sturgess and M Wright, *Water rights in rural New South Wales: the evolution of a property rights system*, Centre for Independent Studies, Sydney, 1993, 12.

44 Ibid, 11.

45 *Water (Amendment) Act* 1986 inserted Div 4C into Part 2 of the *Water Act* 1912 (NSW). However these amendments only commenced application in 1989. The main reason for the delay was to allow financial institutions to make sure that any mortgage interests they had over land would be secure: see B Cummings ' Water Transfers: the NSW Experience ' in *Transferability of Water Entitlement: An International Seminar and Workshop Proceedings, July 1990*, Armidale, Centre for Water Policy Research, 1990, JJ Pigram and BP Hooper (eds),186.

46 *Water Act* 1912 (NSW) Part 2 Div 4B.

47 M Bond and D Farrier, 'Transferable Water Allocations - Property Right or Shimmering Mirage?', (1996) 13 *Environmental Planning Law Journal* 213, 215.

48 *Water (Permanent Transfer of Water Rights) Regulations* 1991 (Vic), Schedule 5 lists areas and districts mostly in Northern Victoria.

49 *Water (Permanent Transfer of Water Rights) Regulations* 1991 (Vic), ss5 and 7.

50 *Water Act* 1989 (Vic), s 224(4).

51 See the series of undated *Water Notes* prepared by the Land and Water Unit, Goulburn-Murray Water.

52 COAG, *Communique from the Meeting of 25 February 1994*, COAG, Canberra, 1994 and *Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, unpublished paper, February 1994. For a comprehensive review of Australian water policy of the period see H Bjornlund, *Water Trade Policies as a Component of Environmentally Socially and Economically Sustainable Water Use in Rural Southeastern Australia*, PhD Thesis, University of South Australia, 1999. For an analysis of the policy as it relates to Western Australian reform proposals see A Gardner, 'Water Resources Law Reform', (1998) 14 *Environmental and Planning Law Journal*, 377.

53 Further pricing reform required that adequate financial provision be made for refurbishment of assets such as storages and other infrastructure, and that cross-subsidies which currently exist between water users be removed. See *Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, unpublished paper, February 1994.

54 As far as possible, the roles of water resource management, standard setting and regulatory enforcement were to be separated institutionally from service provision. The management of irrigation areas should be devolved to local bodies subject to the establishment of appropriate regulatory framework: ibid.

55 This is named the Ramsar convention after the town where the convention was signed in 1971. For an analysis of the implementation of the Ramsar convention see M Comino, 'The Ramsar Convention in Australia – Improving the Implementation Framework' (1997) 13 *Environmental and Planning Law Journal 89*.

56 'Wetlands' include areas of marsh, fen, peatland or water, whether artificial or natural, permanent or temporary with water that is static or flowing, fresh, brackish or salt. There are not confined to inland areas and may include marine areas which at low tide are covered by waters not over six

metres. See Article 1, Ramsar Convention on Wetlands of International Importance, 1971, (1972) 11 ILM 963.

57 In response to growing concerns over the losses of wetlands, the National Wetlands Program was established by the Commonwealth in 1989. The Program funded the creation of a directory of important wetlands in Australia in 1993, and provides funds for States and Territories to develop management plans and improve management arrangements for Ramsar listed wetlands and others on the directory. For a discussion of 'wise use' and the changing focus of the Ramsar Convention see D Farrier and L Tucker, 'Wise Use of Wetlands under the Ramsar Convention', (2000) 12 *Journal of Environmental Law,* 21.

58 See for example the Stockholm Declaration (1972) 11 ILM 1416, Rio Declaration (1992) 31 ILM 874, the Japan-Australia and China-Australia Migratory Bird Agreements. For a description of these see Fisher, 2000 at chapter 2.

59 World Commission on Environment and Development, *Our Common Future*, Oxford University Press, Oxford, 1987, 41.

60 These actions should include the rehabilitation of polluted and degraded water bodies; protection of groundwater resources; and once again the conservation and protection of wetlands. See generally chapter 18 of Agenda 21.

61 *Intergovernmental Agreement on the Environment*, AGPS, Canberra, 1992, ss 3.4 and 3.5.

62 *Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, unpublished paper, February 1994, para 3.2; and *Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, unpublished paper, February 1995, para 2.

63 The move in April 1995 tied the implementation of water policy to the second tranche of the Commonwealth's National Competition Policy payments. See FG Hilmer, *National Competition Policy: Report of the Independent Committee of Inquiry*, AGPS, Canberra, 1993 commonly referred to as the Hilmer Report and COAG, 1995 above note 47.

64 ARMCANZ, *Water Allocations and Entitlements: A National Framework for the Implementation of Property Rights in Water*, Occasional Paper No 1, Task Force on COAG Water Reform, Canberra, 1995 (hereafter ARMCANZ, 1995).

65 ARMCANZ, 1995, Principle 1.

66 ARMCANZ, 1995, 5.

67 ARMCANZ, 1995, 12.

68 ARMCANZ, 1995, 5.

69 ARMCANZ and ANZECC, *National Principles for the Provision of Water for Ecosystems*, Occasional Paper SWR No 3, Sustainable Land and Water Resources Management Committee, Subcommittee on Water Resources, Canberra, 1996 (hereafter ANZECC, 1996).

70 See ANZECC, 1996, Principles 4 to 6.

71 *Water Act* 2000 (Qld) ss 10,11; *Water Management Act* 2000 (NSW) s 3.

72 *Water Act* 2000 (Qld) s 10(3).

73 Other chapters of the Act, for example Chapter 3 which deals with infrastructure and sewerage services have different purposes and do not refer to sustainable management. *Water Act* 2000 (Qld) s 361 sets out the purpose of Chapter 3.

74 *Water Management Act* 2000 (NSW) s 3.

75 *Water Management Act* 2000 (NSW) s 5(3).

76 *Water Management Act* 2000 (NSW) s 52.

77 *Water Management Act* 2000 (NSW) s 53.

78 *Water Management Act* 2000 (NSW) s 55.

79 *Water Act* 1989 (Vic) s 1.

80 *Water Act* 1989 (Vic) s 8.

81 *Water Act* 2000 (Qld) ss 46(1)(e) and 46(3)(a). Ecological outcome is defined as 'a consequence for an ecosystem in its component parts specified for aquifers, drainage basins, catchments, subcatchments and watercourses': schedule 4.

82 *Water Act* 2000 (Qld) ss 41, 47.

83 *Water Act* 2000 (Qld) s 39(c) and Water Management Act 2000 (NSW)

84 *Water Act* 2000 (Qld) ss 49, 50.

85 *Water Act* 2000 (Qld) s 46(3)(b).

86 *Water Act* 2000 (Qld) schedule 4.

87 *Water Act* 2000 (Qld) s 128(1)(e).

88 *Water Act* 2000 (Qld) s 55(3).

89 The new Act uses the word 'rights' only in reference to state and basic landholder rights. All other users obtain 'licences', denoting that their interests, although tradable, are ranked lower than the two rights. The licences are generally issued for a period of 15 years: *Water Management Act* 2000 (NSW) s 69(1)(a). Local and major water utility access licences are issued for 20 years and regulated river (supplementary water) access licences are issued for the term of the associated access licence: ss 69(1)(b) and (c) and 70.

90 *Water Management Act* 2000 (NSW) s 56(5).

91 *Water Management Act* 2000 (NSW) s 43.

92 *Water Management Act* 2000 (NSW) ss 38-9.

93 *Water Management Act* 2000 (NSW) s 44.

94 See for example list of Lachlan River Management Committee furnished by DLWC Forbes, November 1999 to the writer.

95 *Water Management Act* 2000 (NSW) ss 12 and 13.

96 *Water Management Act* 2000 (NSW) s 13(1)(g).

97 *Water Resources Act* 1997 (SA) s 90. The 1995 plan was adopted at the commencement of the Act and a new State Water Plan was made in 1999.

98 *Water Resources Act* 1997 (SA) s 91.

99 *Water Resources Act* 1997 (SA) s 92.

100 *Water Resources Act* 1997 (SA) s 92(4).

101 *Water Resources Act* 1997 (SA) s 7(5) provides that water may be taken without a license for those purposes by an occupier of land from a river flowing through the land, or a lake or well on the land, or from surface water flowing over land which they occupy.

102 *Water Resources Act* 1997 (SA) s 8.

103 *Water Resources Act* 1997 (SA) s 9(1). Examples of prescribed water resources are the River Murray, parts of Morambro Creek and its catchment.

104 *Water Resources Act* 1997 (SA) s 50(2)(a). This person will be the presiding member of the Water Resources Council.

105 *Water Resources Act* 1997 (SA) s 50(4).

106 NSW in 1995 also started to reform bulk licences for irrigation areas and districts.

107 *Bulk Entitlement (Eildon-Goulburn) Conversion Order* 1995, cl 4. The probability is dependent on computer models of hydrological conditions and information collected over a period of time. The more data and the longer the collection period, the more accurate the model.

108 *Water Act* 1989 (Vic), s 43. If it is by share of storage, then the amount of water is to be further quantified by reference to further matters such as the share of inflow to the storage,

volumetric share of releases, seepage and evaporative loss adjustments, and the share of the water remaining in the storage after heavy inflow causes the water in the storage to spill over.

109 *Water Act* 1989 (Vic), s 40.

110 *Water Act* 1989 (Vic), s 64A.

111 *Water (Irrigation Farm Dams) Bill* 2001, s 10 which provides for a new Division 3 to the principal Act.

112 For example it is argued that the environmental flow objectives were drafted to accommodate the proposed storage development and failed to protect the health of ecosystems: see the analysis of Queensland's first two Water Resource Plans by FC Coffey, 'Assessment of Water Resource Plans under the Water Act 2000 (Qld): Ecological Outcomes and Environmental Flow Objectives in the Context of the Precautionary Principle and Sustainable Management,' (2001) 18 *Environmental and Planning Law Journal* 410.

113 Plans in transition such as the Condamine and the Burnett have been deemed to comply with most of the process for preparation of a plan set out in Chapter 2 of the Act. Hence technical reports and documents that were to be part of the safeguards of the planning process are waived and public participation jeopardised. Transitional provisions for the Border Rivers, Burnett, and Condamine-Balonne WRPs may give priority to persons already using their licences and those who had built dams to collect overland flows by specified cut-off dates in 2000. *Water Act* 2000 (Qld) ss 1042 and 1043.

114 See second reading speech and debate over the *Water Infrastructure Development (Burnett Basin) Amendment Bill, Queensland Hansard*, 12 December 2001.

115 As above. See also mixed reaction by the community in S Ryan, 'Paradise Lost?', Courier Mail, 7 January 2002.

116 Since 1993, Barmah-Millewa Forest has an annual environmental allocation of 100 thousand ML, half provided by NSW and half by Victoria. This allocation is made under the Murray Darling Basin Initiative and in 1999 Victoria recommended that the increase be made out of Victoria's share of Murray water: see Murray Water Entitlement Committee, *Sharing the Murray- Proposal for defining people's entitlement to Victoria's water from the Murray*, Melbourne, 1997.

117 See C Gippel, 'Managing regulated rivers for environmental values: selected case studies from Southeastern Australia' in SO Brizga and BL Finlayson (eds), *River Management: the Australasian Experience*, John Wiley and Sons, London, 1999 and PL Tan, 'Irrigators come first: conversion of existing allocations to bulk entitlements in the Goulburn and Murray Catchments, Victoria' (2001) 18 *Environmental and Planning Law Journal* 154.

118 *Water Management Act* 2000 (NSW), s 8.

119 Second reading speech, The Hon R Amery, *NSW Legislative Assembly, Hansard*, 22 June 2000 (http:www.parliament.nsw.gov.au/prod/l (1 November 2001)

120 *Water Act* 2000 (Qld) s 47(c).

121 See Murray-Darling Basin Agreement, Schedule E - Interstate Transfer of Water Allocation. For details see: http://www.mdbc.gov.au/naturalresources/policies_strategies/projectscreens/pilot_watertrade.htm

(31 October 2001).

122 In Queensland transfers for less than one season, called seasonal water assignments, fall into a different category and need less scrutiny, *Water Act* 2000 (Qld) ss 230-236.

123 *Water Act* 2000 (Qld), s 129.

124 *Water Act* 2000 (Qld), s 134.

125 *Water Act* 2000 (Qld), s 223.

126 *Water Regulation* 2000 (Qld), s 5(2).

127 *Water Act* 1989 (Vic) s 228.

128 For example in South Australia the relevant legislation is *Development Act* 1993, *Environment Protection Act* 1993, *Native Vegetation Act* 1991, *Local Government Act* 1999, *Soil Conservation and Landcare Act* 1989.

129 The only State with heritage river protection is Victoria: *Heritage Rivers Act* 1992.

130 Finalisation of these plans have been slow so the protection so far is largely nominal. See M Maher, J Nevill and P Nicols, *Improving the legislative basis for river management in Australia - Stage 2 Report*, Draft Report for the Land and Water Australia, August 2001, Appendix A

131 *Water Act* 1989 (Vic) ss 40(ja), 35.

132 *Reform of Commonwealth Environmental Legislation – Consultation Paper*, Commonwealth Department of the Environment, Canberra, 1998, 3, cited in Fisher, 52. The legislation includes *Environment Protection (Impact of Proposals) Act 1*974, *Endangered Species Protection Act* 1992, *National Parks and Wildlife Conservation Act* 1975, *World Heritage Properties Conservation Act* 1983, *Whale Protection Act* 1980.

133 See L Ogle, 'The Environment Protection and Biodiversity Conservation Act 1999 (Cth): How workable is it?' (2000) 17 *Environmental and Planning Law Journal*, 468.

134 The external affairs power of the Commonwealth is found in the Constitution s 51(xxix). This gives power to the Federal Parliament to make law implementing an international treaty or convention. For further reading see J Crawford, 'The Constitution and the Environment' (1991) 13 Syd LR 11.

135 In the first decision made under the Act in *Booth v Bosworth*, [2001] FCA 1453, the Federal Court accepted the argument that the spectacled flying fox was a species that contributed to the character of the Wet Tropics World Heritage Area as one of the 'most significant regional ecosystems of the world'. The defendant's actions in operating an electrical grid to electrocute these flying foxes which ate fruit of his lychee orchard located next to the Heritage Area, would therefore render the species endangered in the next five years and had to be restrained.

136 A Ramsar wetland is defined under the EPBC as an Australian wetland on the List of Wetlands of International Importance kept under the Ramsar convention, or a wetland thus declared by the Commonwealth Environment Minister: s 17 *Environment Protection and Biodiversity Conservation Act* 1999 (Cth).

137 See L Ogle, 'The Environment Protection and Biodiversity Conservation Act 1999 (Cth): How workable is it?' (2000) 17 *Environmental and Planning Law Journal*, 468.

138 *Water Resources Act* 1997 (SA), ss 7 and 8; *Water Act* 2000 (Qld), s 19.

139 See A Cassar, 'A critical evaluation of existing legal regimes for the protection and management of groundwater' (2000) 17 *Environmental and Planning Law Journal* 406.

140 *Australian Water Resources Assessment 2000*, National Land and Water Resources Audit, Canberra, 2001, 77.

141 For an explanation of the susceptibility of this and other rural issues to politicisation, see section 3.1.1 of the companion issues paper to this one: L Frost, I Reeve, R.Stayner and J McNeill, 'Issues Paper No 3: Issues in Regional Development' Report to Murray-Darling Basin Commission, Institute for Rural Futures, University of New England,

Armidale, 2002.

142 *Water Act* 2000 (Qld) is not clear on this, but see s 128(1)(e).

143 Water Audit, 1995, 29

144 See *Bulk Entitlement Order (Kyabram) Conversion Order* 1995 (Vic) cl 7.

145 See *Bulk Entitlement Order (Eildon-Goulburn Weir) Conversion Order* 1995 (Vic) schedule 4.

146 J Nevill, 'Freshwater diversity: Protecting freshwater ecoystems in the face of infrastructure development', http://www.netspace.net.au/~jnevill/freshwater-a.htm (11 November 2001).

147 ARMCANZ and ANZECC, *National Principles for the provision of water for ecosystems*, Occasional Paper SWR No 3, Canberra, Commonwealth of Australia, 1996, 10.

148 See section 6.2.1 of the companion report to this issues paper: I Reeve, L Frost, W Musgrave, and R Stayner, *Overview Report, Agricultural and Natural Resource Management in the Murray-Darling Commission. A Policy History and Analysis*, Institute for Rural Futures, University of New England, Armidale, 2002.

149 An American environmental litigator makes this conclusion from her experiences in recent US cases: see KL Boyles, 'Making the Case for Enforceable Standards' (1998) 13 *Journal of Environmental Law and Litigation 1*, 12.

150 See this author's article at note 116 above and the references therein.

151 There has been acknowledgement of this need but no action taken in Victoria. Cf NSW which is to make regulations for transfer principles for trade in consumptive licences and entitlements: *Water Management Act* 2000 (NSW) s 71.

152 Two exemptions from freedom of information obligations are frequently encountered. They are (1) that the information is commercial-in-confidence, and this is a hurdle which is likely to increase as more private enterprise gets involved in water supply and management functions; and (2) that documents could prejudice the confidentiality of Cabinet considerations or operations. The second reason was furnished for refusing the FOI application of the Queensland Conservation Council for key documents regarding the decision to build Paradise Dam on the Burnett River, Queensland. See K O'Conor, 'The Politics and fast-tracking of Paradise Dam: A synopsis', Queensland Conservation Council, unpublished letter, 17 October 2001.

153 Court decisions in adjudication of water rights in Colorado typically use that form of words for instream flows. See L Potter, 'The Public's Role in the Acquisition and Enforcement of Instream Flows,' in LJ MacDonnell, TA Rice and SJ Shupe (eds), *Instream Flow Protection in the West,* Natural Resources Law Centre, Colorado, 1989 at p 49.

154 See for example *Water Management Act* 2000 (NSW) ss 62, 93 and 129 and *Water Act* 2000 (Qld) ss 132, 134, 208, 851, 863 and 87.

155 *Water Management Act* 2000 (NSW) s 336.

156 *Water Act* 2000 (Qld) s 784(1)(a).

157 Commonwealth Constitution s 51 (xxxi).

158 See for example, *Water Resources Act* 1989 (Qld) s 44(1)(f).

159 See *Sharing the Water Resources on Unregulated Rivers: Adding Value to the Natural Assets of NSW*, Sydney, DLWC, 1999, 15.

160 While total access allowed under existing licences amounts to 460 gigalitres a year, sustainable use is estimated at 215 gigalitres a year: The Hon R Amery, Minister for Agriculture and Minister for Land and Water Resources, Media Release, 21 August, 2001.

161 L Bull, 'Irrigator anger bubbling over', *The Land,* 13 September 2001.

162 In 1996 an Independent Audit Group in its report to the Murray-Darling Ministerial Council recommended a heirarchy of rights in order to create a basis for a coherent and impartial assessment of the equity issues arising within and between States. The hierarchy was developed on the basis of two principles. First, those with formal access rights to water should be given precedence over informal forms of access (such as off-allocation and sales water); and secondly, those with a history of use should have precedence over those without: Murray-Darling Basin Ministerial Council, *Setting the Cap: Report of the Independent Audit Group*, MDBMC, Canberra, 1996, 4 and Appendix G, 60.

163 The Hon R Amery, Minister for Agriculture and Minister for Land and Water Resources, Media Release, 21 August, 2001.

164 *Water Act* 2000 (Qld) ss 984-992. For discussion on compensation issues see PL Tan 'Water licences and property rights: the legal principles of compensation in Queensland', (1999) 16 *Environmental and Planning Law Journal* 284.

Water Entitlements & Property Rights:
An economic perspective *

Paper by John Marsden

Marsden Jacob Associates
Financial & Economic Consultants

Level 3, 683 Burke Road, Camberwell, Victoria 3124
Telephone: (03) 9882 1600 Facsimile: (03) 9882 1300
Email: economists@marsdenjacob.com.au

* This paper is an edited version of a paper presented to the 4th Australasian Water Law and Policy Conference, 24/25 October 2002, Sydney.

Abstract

In the past decade Australian governments have reformed water legislation, capped the growth of extractive water use in major systems and introduced planning mechanisms to reduce over-exploitation and environmental deterioration. The most ambitious of these initiatives is the decision of the M-DBMC to explore options to lift substantially flows available to the River Murray.

These initiatives have raised basic questions about the nature of the underlying property rights.

From an economic perspective, all property right regimes should be defined to be welfare maximising. Optimal regimes therefore differ from situation to situation because underlying benefits and costs vary.

To provide certainty, legislation and legal precedent act to codify property right regimes at particular points of time.

Water and fisheries are common pool resources for which community welfare is typically best served by common property right regimes with access rights held by private individuals under adaptive conditions; rather than outright private or public property.

The paper reviews and defines criteria to characterise water right regimes and very briefly compares the spectrum provided by Chile, Australia and South Africa.

Introduction

In the 20 or so years since the first paper on property entitlements and tradeable water was published in an Australian journal, pre-existing understandings on water rights and entitlements have been disrupted and challenged.[1]

Triggers to the current debate and its intensity include:

- the agreement specified in the CoAG Water Reform Framework that:
  - *State government members of the Council would implement comprehensive systems of water allocations or entitlements backed by the separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quantity*
  - *where they have not already done so, States, would give priority to formally determining allocations to water, including allocations for the environment as a legitimate user of water.* [2]

  Progress in implementing this reform is an assessable item by the National Competition Council for NCP tranche payments to the States.
- separation and trade in water[3] which have triggered concerns and misgivings in affected regional communities;
- the inclusion or strengthening of environmental objectives in the respective water Acts across the States and the resulting reduction in the probabilities that Ministerial discretion will be exercised (as it had been traditionally) in favour of the irrigators and irrigated development. All states, other than Victoria, have enacted major new water legislation in the past decade;[4]
- recognition by the Murray-Darling Basin Ministerial Council that the continued growth in consumptive diversion was unsustainable and the consequential imposition of a Cap on this growth;[5, 6]
- successive years of drought coinciding with the introduction of the Cap, with the result that irrigators became doubly aware during the second half of the 1990s of the constraints on allowed diversions and the sharpened distinction between nominal and effective entitlements;[7]
- the rapid growth in trade - overwhelmingly in temporary (ie., within season) transfers. The upside of this trade is that those selling gain cash while those buying can underpin or extend their production.[8]

However, the downside is that third parties who previously benefited by being able to use freely the unused water of others have had to enter the market - often on a very substantial scale - simply to maintain existing levels of production.[9] In economic terms, this may be defined simply as a "transfer" but the political reality is different;

- the recent Corowa Communique by the Water Ministers that the MDBC will systematically explore the options and strategies for retrieving consumptive water in order to increase environmental flows in the River Murray system;[10] and
- the increasing awareness by the urban electorate of some of the more sensitive issues and examples in the debate between consumptive use and environmental sustainability.[11]

As a consequence

- some irrigators are questioning the nature of water rights and entitlements, asserting a private property interpretation and questioning existing institutional arrangements;
- secured lenders have become increasingly concerned - in part because the transition from the old to new regimes raises several risks for them but also because the old regime was not what they had perceived it to be; and
- there is the risk of a crisis of confidence in investment in irrigated agriculture as drought and falling commodity prices coincide with fears and concerns of the water rights and entitlements.[12]

Australian Systems of Water Entitlements / Allocations

Under the Australian constitution, the States are responsible for water, with the Commonwealth being specifically prohibited from having a direct role in water management by Section 100.

> *The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation.*

Commonwealth Ministers have recently become actively involved, in part to address the concerns of their constituents. Since the Commonwealth does not have direct responsibility in the area of water, it must use other devices to exert influence on the states. These include the Council of Australian Governments (COAG) and National Competition Policy.

Current Australian systems of water right entitlements and allocation are essentially variations on a theme - despite sometimes annoying differences in terminology.[13] These administrative systems allow some degree of user and community participation through planning and consultation processes.

With the exception of the Northern Territory, rights to water are not owned by the Crown, but rather, vested for the purposes of management. Rights to access and use the resource are then granted by the State to individual users with a hierarchy of entitlements ranging from high security entitlements to lower security entitlements.

All of this is well known.

What's In the Bundle

The traditional high security entitlement entitles the landholder to, at least:

- a nominated volume of water subject to seasonal availability and reliabilities;
- delivery of water via channels, community pumps or the rivers at locally agreed frequencies; and
- the right to use the water on the landholder's property.

Until 1997, all States granted a single entitlement, bundling together all main elements/characteristics. These bundled systems of rights/entitlements are probably efficient where all irrigators have the same/similar service and demands, water is tied to land, there is no concern over the suitability of any type of land for the purposes of irrigation or over the sustainability of irrigation practices, and there is no explicit or implied allowance to discharge salt as a result of irrigation. None of these pre-requisites continue to hold.

As a result, three of the four States in the Murray-Darling system have now separated the site use right. In Victoria, leading thinkers also agree that such a separation is desirable.

> *it is worth noting that checks and approvals before or at the point of a trade, cannot easily achieve **continuing** control of site-use matters, such as use of groundwater, or irrigation and drainage practices. This is another argument for separating out site-use permits, and making them independent of water entitlements and water trading.*[14]

The separation of site use rights/licences from the water entitlement itself is simply one of many potential unbundlings. A Victorian water right includes:[15]

- a volumetric entitlement with specified reliability;
- the right to take lower reliability sales water;
- rights to locally determined service levels;

} explicit

- rights to channel delivery capacity;
- rights to river delivery capacity for bulk water; and
- rights to salt disposal.

} implicit

Ownership of land also contains implicit rights or entitlements to water. These include:

- a right to harvest water up to certain limits;
- the right to grow trees and ;
- riparian, i.e., stock and domestic, access.

The unbundling of individual elements of a contract, licence or property right allows separate decisions to be made on the use or conservation of each component. In a frictionless world - devoid of transaction costs, third party interests and externalities - efficiency would be promoted by

unbundling all elements. However, the real world is full of transaction costs and the concerns of third party interests.

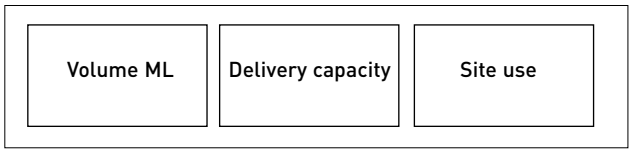
When individual decisions to use and/or trade can be taken separately on each element the dynamics of and costs of measures for third party protection are changed. This consequence was not adequately foreseen in some of the Australian jurisdictions. This is particularly obvious in the current difficulties that banks and other secured lenders face in the adequacy and costs of registries and protocols required to maintain adequate security in the face of separated titles. As a result, the need for and extent of further 'unbundling' should not be uniform.

The legislative framework should allow and facilitate the opportunity to split the entitlement for the purpose of trade into components, leaving decisions to split the component rights to be made following examination of the benefits and costs of that step for individual systems.

Different States have made different decisions on specific unbundling (Chart 1) but none have introduced generic provisions to facilitate tailored unbundling in local areas.

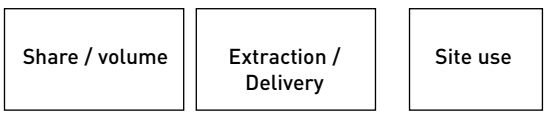
Chart 1 : Comparison on Unbundling in State Legislation

Traditional bundled water right (Victoria)



SA legislative specification

Unbundled NSW specification



Access Rights To Water ...

As noted, in all Australian States, water is vested in the Crown for the purposes of management and conservation. Access rights to use the water are then granted by the respective States.

These rights meet the standard definition of a tradeable permit.

> *Tradable permits address the commons problem by rationing access to the resource and privatizing the resulting access rights. The first step involves setting a limit on user access to the resource. ... For water supply it would involve the amount of water that could be extracted. ... This limit defines the aggregate amount of access to the resource that is authorized. These access rights are then allocated on some basis (to be described) to potential individual users. Depending on the specific system, these rights may be transferable to other users and/or bankable for future use. Users who exceed limits imposed by the rights they hold face penalties up to and including the loss of the right to participate.*[16]

Initially Australian rights were not tradeable, nor was the volume of access rights capped.

By the mid-1990s, both NSW and Victoria had followed the earlier South Australian initiative and stopped granting new licences. In 1994 all three States agreed to cap growth in consumptive diversions in the Murray-Darling system. This second step was achieved not by legislative change but by the voluntary agreements of NSW, Victoria and South Australia to cede some of their sovereignty and legislated rights.

Water entitlements in Australia have traditionally been and remain access rights. Access rights to water now exhibit the standard characteristics of a tradeable environment allowance designed to promote trade and investment. That is, the access right is:

- protected since the aggregate volume of allowed take/diversions is capped;
- tradeable to at least other irrigators;
- divisible into smaller parcels for ownership and use;
- separated from land title;
- holdable at least in principle by non-irrigators; and
- subject to separate registry and trading arrangements and protocols.

… with extras & Attenuations

However, Australian water entitlements involve more since they are nested in a wider framework with extensive features to:

- protect third party consumptive users. This protection is provided via the protocols on delivery, use and carry over and in the rules for transfer and trade. These protocols and rules vary non-randomly. They are essentially tailored, relating to the State, specific areas and districts, valleys and sometimes reaches;
- protect and sustain the riverine environment. During the 1990s, increasingly comprehensive planning frameworks have been developed. In NSW at least, these have lowered allowable consumptive use to below Cap levels;
- allow adaptive management of consumptive use and environmental flows over time. Thus, the river/water management plans of NSW, Queensland and SA stipulate regular periodic reviews; and
- protect the land and water resource base. Rice and cotton environmental policies, EPA licensing land and water management plans and codes of practice all condition and restrain the ability to use water.

Thus, the Australian States have chosen to improve the specification of tradeable water entitlements (TWE) by rejecting the simple stylised form of TWE which might most facilitate trade (and possibly short-term investment) in favour of a more conditioned and attenuated entitlement that also addresses other key objectives.

The Australian systems of water entitlements are therefore hybrid systems which attenuate the otherwise textbook access rights.

Divergent Views

Not surprisingly, there is also considerable tension and divergence of views on these attenuations. For instance,

- there is strong support to promote trading to facilitate the movement of water to higher value uses, i.e., *"out of rice and into high value horticulture."* Supporters of this view tend to be impatient of variation in terminology across States and the variation in rules and protocols (i.e., attenuations) since this variation serves to reduce confidence that people know what they are trading and to fragment an already shallow market;
- in the opposite direction, there is also wide support for stronger protection of local communities and individuals who fear that trade will further decimate regional towns and strand irrigation, processing and community infrastructure.

  Systematic surveys by both Professor John Tisdell and CSIRO demonstrate at best an ambivalence toward trade among most irrigation communities who see trade (and other CoAG reforms initiatives) as a further attack on their strongly held values of equity, fairness and sharing.[17] Regional irrigation leaders make the same point strenuously;[18] and
- environmentalists support the development and implementation of river/water management plans but are frustrated by what they see as increasingly detailed requirements for socio-economic analysis which slow the process and reinforce the status quo. On the other hand, they are critical of the highly effective land and water management plans being implemented by the NSW irrigation corporations, primarily because these plans were developed on a business basis rather than an open community basis. (Quite possibly, the business basis explains why these particular plans have been identified as being the most highly effective.)[19]

However, the most critical differences are now focussed on the tradeoffs between:

- the certainty of the content of the title, ie., the fixity of the attenuations and conditions on the one hand and, on the other hand,[20]
- flexibility/adaptive management, i.e., the capacity, appetite and mechanisms to adjust Australian systems of water entitlements and allocations to reflect better information and knowledge including changes in natural processes.

We need a framework with which to understand and assess these tradeoffs.

Looking Forward

Our purpose here is to examine how water entitlements should be defined from a public policy perspective and how this definition is impacted by circumstances. Thus we take a rather different perspective from the lawyer who is asked *"what can we do legally"* or the parliamentary draftsman who is asked how policy intent can be best put into effect.

Multiple Objectives

From a public policy perspective, we need to identify the best method of allocating and managing water. That is, we need to define the system/regime of access rights to water which best:

i) allows **efficient and profitable use** of the resource. This objective applies also to land and other production inputs generally and requires consideration of separation and security of title, details of registry arrangements, universality and so on.

Of the 51 national principles for water trading identified for the High Level Steering Group of SCARM/ARMCANZ, a total of 39 related to the definition and form of the entitlement to water;

ii) recognises and manages relevant **third party effects and externalities**. This objective applies to most network systems where end of system users may be adversely impacted by upstream users. It raises issues such as the comprehensiveness and strength of planning controls, the quality of registry arrangements from the perspective of secured lenders, and the thoroughness and efficiency of the vetting and approval processes;

iii) reflects the limits imposed by **seasonal variability**. This objective applies to water resources regardless of any environmental objective. In the Australian case this relates to the quality and protocols of the initial seasonal allocation announcements and subsequent update;

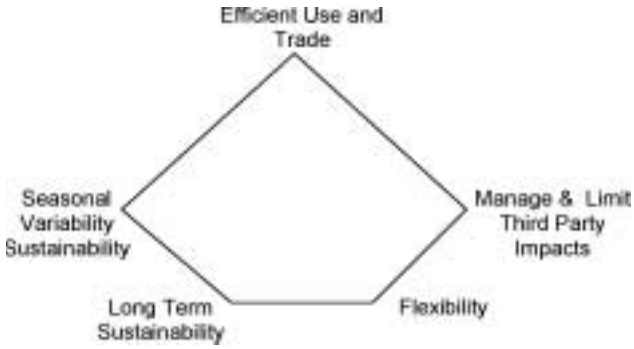
iv) ensures **long-term sustainability of the resource** and the related environment(s). This objective reflects the common pool characteristics of water resources; and

v) allows **flexibility**, i.e., adaptive management, to change allocative arrangements to optimise changing circumstances. Flexibility raises issues on the effectiveness and comprehensiveness of the agreed adaptive processes and the nesting of these processes in decision trees and in the institutional arrangements.

We note the last criterion was not explicitly recognised in the CoAG Water Reform Framework.

Our objective statement therefore contains multiple objectives (Chart 2).

Chart 2 : Design Criteria For Access Rights to a Common Pool Resource



With five different major criteria to satisfy it is obvious that there must be tradeoffs. For instance, (as discussed below) there is a conflict between the need to keep access rights very simple and securely defined in order to promote trade and dollar returns, and the need to limit and manage third party effects or the need to ensure environmental sustainability in complex eco-systems. As noted, typically, different parties will have quite different perceptions of these tradeoffs.

A second implication is that "best" must be defined in context. This follows from the fact that there are multiple criteria and that the situation regarding any one of them is rarely uniform (Chart 3). As a result, the best approach to allocating water rights/entitlements is unlikely to be fixed over time and may not be uniform at any point of time.

Moreover, this means that flexibility, i.e., the ability to adapt arrangements as underlying conditions changes is desirable and therefore an important design criteria in its own right.

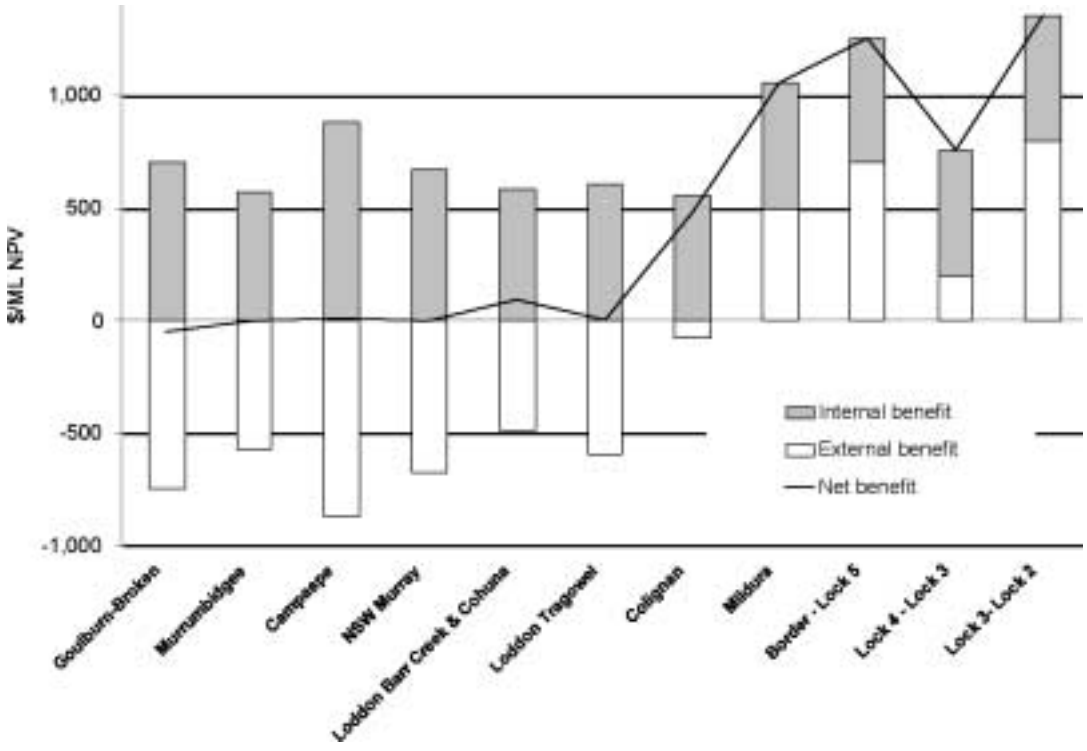
Change (or adaption) itself involves costs. Since we already have allocation systems in place, we therefore need to examine transitional issues and costs and what is required to effect any otherwise desired changes. If those issues and costs are sufficiently large and important then they need to be reflected in the definition of best method.

Chart 3: "Best" Allocation of Transmission and Efficiency Losses

A neat and topical example of how the "best" allocation of rights and entitlements is determined *inter alia* by the size and direction of externalities - or at least our understanding of them - is provided by the assignment of rights to transmission and efficiency losses.

In the early 1990s, all transmission losses from the canal system were considered to be bad for both downstream irrigators and the riverine environment because they contributed to rising water tables and salinity. To provide the then future irrigation corporations with the incentive to reduce losses in canal systems, the decision was made that these losses should be assigned to the stakeholders of the irrigation corporations and included in the corporation's bulk licences. (The bulk licences are, however, net extractions which exclude clean water volumes released into major nominated outfalls.) Thus, the NSW irrigation corporations have an incentive to reduce transmission losses and substantial reductions have been achieved.

And the trouble with this? Recent field analysis and research indicates that a significant but variable part of transmission losses and poor water use efficiency may be in fact good for both downstream irrigators and the riverine environment. Worse, the available evidence is that goodness or badness of transmission losses and poor water use efficiency varies according to location in the catchment.



Source : ABARE

As a result, the optimal assignment of ownership of losses seems likely to differ according to the position of those losses in the catchment. Moreover, the existing assignment can now been seen as providing a further commercial incentive to disadvantage downstream irrigators and the environment. It is extremely unlikely that there is flexibility to reverse this incentive by reassigning the right/entitlements. However, the example does illustrate:

- the dependence of the optimal assignment and arrangements on the current (or incorrect) understanding of the situation; and
- the need for governments and their advisors to now approach the questions of transmission losses and water use efficiency on-farm with a rather higher level of sophistication and understanding.

Achieving Flexibility/ Adaptive Management

As noted, the most critical area of debate surrounding Australian water entitlements is the flexibility, i.e., the capacity, appetite and mechanisms to adjust Australian systems of water entitlements and allocations to reflect better information and knowledge including changes in natural processes.

A major trigger for irrigator concerns over property rights has been the introduction in NSW of Water Sharing Plans and the restriction of compensation to changes which occur within the tenor of the plans. This mechanism effectively provides for a new set of conditions for each form of entitlement to be issued to coincide with the commencement of each plan.

The fact that this mechanism has previously been employed in fisheries and is well acknowledged in the international literature has been of little relevance to the State's irrigators.

The NSW Government had initially considered setting a five-year period for the Water Sharing Plans but moved to 10 years to give irrigators greater certainty. However, lengthening the period of the water sharing plans may not give either irrigators or their secured lenders the perceived benefits since uncertainty increases as the period of the plan expires. At the end of one year, there is the comfort that there will be no changes in allocation for nine years, but conversely ...

A more appropriate mechanism may be to require the States to apply the principle of continuous disclosure which would allow investors and secured lenders to reassess risks and credit limits on a regular basis as they do in the business sector.

Issues relating to the nature of the entitlement and the ability to achieve flexibility to ensure optimal long-term outcomes for the resource, both for commercial and environmental purposes, are not of course limited to Australia, nor are they limited to natural resources.

Any policy decision taken on the nature of the water entitlements/allocations (and the ability to change the nominated or effective volumes/shares allocated to individual with/without triggering compensation) would appear to have direct implications for fisheries and forestry and, to a lesser extent, radio frequency spectrum licences.

The North American experience suggests compromise rather than clear, but extreme, outcomes.

A particularly useful reference and collection of papers is provided by the very recently released book "The Drama of the Commons" edited by Ostrom and others and containing papers, inter alia, by Tietenberg. Since Tietenberg was a principal influence upon the design of the US tradeable permit system for sulphur dioxide abatement, and one of the most respected authorities on tradeable permits, his observations on the legal nature of entitlements, set out below, are therefore very relevant:

1. Although the popular literature frequently refers to the tradable permit approach as "privatizing the resource" (Spulber and Sabbaghi, 1993; Anderson, 1995), in most cases it doesn't actually do that. One compelling reason in the United States why tradable permits do not privatize these resources is because that could be found to violate the well-established public trust doctrine." This common law doctrine suggests that certain resources belong to the public and that the government holds them in trust for the public; they can't be given away.
2. Economists have argued consistently that tradable permits should be treated as secure property rights to protect the incentive to invest in the resource. Confiscation of rights could undermine the entire process.
3. The environmental community, on the other hand, has argued just as consistently that the air, water, and fish belong to the people and, as a matter of ethics, they should not become private property (Kelman, 1981). In this view, no end could justify the transfer of a community right into a private one (McCay, 1998).
4. The practical resolution of this conflict has been to attempt to give adequate" (as opposed to complete) security to the permit holders, while making it clear that permits are not property rights. For example, according to the title of the U.S. Clean Air Act dealing with the sulfur allowance program: An allowance under this title is a limited authorization to emit sulfur dioxide. ... Such allowance does not constitute a property right" (104 Stat. 2591).
5. In practice this means that administrators are expected to recognize the security needed to protect investments by not arbitrarily confiscating rights. They do not, however, give up their ability to change control requirements as the need

arises. In particular, they will not be inhibited by the need to pay compensation for withdrawing a portion of the authorization to emit as they would if allowances were accorded full property right status. It is a somewhat uneasy compromise, but it seems to have worked.[21]

This compromise has been considered both by the Productivity Commission in its review of radio frequency spectrum[22] and in the High Level Steering Group report on National Principles for Water Trading.[23] Neither final report has been released but the NCC quoted extensively from the latter document in its 2001 tranche assessment. Of direct relevance are the conclusions that:

> *Water entitlements should be treated as equivalent to a 'lease in perpetuity', balancing the desire of water users for a secure property right and the needs of the community for adaptive management of natural resources.*

and

> *The holder is entitled to continuing access to the entitlement but the reliabilities and other parameters may be amended.*
>
> - *Users should be given the opportunity to play a responsible role in reviewing and amending conditions.*
> - *The approach and triggers for reviewing conditions applicable should be clearly specified.*
> - *Compensation may be payable, for instance, where reductions in reliabilities and other relevant parameters are capricious or disproportionate.*

With the benefit of hindsight, this latter principle should perhaps have referred to financial assistance, which is consistent with the concept of a "lease in perpetuity", rather than compensation, which is consistent with the full private property view.[24]

With this amendment, we are still forced to consider the practical meanings of "capricious" and "disproportionate".

Capricious here is intended to refer to process, natural justice and soundness of reasons for change.

Disproportionate relates to the size of change and the ability of those affected to adjust to it.

I believe there is little doubt that the scale of the volume of water that would need to be retrieved to ensure a healthy, working river system in the Murray is likely to involve major non-incremental changes. By definition, such major non-incremental changes are likely to exceed the capacity of many irrigators and their communities to adjust and adapt. Consequently, willingness to discuss financial assistance and other structural adjustment assistance should not be seen as an impediment to move towards a healthy river system. Rather, it should be seen as facilitating and empowering.

Criteria for Assessing Systems for Water Entitlements

Australian governments and their agencies are currently examining systems of water entitlements. In this examination their reviews need to reflect the multiple objectives which systems of water entitlements are required to deliver. There is a danger that the criteria will focus too narrowly on one objective or another. For instance, the Productivity Commission's international benchmarking review[25] appears to focus its benchmarking yardsticks heavily on the trade and investment objective. There is no mention of the flexibility objective.

The promotion of trade and investment in water offers huge benefits. Marsden Jacob (1999) estimated that as early as 1997-98 permanent and temporary trade in NSW increased the value of irrigated production by around $65 million a year.[26] Estimates for north-east Victoria are of similar magnitude.

However, the promotion of trade and investment is but one of five objectives to be considered when assessing and defining the best system of access rights to water.

Comparison Across Jursdictions

I have been asked by the conference organisers to comment on differences between Australian and overseas regimes. This is a major topic in its own right ... however.

Chart 4 provides a very brief comparison of the South African, Australian and Chilean systems of water entitlements. All three begin by vesting the water in the Crown or State and then allocating access rights. The South African and Chilean regimes provide a striking contrast in terms of the choice of tradeoff between the advantages and certainty of an unattenuated private title to the access right and the objective of flexibility/adaptive management. At one end of the spectrum we have:

- the Chilean case where these access rights are clearly established as private property by both the Water Code and constitutional guarantee; [27]

and at the other end of the spectrum,

- the South African case where the access rights are the antithesis of compensatable private property. They must be reviewed every five years and can be removed for environmental or socio-economic reasons without compensation.

Australia currently lies somewhere between these two extreme ends of the spectrum.

A key difference between Chile and Australia appears to be the failure of the Chilean system to establish explicit powers to establish caps or limitations on extractions. What is clear, however, is that the practical decisions under the Chilean regime are to condition and qualify the private rights to the maximum of the limited extent possible.

Similar convergence to the mean is reported in the western states of America where the needs for environmental flows and conservation are being injected to over-ride or at least supplement the traditional Prior Appropriation doctrine.[28]

Comparison of the Chilean regime with the western United States indicates:[29]

- both countries provide constitutional protections against taking private property without compensation;
- in line with Australia and South Africa, both countries distinguish between state ownership of the water itself and ownership of the access rights to water;

Chart 4 : Brief Comparison across Jurisdictions

Aspect/Issue	South Africa	Australia (NSW, SA & Vic)	Chile
Tenure of licence	Varying tenure with maximum duration of 40 years	NSW:15 years Vic:mixed – limited & perpetual SA:perpetual	Perpetual
Fixity of conditions (Indefeasibility)	Large ministerial discretion	SA:amended in line with water allocation plan NSW:10 year review	Fully protected private property right once granted
Compensation	Not for environment & social	Varies across States Vic:none NSW:within plan	Constitutionally guaranteed

- Chile places no restraints on the use of the water by rights holders. In contrast many of the western states require beneficial use to be demonstrated and require applicants to show that proposed uses meet these criteria; and
- the common law of the western states considers water rights to be abandoned if there is a successive period of non-use. A water rights certificate issued by a western state can not therefore be relied on for evidence of a valid water contract.

By contrast, Chilean water rights are not subject to forfeiture which contributes to the high level of hoarding.

Thus, neither regime is free of shortcomings to promote trade. Moreover, the Chilean regime intentionally provides little consideration of the public interest. While the western states have failed to reconcile competing public and private interests they have inserted public interest tests but these are reported to be cumbersome and deter trade.

Other research has examined how different countries have handled river basin management. Comparison of the legal and management regime for the Colorado and the Murray-Darling indicates:[30]

- the US system has resulted in a known but expensive system to resolve interstate water dispute, (e.g. Arizona vs California in the US Supreme Court);
- US Courts are generally loathe to contravene prior precedent in order to have the flexibility to establish new systems;
- while the US and its States have moved away from the pure prior appropriation doctrine, primarily to allow for environmental and other uses not originally recognised, Australia has moved closer to a market based system in order to use more efficiently what water may be available;
- there has to date, been a lack of coordinated basin-wide planning has resulted in slow moving and sometimes disjointed processes in both basins.

In sum, the overseas systems demonstrate very sharp differences, particularly on whether the access right is a full private property right or a "lease in perpetuity". The South African system stands at one end of the spectrum, the Chilean system at the other.

The western US states - and to a lesser extent, the Chilean system - are heavily reliant on court processes with attendant certainty, high costs and inflexibility.

In contrast, the Australian system has, to date, been very strong in its consensus and administrative processes but offers less certainty to the holders of water access rights. The consensus / administrative process means that adaptation to changed circumstances and knowledge proceed by negotiation rather than through the courts. Consistent with the Australian ethic, the processes of consensus/negotiation are more likely to lead to a sharing of costs and benefits of major changes than do black letter law court process.

If Australia were to shift to make water rights a full private property right with compensation guaranteed for any attenuation of that right, then it would have moved to a system which protects private interests more strongly than do the rights systems in the western US states. This is so because in the western US states, the right is not absolutely private property. Even historically, the western US water rights were – and remain – subject to tests of beneficial use and relinquishment. A shift in Australia to a regime of a full private property right with guaranteed compensation would give equivalent protection to private interests as does the 1981 version of the Chilean Water Code.

NOTES

* This paper is an edited version of a paper presented to the 4th Australasian Water Law & Policy Conference, 24/25 October 2002, Sydney.

1 Randall, A., (1981),Property Entitlements and Pricing Policies for a Maturing Water Economy, AJAE 25(3)

2 CoAG Communique, Hobart 25 April, 1994.

3 Marsden Jacob Associates (1999) *Water Trading Development & Monitoring*, report for Department of Land & Water conservation.

4 Prior to the introduction of the *Water Management Act (2000*), Qld water legislation specified no environmental objectives.

5 Murray-Darling Basin Ministerial Council (1995) *An Audit of Water Use in the Murray-Darling Basin*, Canberra.

6 Murray-Darling Basin Ministerial Council (1996) *Setting The Cap*, Schedule F, November.

7 For Murray Irrigation, the reliability of the nominal entitlement implied an average long-term allocation of 87%. Under the River Management Plan, the average long-term allocation has been reduced to 83%.

8 Marsden Jacob Associates (1999) *Water Trading Development & Monitoring*, report prepared for Department of Land & Water Conservation.

9 Dick Thompson and Geoff Hipkins (2002) *A Sound Environment : Healthy Rivers And A Buoyant Irrigation Industry*, a presentation to the Eastern NSW Branch of the AIAST forum on Water Rights, Murrumbidgee Irrigation, February.

10 MDBC Corowa Communique

11 As an example, entering "Cubbie Station" into a Google search produces over 1000 items. On water issues, The Australian has had a consistent focus on the water environment while the Australian Financial Review reporters have emphasised the challenges to legitimate rights holders.

12 CSIRO Land & Water Adelaide Seminar Series (1999), Abstract, Geoff Syme and Blair Nancarrow.

13 Terminology in practice varies substantially with the terms: water right, entitlements, allocations and licences when used, generally are used interchangeably. However, the term 'licence' typically means an entitlement with a fixed period for renewal.
In this paper, I have used the term 'entitlements' to encompass all the above. The term 'property right' is used in its broad sense and encompasses public, common and private property regimes with and without attenuation.

14 Department of Natural Resources & Environment (2001) *The Value of Water, A Guide to Water Trading in Victoria*, December.

15 Marsden Jacob Associates (2000), Goulburn-Murray Water, Retail Entitlement Reform, A Strategic Economic Appraisal.

16 Tietenberg, Tom (2002) "The Tradable Permits Approach to Protecting the Commons: What Have We Learned?" in Elinor Ostrom, Thomas Dietz, Nives Dols ak, Paul C. Stern, Susan Stonich, and Elke U. Weber, Editors *The Drama of the Commons*, p. 197.

17 See for example, Tisdell, J. Ward, J., Grudzinski, T., and Earl, G. (2001a) *Irrigator and community attitudes to water allocation and trading in the Goulburn Broken Catchment*, Melbourne : CRC for Catchment Hydrology; Technical report 01/3., CSIRO. See also CSIRO Land & Water Adelaide Seminar Series (1999), Abstract, Geoff Syme and Blair Nancarrow

18 Dick Thompson and Geoff Hipkins, Murrumbidgee Irrigation (2002) *A Sound Environment : Healthy Rivers And A Buoyant Irrigation Industry*, a presentation to the Eastern NSW Branch of the AIAST forum on Water Rights, February.

19 SMEC (2001) *Review of Natural Resource Planning and Implementation Process in Selected Irrigated Regions throughout Australia*, prepared for the Murray-Darling Basin Commission.

20 We should note that many commentators confuse the issues of registry arrangements and protection of secured lenders and other third party interests on the one hand with the issues relating to the nature of the property right and the fixity of the attached conditions/attenuations. These are two separate and distinct sets of issues.
Banks and other second lenders need registry arrangements which are certain for the purposes of secured lending and/or trade. But this is a separate issue to whether the conditions attached to the entitlements are immutable without guaranteed compensation.

21 Tietenberg (2002), The Tradeable Permits Approach to Protecting the Commons ... , p. 205.

22 Productivity Commission (2002) *Review of Radiocommunications Acts and of the Market Based Reforms and Activities Undertaken by the Australian Communications Authority*, Draft Report, February.

23 High Level Steering Group (2000) *National Approach to Water Trading*, paper prepared by Marsden Jacob Associates.

24 Under the full private property view, the key question is when is the access right attenuated and when is it reduced or annulled? A legal answer is that *"the distinction between having a right attenuated and having it replaced or annulled depends on the degree of detail applied in the definition of a particular right."* Espen Sjaastad and Daniel W. Bromley (2000) "The Prejudices of Property Rights: On Individualism, Specificity, and Security in Property Regimes" *Development Policy Review,* 18(4):365-89, December.
But this is an insufficient guide to practical policy unless there is total reliance on black letter law and the courts.

25 Productivity Commission (2002) *Arrangements for Defining, Allocating and Enforcing Water Rights*, International Benchmarking Study, Study Outline.

26 Marsden Jacob Associates (1999) Water Trading Development and Monitoring, report prepared for the Department of Land & Water Conservation.
The gains from shifting water from one farm to higher value uses on another farm appear to be matched by similarly important gains from shifting water to higher value uses on-farm. Hassall reported the major gains in the Macquarie were due to internal, on-farm changes to shift water to higher value uses. Hassall found that while the volume of water used by Macquarie irrigators in 1997-98 was 25% less than in 1993-94, the value of irrigated output was up by more than 40%. See Hassall and Associates (1999) *Socio-economic impact of changes in water policy on irrigation in Macquarie Valley*, prepared for CARE, June.

27 As noted by Mentor (2001) and others, the 1981 Chilean water code is a response to the 1967 code which had been enacted as part of the Agrarian Reform Law. The purposes of Agrarian reform were to expropriate and redistribute large landholdings. The 1967 code which was intended to empower new land owners to receive water as well sharply increased state authority over water rights and was accompanied by a constitutional amendment proclaiming all water rights to be public property. In 1973, the Chilean armed services overthrew the Allende government.
See Mentor,, Joe Jnr (2001) *Trading Water, Trading Places: Water Marketing in Chile and the Western United States*, AWRA/IWLRI-University of Dundee International Specialty Conference.

28 Mentor, Joe Jnr (2001)

29 Mentor, Joe Jnr (2001)

30 Coffman, M.D., (2001), Consensus or Court: Examining Australian and US Legal Water Regimes. AWRA/IWLRI - University of Dundee International Specialty Conference.

Robust Separation

A search for a generic framework to simplify registration and trading of interests in natural resources

M.D. Young and J.C. McColl

Policy and Economic Research Unit

September 2002 Folio No: S/02/1578

'Don't slavishly follow precedent.
New precedents are waiting to be born."
Sir William Payne, 1959.

Dedication

This report is dedicated to five people.

- Sir Robert Torrens and Ulrich Hubbe; and
- Lord Sherbrook, Robert Lowe and Lord Bramwell.

The first two of these people developed the Torrens Title Property Title registration system that dramatically simplified and improved dealings in land around the world. It was based on a system used in the nineteenth century to register ships in Germany. The Torrens Title Act was passed by the South Australian Parliament in 1857.

The second three of these people developed the idea of a limited liability share company. The Companies Act was passed by the British Parliament in 1862. The practical bottom line solution was simple—add "Limited" to the end of a Company name.

Both ideas established new legal concepts and precedents. Both radically changed the grounds for dispute and dramatically reduced transaction costs. Both are built upon foundation concepts that have stood the test of time.

This report begins the search for a new non-controversial way to define and trade interests in water and other natural resources.

Acknowledgements

This report has been prepared as part of a partnership research agreement with the South Australian Department of Water, Land and Biodiversity Conservation. The opportunity to go back to the fundamentals is one to be treasured.

The ideas contained in this report have resulted from the opportunity to meet with many of Australia's leading natural resource managers and work closely with them on a number of issues in water, fishery, forest, pastoral and rangeland management over a long period of time. In particular, we would like to thank and acknowledge those all those people who are passionate about water rights, the use of water and the function it plays in the delivery of economic, social and environmental benefits. In recent years several people have had a major influence on our thinking. In particular and in alphabetical order we would like to thank those who have significantly influenced our thinking in the last two years: Rod Banyard, Steve Beare, Don Blackmore, Julie Cann, Sandy Clark, Des Cleary, Jeff Connor, John Crosby, Peter Cosier, Megan Dyson, Geoff Edwards, John Fargher, Campbell Fitzpatrick, Paul Frederick, Jan Greig, John Hamparsum, Darla Hatton MacDonald, John Hill, Peter Hoey, Hugo Hopton, Phil Kalaitzis, Matt Kendall, Scott Keyworth, Russell King, John Langford, David Lewis, John Marlow, John Marsden, Jim McDonald, Wayne Meyer, Stephen Mills, Colin Mues, Blair Nancarrow, Vanessa O'Keefe, Jenny Petersen, Mike Smith, Claus Schonfeldt, Gerrit Schrale, Randy Stringer, Geoff Syme, and Ian Wills.

The report has also benefited considerably from the opportunity to expose and discuss drafts of this report at workshops, seminars and conferences organised by the Australian Agricultural and Resource Economics Society; the Australian National Council for Irrigation Development; the Centre for Ecological Economics and Water Policy; the Australian National University and CSIRO Land and Water.

Finally, we have gained considerably from comprehensive reviews by Dave Anthony, Sandy Clark, Sam Drummond, Geoff Edwards, Paul Frederick, Imogen Fullagar, David Lewis, Neil Byron, Claus Schonfeldt and Ian Wills.

1. Introduction

This report is about the search for an economically efficient and equitable definition and trading of property rights. We focus on the notion of "interests" in natural resources and "obligations" associated with the use of natural resources.

Because the same words have different meanings in different states[2] and that we suspect that we are looking for new legal concepts, we intentionally avoid using terms in common parlance.

Although our search is for a generic system applicable to all natural resources,[3] we focus on water resources. We consider that the most appropriate way to define interests in water and obligations associated with the use of water is still controversial. The prime reason for this is that the existing plethora of water allocation systems has been derived piece-meal over time and have not been built for trading—in effect, trading has been "bolted on". Also, most systems were established in a development era when the aim was to get the resource used. As a result, it is often not clear that the total quantity of the resource available is limited. Every time one person takes more, some one else gets less.

The plethora of systems complicates trading, management and communication. Opening up opportunities for arbitrage and confusion, exchange rates are used to convert from one system to another; and salinity obligations associated with a licence vary from State to State. Expectations about the amount of water that is likely to accrue to a licence also vary. In Victoria, for example, a high security licence holder can expect to receive access to sales water while in NSW there is no such expectation. The ongoing right is called an entitlement in New South Wales but a licensed allocation in South Australia.[4] The period for which a licence is issued also varies from State to State and even region to region. Definitions of reliability and rules pertaining to transferability are also inconsistent with one another. There is also an array of restrictions on trading both within and among States.[5]

2. Background

In 1994, the Council of Australian Governments (COAG) collectively committed the governments of Australia to a water reform process. Two key elements of the COAG reform process are: first, a commitment to

separate interests in land from interests in water; and second, to improve pricing arrangements (see Figure 1). We leave water-pricing considerations, including the effects of inconsistent pricing arrangements on trade, to other reports. Nevertheless, it needs to be recognised that inconsistent pricing arrangements, inconsistent use conditions and inconsistent approaches to enforcement distort trade and discourage economically efficient resource use.[6]

Separation of interests in land from interests in water has facilitated the emergence of new markets for water resources. In many areas, resources are now "capped" and pursuing new opportunities depends on trade. However, significant impediments to trade have also been revealed. National Competition Council assessments and an emerging body of research has identified significant economic gains in those areas where trading has occurred.[7] On the other hand, there have also been undesirable environmental impacts resulting from trading in water. A major national debate has been generated about water allocation, river flows, water trading, the environment and compensation.

Left for others to work out was the question of how best to specify interests and the associated obligations. This report takes up that challenge and addresses critical concepts and principles associated with an economically efficient and equitable definition and trading of rights and obligations to use water.

Rather than seeking to resolve these current issues within the existing framework, we search for the building blocks of a world leading system that could be put in place and allows current and possible future issues to be progressively resolved. We encourage debate about concepts, ideas or building blocks that we have missed.

3. Vision

The vision we hold is a belief that there exists a way to define interests in natural resources that will stand the test of time and, eventually, make the specification of interests in water non-controversial.

This paper searches for a generic approach to the definition of interests, rights, and obligations and use conditions and which sits comfortably within an economically efficient trading system. Such systems emerge only when their conceptual building blocks are robust. To be adopted widely and to stand the test of time they need to be robust both from current perspectives and also those likely to emerge in the future. The concept of robustness is similar to the National Competition Council proposition that the Australian water reform process should produce outcomes that are "durable."[8]

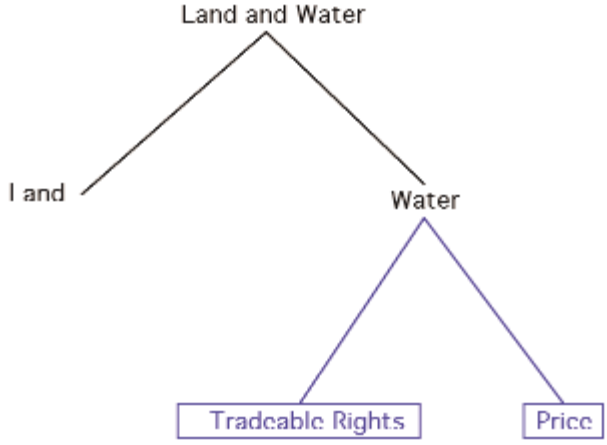
4. Critical Concepts and Principles

4.1 Conceptual foundations

From a "rights" perspective, the critical concept that COAG introduced was that of separation. As a general rule, separation enables resources to be used in a more economically efficient manner but the devil is in the detail. Separation of "water property rights from land title" was a first step. The focus of this paper is on the second step—separation into a form that proves to be robust and non-controversial in the years to come.

The question that COAG left unresolved was the issue of how to define "water property rights" once they have been separated from land titles (See Box 1). Property rights are often described as a bundle of sticks with each stick representing a separate attribute. In a mature resource-limited environment, such as that characterised by a "capped" water resource, the way these attributes are assembled changes the way problems can be managed, the level of transaction costs and the understanding of risk.

Figure 1 **The COAG vision—legally separate interests in water from interests in land, specify them fully and price them appropriately.**



Current debates suggest that a robust system, among other things, would need to facilitate:

- The permanent resolution of allocation issues;
- The periodic distribution of allocations in a way that enables them to be used and traded at minimal cost;
- The definition of risks in a way that makes it clear where responsibility lies, under what circumstances compensation is due, and the processes for obtaining it;
- The management of externalities associated with use and consumption—the interests of third parties and future generations—with a minimum of controversy;
- Economically efficient and low cost trading and administration.

Box 1
The 1994 COAG decision

"In relation to water allocations or entitlements;-
"(a) the State Government members or the Council, would implement comprehensive systems of water allocations or entitlements backed by the separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if applicable, quality,"

Source: COAG Communiqué, 1994.

For a robust system, we need a generic framework that will serve the test of time. Like a building that is designed to last for centuries, the conceptual foundations—the building blocks—must be well organised. As noted earlier, most of the current systems have had trading, environmental management and other systems bolted on. None were designed from first principles to operate in an environment where systems had been developed to their biophysical limit and improvement could come only via adjustment and/or trade.

Theory would suggest that a robust system must pass the conventional tests of efficiency and fairness in a changing environment. Such a system will need to have solid conceptual foundations. In the search for insights as to how to do this, we have cast our net wide.

4.2 Searching for the building blocks

Fundamental clues leading to the identification of building blocks for the foundation we put forward come primarily from the limited liability company and share trading system, from the Torrens Title system, and from the banking system.

4.2.1 Limited liability share companies

The full extent and nature of risks associated with dealing with these legal entities and the way that collective interests are to be partitioned is well established and understood. Decision making protocols are also defined. Opportunities are defined in terms of a share of net profits (periodic allocation - dividends).

The limited liability share company system tells us that:

One should trade only the "net" opportunity and never use the interest system to trade gross opportunities.

In an environment where future allocations are uncertain, interests should be expressed in proportional and not absolute terms. That is, interests should be defined so that arguments about fairness among those who hold a direct interest are resolved for once and for all time.

Transaction costs are significantly lower if periodic allocations (dividends) are managed totally separately from trading in shares. Shares define interests in the receipt of future allocations, not allocations made in the recent past.

Share company-like protocols offer an economically efficient and equitable way to respecify and/or separate collective interests via well understood merger, acquisition and sub-division processes. Essentially, the mathematical rule is that one's proportional interest, after adjusting for risk, should not change.

4.2.2 The Torrens-Title system

The Torrens-Title system revolutionised the means by which ownership was defined by drawing upon a ship-registration system developed in Germany. Instead of producing a deed or contract to define ownership, one has to go to a register. Essentially, the vision underpinning the Torrens Title system is that interests in property should be defined on a register not by distributed pieces of paper. This simple insight

dramatically reduces the opportunity for fraud and misrepresentation of the true nature of an interest. You can get a certified copy of what is recorded on the register but in any dispute, by law, the register is deemed to be correct.[9] Under such a system, the residual risk of misrepresentation of an interest is so low that governments are prepared to guarantee its integrity.

The Torrens-Title system tells us that:

- Full specification of interests is best achieved via guaranteed registration of all interests, including those of mortgagees, on a register rather than licences.
- For any transaction, formal settlement procedures are necessary to maintain system credibility.
- Transactions, once made, should be irreversible. No transaction should be completed until all third party interests have been cleared and arrangements put in place for all new interests to be registered fully as the transaction is executed.
- Permission to use an area of land for a specific purpose is most economically efficiently defined via processes that largely are independent of the definition of interests in that opportunity. That is, permission is granted to the people whose interests are recorded on the title, their heirs and their successors.

4.2.3 The banking system and monetary system

Over centuries the banking sector and governments have developed a remarkably uniform system for recording interests in quantities of money and the trading of them. Essentially, there is a single generic system.

In contrast to share and land title systems, pieces of money are never owned. One's name is never attached to a coin or a note. Instead, a pool of money is managed by setting up accounts that define a person's interest in the pool. Interest is defined without having to label each bit. The result is a system with very low transaction costs.

Formal exchange rates and mechanisms are used to convert from one currency to another. A debit and credit system is used to record interests in the pool as they change by the second.

The banking and global financial system tells us that:

- Internet accessible debit and credit accounting systems offer the state of the art in managing individual accounts.
- For transactions of relatively low value, costs can be lowered by not bothering to facilitate tracking of all the previous owners of a bundle of money.
- While a single system has its advantages, if the essential elements of the system are similar, then relatively simple and low cost exchange systems can be developed.
- Exchange rates can and need to adjust as information changes.
- Double entry recording of transactions reduces the likelihood of errors.

4.2.4 The Literature

Generic literature on the design of tradeable property right systems is limited. There are, however, a number of additional principles and concepts that are critical. One of these, the Tinbergen Principle[10] states that to attain a given number of independent targets there must be at least an equal number of instruments. This principle, and the research underpinning it, gives us insight into the importance of separation and the most appropriate way to do it. In particular, issues associated with equity among aspiring users need to be managed separately from issues associated with management of the pool at any point in time and issues associated with use. Interestingly, the emergence of the Tinbergen Principle as a concept central to the development of economics, led the Nobel Prize Committee to award the first Nobel Prize in economics to Jan Tinbergen and Ragnar Frisch in 1969. Both were recognised for their contributions to the development of dynamic modelling.

5. Building the Foundation

5.1 Separation

As indicated earlier, COAG has recommended that interests in water be separated from interests in land. Across Australia, transaction costs—both in political and administrative terms—are still high. Risks to

water users, community, government and the environment tend to be high, especially when these risks are incompletely specified.

Current practice has tended to combine well-defined components with poorly defined components. This has frustrated progress. Every time a problem emerges the entire system is reviewed rather than simply that component where the problem arises.

We believe the answer lies in further separation of interests in natural resources (property right) into its component parts.

Separation of the interest into its component parts facilitates development of more economically efficient management and accounting systems. It facilitates adjustment of part of the system without having to review the whole system. This reduces transaction costs. Moreover, risk management is more efficient when each type of risk is managed separately.

5.1 The critical components

Typically, a single licence is allocated to a water user and managed via a host of complex procedures. Even within a catchment, it is not uncommon to find many different types of licence alongside each other. However defined, each licence appears to contain three generic components:

- A long-term interest in a stream of periodic allocations;
- The stream of periodic allocations, which following assessment of resource availability, have been distributed or made available for use and/or trade;
- Permission to "use" the resource at a specific location subject to use conditions and obligations typically associated with the management of externalities.[11]

In the following sections, we provide more information on each of these components. As a general rule and building on the clues summarised earlier (see section 3.2):

- The interest in the stream of periodic allocations is best defined as a proportional share of the "net" opportunity in the same manner that companies define equity ownership;
- Periodic distributions of allocations are similar to a stream of dividends and are best managed using transparent double accounting systems like those used by banks; and
- Obligations and conditions pertaining to use are best managed in a system that resembles the current licence system but written more like development approvals.

5.2 Definitions of the interest

As with a company and in a trading environment, shares and dividends can be managed at least cost if they are defined separately.

For each dimension of a tradeable resource allocation system that needs to be managed, we propose a Separated System. Essentially, an interest in any common pool resource, like a quantity of water, can be considered as having three key components:

- The entitlement—the long-term interest (share) in a varying stream of periodic allocations;
- Allocations—a unit of opportunity (usually a volume) as distributed periodically; and
- The use licence—permission to use allocations with pre-specified use conditions and obligations to third parties.

In a separated system, each component can be managed independently without consideration of what is happening to the other component. Entitlements define equity among those with interests in the resource, allocations define the periodic quantity that may be extracted from the common pool or sold, and the use licence defines the site-specific conditions pertaining to use including limits on the degree to which users, through their actions, are allowed to change the environment.

In areas or systems where use may cause adverse impacts like salinity, the use licence should be expressed in a manner that enables a separate entitlement/allocation system to be set up to manage that issue. Similarly, the entitlement should be drafted in a manner that enables channel congestion to be devolved to a separate entitlement/allocation system.

The system we summarise applies, with minor variation, to all water resource systems—regulated and unregulated, surface and ground. Although not explained in this report, we suspect that it is applicable to many other common pool resources.

Collectively, these three elements of the component determine the value of each unit and opportunities for trade in the interest.

5.2.1 Defining the entitlement

The most valuable component is the entitlement—the interest in a stream of allocations that occur from time to time.

Entitlements are granted by government. They define the degree of access that can be expected over time and the nature of changes, if any, that can be expected.

In defining the entitlement, five considerations are important:

- What priority, if any, is given to entitlement holders when the available resource is distributed and how reliable or variable access is likely to be;
- The nature of the periodic allocations to be expected;
- The extent of the area and resource over which risks associated with the entitlement are pooled; and
- How allocative risks are distributed between entitlement holders and the government; and
- The effects of land use changes on future allocations.

Essentially, if both priority and risk are managed at the entitlement level, then trading of allocations can be relatively unconstrained and exposed to market forces. Provided, of course, that externalities resulting from the use of the resource are managed via a separate use licence.

Attention needs to be given to the size of the common pool. Within the pool there is little opportunity for arbitrage. Entitlement conversion from one part of the system to another requires an exchange rate to be set. At every exchange point opportunity for arbitrage is created. In fact, if this observation is taken to its logical conclusion then there is a case for at least considering issuing Basin-wide entitlements and asking holders to specify which river reach they would like their allocation issued for.

5.2.2 Priority among entitlement holders

In the system proposed, the framework offered is similar to that used by companies to manage shares. In a trading environment administrative costs tend to be lower if shares and dividends are managed separately. Whenever a decision is made to make a distribution, a dividend is paid to current shareholders on a pro-rata basis. Thereafter, no attempt is made to trace where the dividend goes or where it is used. That is a separate exercise. The share structure is used to define equity in distribution—not to manage the resource base.

Management of priority is determined in companies through the issuance of classes of shares. For most pool resources, distributions can be expected to vary through time and resource users can expect to have differing needs for access to the allocations. As a general rule, some people will seek and value priority in allocation more than others. Classically, in irrigation it is those with permanent plantings that seek greater priority in allocation so that they can reduce the risk that they will not receive an allocation from the pool.

Many Australian systems separate interests by defining one group as having much higher priority than another. High security and general security are the terms used in New South Wales. In some parts of the USA, volumes are allocated a priority according to date of issue. The first issued volume always get their full allocation, the last rarely get water.

Theoretically, if trading costs are very low, then there is little economic advantage in having more than one class of interest. In a low trading cost environment, firms can tailor reliability by holding as much of an interest as they wish and selling surplus allocations as and when appropriate. If trading costs are high, then there is a strong case for defining the interest by reliability class so that firms can tailor allocations to needs without having to trade to achieve an economically efficient result.[12] As a general rule, the lower trading costs are, the simpler the system can be. In a very low cost trading system, the economic case for more than one class of share is minimal and market mechanisms can be used to manage water supply risk. In systems where there is more than one class of share, it is likely that in some situations allocations to the second class of share are likely to be minimal.

The main advantages of the share language are well understood conventions, and transparency in communication. The word share makes it clear that the allocation may change. In particular, the system requires administrators to announce the size of the allocation per share to be distributed and from what date that allocation will be made available for use. It is necessary, also, to announce when the period over

which the allocation may be used and what will happen if it is not used. Under some systems, a considerable proportion of an unused allocation can be carried forward. In other systems, storage without substantial loss is impossible. Careful consideration of the incentives associated with the carry forward versus partial or total extinguishment issue is necessary.

We leave consideration as to the most appropriate spatial unit over which interests are defined as an issue to be addressed in implementation. These considerations do, however, increase the case for using a share-like structure.

5.2.3 Definition of the unit of allocation

In corporate systems, shares define an interest in the net result of company performance. The parallel approach for natural resources, like water, is that the share should be in the quantity of water consumed. Interestingly, most water interests in the United States of America are defined in these terms. The literature and experience there suggests that only the volume that is consumed should be tradeable and that, as a result of improvements in water-use efficiency, irrigators should be allowed only to retain real increases in the volume of water consumed.[13]

Critically, and as summarised in Box 2, if this principle of only allowing people to trade the volume of water that is consumed is violated then improvements in water use efficiency will cause any fully allocated system to become over-allocated and any over-allocated system to become even more over-allocated. Under the scenario set out in Box 2,100,000 ML of permanent water trades results in 40,000 ML increase in the total volume of water that is consumed. In the past, Australian irrigators have been allowed to keep and use these savings and, as a result, the quantity of water used in capped systems continues to increase.

For systems where technical water use efficiency is not high,[14] essentially there are two robust approaches to this "return flow" problem.

1. Either, any interest in a stream of periodic allocations should be defined as a "net" interest reflecting the quantity consumed not the volume pumped. Returns via surface drainage and through groundwater need to be accounted for. Where this is not possible, the proportion of an allocation that is "deemed" to be used should be documented.
2. Or, as water use efficiency increases there is an across the board reduction in the quantity of water per unit entitlement periodically allocated.

As indicated earlier, for a robust solution to the allocation problem, it is necessary also to manage salinity and other water quality issues separately from the management of volume. That is, if, for example, a return flow causes an increase in river salinity or dryland salinity, that issue needs to be managed using a separate policy instrument. Later in this report, it is recommended that use licences be used to manage impacts like these on third parties and, when and or where the problem becomes significant, the problem be managed using a separate entitlement/allocation structure.

Box 2
The consequences of defining an interest in gross rather than net terms

Consider 50 farms that each have an allocation of 2,000 ML. The total allocation is 100,000 ML.

Assume also that these farms are irrigating at 50% Water Use Efficiency. That is, they pump 2,000 ML but 1,000 ML of this returns to the River via surface drainage and groundwater recharge. As a result, these 50 farms use only 50,000 ML.

Suppose that each of these farms decide to sell all their interest to people who plan to use if to grow grapes under drip irrigation using technology that achieves 90% water use efficiency. As a result, consumptive use changes from 50,000 ML to 90,000 ML.

After the system returns to equilibrium, as a result of the trade all irrigators in the system lose access to 40,000 ML that would previously have been shared among them. Gradually, a system that was fully allocated becomes both over-allocated and over-used.xv

5.2.4 Full specification of risk

COAG and others have repeatedly emphasised the need for the full specification. One of the main issues is the risk that expected distribution of future allocations may change. If fully specified, then the risk of change in entitlements and allocations needs to be partitioned between the interest holders and the government. The mechanisms used to partition this risk should resemble a two-sided contract where the government is required legally to pay compensation for those matters for which it accepts responsibility.[16]

Typically company share systems make it clear that the risk of changes in value resulting from "natural" variation, underlying changes in technology, etc., are risks that the holder of the share bears fully. Action

can, however, be taken whenever a proportional interest is suddenly and significantly eroded and/or an administrative error is made. As a general guideline, we conclude that the use of share terminology communicates a much better sense of the unit of entitlement and what is compensable than a volumetric specification.[17]

Arbitrary decisions purely taken as a result of political pressure and imposed on the system may alter the balance between consumptive use and the environment, and/or between different consumptive users. On the other hand, over time, political and adaptive administrative processes may properly reflect changes in community values.

While it is not possible to fully specify the exact quantity of water that will be available in a varying environment, it is possible to fully specify risk. The essential proposition is that in an environment where climates change, technology improves and knowledge of the system is likely to improve, greater equity and investment security may be achieved through a focus on the specification of risk rather than a formal share to the environment.

A suggested framework for the assignment of risk is presented as Table 1. In essence, we suggest that compensation would be payable only when risk turns to reality and only in circumstances that might, in retrospect, be reasonably described as failure by the administrative agency to exercise adequate duty of care or diligence in managing the interests of all parties. It seems reasonable to expect a government to be able to manage and plan the transition from development of a resource to sustained use. In particular, it seems reasonable to signal the extent of the change and not drift into situations that result, for example, in gross over-allocation or a need for a sudden precipitous change.

One example of the risks associated with allocating quotas in anything other than a proportional basis can be found in New Zealand fisheries. In the 1980s, fishing licences were defined as absolute tonnage quotas and some new ones sold by Treasury. Subsequently, it became clear that some over-allocation existed and that some quotas would have to be cut. As a result, the Government decided to convert all fisheries from *absolute tonnage quotas* to *proportional share quotas* and, by way of compensation, reduced the resource rent for a number of years in significantly affected fisheries. In Australia, compensation may not be payable for reduction of a water allocation. When considering the issue of whether or not compensation was payable when fishing entitlements were reduced by the Australian Fisheries Management Authority, it was found that even though fishing units were found to be a form of property, a proportional reduction of these units in the fishery was not considered to be an "acquisition" under the meaning of Section 51 (xxxi) of the Australian Constitution.[18]

Risk is related to the political and institutional environment in which the property right system operates.

For some issues, the risks are associated with administrative process. For others, the risks are associated with changes in community values and investments. The essential question is one of how risk specification effects resource management decisions.

As a general guideline, risks associated with changes in the natural functioning of an ecosystem are most effectively managed if made a full cost to business (adaptive management). Similarly, if government bears the full costs of arbitrary decisions and is required to compensate for them, they will have a strong incentive to avoid making them.

Administrative decisions taken by the organisation/s responsible for managing the system ideally would flow from improved knowledge and understanding of the system, and after due process.

These may include:

- varying periodic allocations to take into account seasonal variation;
- changing the relative shares between consumptive users and the environment (generally will be a reduction in consumptive use) as a result of improved knowledge about the capacity of the resource and after due process; and
- changing the trading rules for water including modifying exchange rates to minimise arbitrage, or changing the way in which market-based instruments (MBIs) are used.

Table 1: Assignment of Risk

Financial risk of change met entirely by entitlement holder (Adaptive Risk)	Compensation claim may be made against administering agency (Duty of care in managing the interests of all parties)	Financial risk incompletely specified or shared (Uncertainty)
Natural variations in periodic allocations (eg. seasonal fluctuations)	Administrative error associated with a transaction. An adjustment judged by the courts to be capricious.	Catastrophes such as the failure of a dam.
Change in mean annual rainfall (eg. effect of climate change)	Issuance of new entitlements once the system is known to be fully allocated.	
Revised estimate of the capacity of the resource that are the result of an adaptive process (eg. improved scientific knowledge—adaptive management, proper process, relatively small changes over time)	Rapid and unexpected administrative change resulting in a sudden and significant reduction in the value of share entitlements (b).	
Land-use change (a) (e.g. pastures replaced by forestry)		

a) For significant land-use changes, it is possible to require that any negative impacts of land-use change be offset via the purchase and surrender of an entitlement equivalent to the size of the expected impact. Similarly, it is possible to allow issuance of entitlement shares when land-use change results in a positive contribution.

b) For example, resulting from initial over-commitment and failure to allocate in a precautionary manner.

5.3 Registration of the interest

The Natural Resource Management Council (2002) has recommended that "Registers of water entitlements like those for land and shares should be open and inspectable."

Before interests in water were separated from interests in land, interests in water could only be mortgaged by registering a mortgage on a land title. At this time, virtually all land titles in Australia were registered under a Torrens-Title like system, sometimes called a "new" system title. From the perspective of some lending institutions, separation of interests in water from interests in land has resulted in the transfer of their registered interest from a "new" system to an "old" system.xix The main feature of the Torrens system is that all interests are defined by reference to a register rather than a paper trail of contracts, etc. Certificates of titles rather than actual titles are issued. As a result, a very high degree of protection is achieved. So high, in fact, that governments can set up procedures enabling the register and all details on it to be guaranteed. This dramatically lowers the cost of borrowing money and significantly simplifies administrative procedures associated with a transaction.

As a general rule, the asset value of a unit interest in a stream of periodic allocations is much more valuable than an interest in a specific allocation volume. As a result, different registration arrangements are appropriate. Torrens Title experience highlights the merits of defining interests in a guaranteed register rather than by issuing licences and several states are in the process of doing this. If this is not done, there is considerable risk of fraud. Under the Torrens Title system, a certificate of title is issued as an authorised copy of that recorded on the register. Applied to water entitlements, all entitlements and any change to one or more of these could be transacted only by changing the details recorded on the register.

5.3.1 Mortgages and interests of other third parties

A register rather than a conventional licence approach also makes it possible for banks and other financiers to register a financial interest in an entitlement and prevent sale until that interest is cleared. Effectively, it would be possible to register a mortgage over an entitlement. A mortgage has two characteristics. First, in the case of default on a loan and following due process, it gives the mortgagee a preferential right to sell the asset and use the proceeds to recover moneys owing. This dramatically reduces the risk of lending money and, hence, the interest rate at which money is loaned. Moreover, by separating entitlements from use licences and allocations, issues associated with default can be managed separately from those associated with use.

Under such a system, it would be possible for a water supply company to register an interest in a volume of water or a water share holding that would provide protection from becoming exposed financially to the "stranded" assets problem. This problem is

thought to be likely to arise when the holders of an irrigation licence sell their entitlements or allocations to others and, hence, are no longer willing to pay for the cost of maintaining irrigation infrastructure. Mortgageability would make it possible for a water supply company to recover the cost of its investment if the supply structure is not used.

5.3.2 Trading

The question then arises of how changes should be made to the register and trades executed. Global experience with the Torrens Title System and transactions involving significant amounts of money suggest that brokers should be licensed and that formal settlement procedures are necessary.

In summary and as a general guideline, unit interests in the periodic distribution of allocations (entitlements) should be recorded on a register that is guaranteed and facilitates the registration of third party interests. Formal settlement procedures should be used to execute changes to the register.

5.4 Periodically distributed allocations

An interest in a periodically distributed allocation derives from a share or its equivalent. However, the nature of the asset and its value is quite different from the share. In particular, and if priority is managed via the entitlement, there is no need to duplicate management of allocation priority at the distribution stage.[20] A distributed allocation is a right to either trade the resource or be subject to compliance with use conditions and obligations.

Once "used" or at the end of the period, the allocation is extinguished. For most water resources, the allocation is progressively extinguished as it is pumped. For most fishing resources under quota management, the allocation is progressively extinguished as catch is landed.

Reflecting the history of the development of licensing and allocation systems, the practices commonly used to manage assets of this form are rarely used. Typically, the entitlement is to trade or use part of a common pool resource. In the case of water, it may be an entitlement to pump a specific volume and/or sell that opportunity to someone else. In the case of fish, it is an entitlement (quota) to harvest and sell a weight of fish.

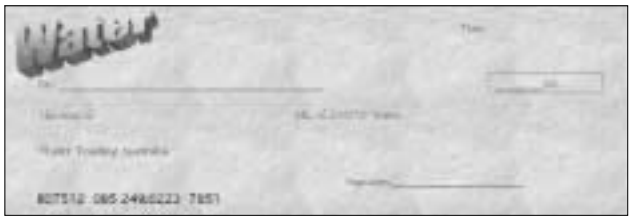
As illustrated in Figure 2 and Figure 3, the state of the art for accounting for the status of such systems has been developed by the banking sector. These systems define ownership via a set of accounts that debit and credit trades and record draw down of the pool. No attempt is made to define ownership of each coin or note in the system. Subject to well-known conditions, account holders are guaranteed the opportunity to withdraw from the common pool as and when they like. A water account could be made accessible over the internet with trades possible either by writing a cheque or by electronic transfer.

Figure 2

Hypothetical Water Account
Account Name: Aussie Irrigation
Statement No: 24

Date		Debit	Credit	Balance
1/7/01	Balance bought forward		400	
1/9/01	Periodic allocation 1000 shares translates to 2000 ML of water that may be consumed		2000	2400
12/10/01	Transfer from XYZ Pty Ltd Cheque No. 1234 5678		500	2900
3/11/01	Use from 1/9/01 to 1/11/01 (Pumped 1000 ML and deemed to have used 50%)	500		2400
3/11/01	Transfer from AB&CD Smith Electronic RN 9876543		300	2700
30/4/02	Use from 2/11/01 to 30/4/02 (Pumped 1320 ML and deemed to have used 50%)	660		2040
30/5/02	Unused water not available for carry forward to 2002/03 season	420		1620

Figure 3 A water cheque that could be used to trade water



5.4.1 Use obligations of periodic allocations

Importantly, in the system advocated above, the issuance of a share (entitlement) and even the holding of a distributed allocation would provide no permission to use a resource. Either of the first two components would, however, be fully tradeable.

5.5 The use licence

To use an allocated resource, a third component is required. This we have earlier labelled the use licence. Typically, a use licence would set out the conditions of use and the nature of obligations to third parties.

5.5.1 Conditions of use

These conditions arise with specific use of the periodic allocation and should reflect requirements provided for in a statutory water management plan. They should be attached to a use licence and may include pumping and drainage disposal requirements, possibly restrictions on practice, and reporting requirements. Details are likely to be subject to periodic change and review as new technology and relative costs change. Often they are likely to be quite site specific and relate to more generic arrangement set out in a management plan for the area in question.

The licence, however, would set out the degree of use permitted in much the same way as an approval is given to construct a house. For example, a use licence may grant permission to flood irrigate a maximum of 350 hectares on a specified area of land. Under such an arrangement it would be possible for a person to decide to operate as an irrigator without holding any entitlement and, simply, buy water as and when it is needed.

5.5.2 Third-party obligations

Third-party impacts arise from resource use not the action of holding an entitlement or allocation. The bottom-line statement of obligations should indicate the maximum degree of impact on others that is allowable. For example, it may reserve the right to pollute to the State and indicate that the user may be obliged to rectify damages imposed on others and or the environment.

Management planning processes could be used to signal when and to what extent obligations may be allowed to accumulate. To this end, management plans need to be statutory instruments that have standing in law. They would also be consistent with any district or regional salinity management strategy, and may possibly be met wholly or partly through the use of market based instruments (e.g. salinity credits).

Progressive advancement of standards associated with the maximum degree of impact on others should be anticipated. Two approaches are possible—either a fixed and automatic trigger can be placed in a licence or, alternatively, the licence may authorise actions that impose costs on others until a management plan dictates that a formal impact management strategy must be put in place.[21]

5.6 Legislation

A related issue is the need for legislation to implement a separated right system. Legislation facilitates and encourages consistency in approach. In some states, existing arrangements and reforms underway mean that few amendments would be necessary to move to the proposed system. In other States significant changes are necessary.

6. Comparison of system with fundamental characteristics

Any discussion of existing or proposed property rights generally involves the specification of a set of essential characteristics defining the property right against which the existing or proposed property rights is tested.

Scott (1999) provided the following list of fundamental characteristics in relation to individual transferable quotas in rights-based fisheries management that has been adapted and used in papers about water rights by the Productivity Commission, Sheenan, and the National Farmers Federation.[22] Scott's original list of fundamental characteristics can be summarised as follows:

Duration—the period for which the interest is defined.

Flexibility—the extent to which the interest can be modified or altered without consent.

Exclusivity—the degree to which the interest holder receives all the benefits from exercision of the allocated opportunity.

Quality of title—the extent of "security," protection from fraud, opportunity to use as collateral, etc.

Transferability—the extent of freedom to trade (level of constraints).

Divisibility—whether or not the interest can be subdivided into parts and each part held separately.

The Productivity Commission list is as follows:

Universality—all resources are privately owned and all entitlements (rights over how they can be used) are completely specified.

Exclusivity—all benefits and costs that result from owning and using the resource only accrue to the owner, either directly or indirectly by sale to others.

Transferability—all property rights are transferable from one owner to another in a voluntary exchange.

Enforceability—property rights are secure from involuntary seizure and encroachment.

The Productivity Commission in reducing the list to four appears to have included quality of title, duration, and divisibility in universality. Enforceability seems to encompass flexibility, but has other elements of protection against encroachment or seizure.

The Separated System proposed addresses each of these characteristics as follows:

Universality—The share entitlement is long-term, non-extinguishable and would remain even if no allocations are made for a number of years. Allocations, when made, are provided for a specified period and are extinguished at the end of that period. The use licence includes conditions of use and obligations to third parties.

Flexibility—The share entitlement provides for a pro-rata share of a variable resource. Allocations are in proportion to the number of shares held. Use licence conditions can be varied via a management plan. Permission to use water is similar in style to a development approval. Risks assigned and responsibility specified. For those risks assigned to the government, compensation is payable and process for redress identified.

Exclusivity—the holder has exclusive access to the benefits of the use of the resource either directly or indirectly by sale to others. The use licence does not guarantee the right to harm others. The system is designed to allow the creation of shares and allocations for salinity emissions, channel capacity, etc.

Quality of Title—Interests are defined on a register in a Torrens Title-like manner. Mortgages can be registered. It is impossible to transfer the interest without first clearing all registered interests. Allocations are managed via a bank-like accounting system. Formal settlement procedures are used. Brokers are licensed.

Transferability—both share entitlements and periodic allocations are fully tradeable. Exchange rates are pre-specified. No trade can be "undone." Internet based trading of allocations is possible. Cheque-like transactions are possible.

Divisibility—Periodic allocations can be sold in whole or in part down to the smallest unit of allocation in the register. A single share can be sold.

7 Implementation issues

There are a number of important implementation issues that require addressing. The most topical of these is the issue of how to define the environment's interest so that its effect on the interests of consumptive users is fully understood and accepted.

The environment's interest can be defined as being either

- prior to those of consumptive users; or
- equivalent and, hence, defined so that trade between environment and consumptive use is possible.

Under the *prior model*, all risk of change in the expected stream of allocations due to alteration in environmental values is born by entitlement holders. Under the *equivalent model*, risk is shifted to society and change, if not executed via a market transaction, would be compensable. In this latter case, for example, 1,000 shares may be allocated to irrigators, urban and industrial water users and 500 shares to the environment. The environmental managers would then need to decide if, when and how they would enter into the market for allocations and the market for entitlements.

There are significant political, economic, social and environmental risks associated with the equivalent model that might, without careful analysis prove catastrophic. Entitlement values will be higher under the equivalent model than under the prior model. Careful, examination of these two alternative models and variants of them is necessary. If the environment's interest is managed under the

"equivalent" model, very careful consideration has to be given to the way periodic allocations would be managed and accounted for.

Consideration also needs to be given to the vexatious issue of what charges should apply and the question of whether or not some of the increase in the value should be clawed back. Indeed, if the equivalent model is chosen then, arguably, there is a strong case for collecting some economic rent to ensure that sufficient money is available to cover the cost of increasing an environmental allocation if this proves necessary.[23]

Conceptually, it is possible to make a base allocation to the environment under prior rules and then manage the residual under the equivalent model. Careful consideration needs to also be given to accountability issues and the most appropriate governance structures for the management of any environment allocation, especially if trade between environment and irrigation is contemplated.

Other critical implementation issues to be explored include questions about

Definition, Planning and Management and, in particular:

- Identifying the most appropriate spatial extent of each entitlement—a Basin, a catchment, a valley or a reach—with close consideration of the arbitrage and risk-sharing opportunities different arrangements set up;
- Determining the pros and cons of having a single entitlement versus one where there are two, three or more classes of shares;
- Determining how the separated system can be linked seamlessly to overland flows, farm dams and unregulated streams;
- Determining how to adjust existing over-allocation of water resources, and how to allocate water resources that are not fully subscribed; and
- Determining the most appropriate planning and management structure to ensure that use remains sustainable.

Trading and dealing and, in particular,

- Determining what charging and pricing arrangements should apply;
- Establishing a bank-like trading system for allocations;
- Determining how to manage simply the return flow or "gross" versus "net" issue;
- Determining the extent to which inter-dependent entitlements can be exchanged for one another—surface water for groundwater;
- Determining the periodic allocations and time until extinguishment; and
- Determining whether or not allocations should be managed at the same or a different scale to entitlements.

Use licence specification and, in particular,

- Determining how to specify third-party obligations and organising them so that they can be separated from the use licence and, issues like salinity and channel flow capacity, managed in an independent trading environment.
- Determining what needs to be included in a use licence and what is best left in a management plan and how the two should interact; and
- Determining how use licence conditions can be reviewed and the best processes used to change them.

Conversion

Determining what principles and processes should be used to convert from each of the many systems that are currently in place to the proposed separated system; and

Determining how to convert the licences in any specific area to the new separated system.

8. Concluding comment

While some may disagree, we consider all the above, including the question of how to define and manage environmental flows, as second order issues that need to be considered after a robust foundation is in place. Consequently, we perceive that the next steps involve careful exploration and consideration of the separated system proposed in this report followed by a series of reports on each of the issues listed above: Options for definition of the environment's interest; integrated planning and management of the resource; trading and registration arrangements; use licence specification; and conversion principles.

Finally, as stated at the start of this report, we seek a robust way to define interests in water and other natural resources. To this end, we seek comments and feedback. Comments should be sent to

Mike.Young@csiro.au or Jim.McColl@csiro.au. We can be contacted by phone on 08-8303.8665.

REFERENCES

Australian Conservation Foundation (2002) *Rights & Responsibilities in Land and Water Management*. Melbourne.

Aretino, B.; Holland, P.; Matysek, A. & Peterson, D. (2001) "Cost Sharing for Biodiversity Conservation: A Conceptual Framework, Productivity Commission." Productivity Commission, Staff Research Paper, Melbourne, http://www.pc.gov.au/research/staffres/csbc/index.html

Banyard, R. (2000) "Tradeable water rights implementation in Western Australia." *Environmental and Planning Law Journal* 17(4):315-333.

McDonald, D. and Heaney, A. (2001) "Improving water use efficiency." ABARE, Current Issues paper 02-6 Canberra. http://www.abareconomics.com/htdocs/pages/freepubs/waterusecl06.pdf

Bjornlund, H. (1999) "Water Trade Policies as a Component of Environmentally, Socially and Economically Sustainable Water Use in Rural Southeastern Australia." Ph.D Dissertation, School of International Business, University of South Australia.

Bjornlund, H. and McKay, J. (2000) "Are Water Markets Achieving a More Sustainable Water Use." Proceedings from the Xth World Water Congress, Melbourne, March.

Brennan, D. and Scoccimarro, M. (1999) "Issues in defining property rights to improve Australian water markets." *Australian Journal of Agricultural and Resource Economics* 43(1):68-89.

Carmicheal, A. and Cummins, T. (No date) "Water talk: Lets start speaking the same language." Unpublished paper.

Council of Australian Governments (1994) "Report of the Working Group on Water Resources Policy: Communiqué." February.

Department of Natural Resources and Environment (2001) *The Value of Water: A Guide to Water Trading in Victoria*. East Melbourne.

Eigenraam, Mark and Stoneham, Gary (1998) "Regional Water Reform: The Economic Impact of Pricing Arrangements." Working Paper 9801, Economics Branch, Department of Natural Resources and Environment, Victoria, May.

Hartman, L.M. and Seastone, D.A. (1965) "Efficiency Criteria for Water Market Transfers." *Water Resources Research* 22(4) 439-445.

Hassall & Associates in Association with Musgrave, W. (2002) "Barriers to Trade of Irrigation Entitlements in Irrigation Areas and Districts in the Murray- Darling Basin: Analysis and Development of Solutions." Report to the Murray Darling Basin Commission, Canberra.

Heaney, A. & Beare, S. (2002) Property Rights and Externalities in Water Trade. In Brennan, D. (ed.) Water Policy Reform: Lessons from Asia and Australia. Proceedings of an International Policy Workshop, Bangkok, Thailand, 8-9 June 2001. Australian Centre for International Agricultural Research Proceedings 106, Canberra.

High Level Steering Group on Water (1999) "Progress in Implementation of the COAG Water Reform Framework: Report to COAG." Occasional Paper Number 1. http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A05637

Natural Resource Management Committee (Marsden Jacob (20021) "A National Approach to Water Trading." Department of Agriculture, Fisheries and Forestry Australia, Canberra. http://www.affa.gov.au/content/publications.cfm?ObjectID=66978F1C-3D26-4C59-9152B42F49C3E47D

National Competition Council (2002) National Competition Policy: Assessment Framework for Water Reform. Unpublished report.

National Farmers Federation (2002) "Property Rights Position Paper." May 2002. http://www.nff.org.au/pages/sub/NFF%20Property%20Right%20Position.pdf

Payne, W.L. (1959) "Report on progressive land settlement in Queensland by the Land Settlement Advisory Commission." Government Printer, Brisbane.

Scott, A. (1999) "Fishermen's Property Rights." *In Individual Transferable Quotas in Theory and Practice*. Arnason, R. and Gissurarson, H. H.(eds) Reykjavik, Iceland, The University of Iceland Press.

Shadwick, M. (2002) "A viable and sustainable water industry." Staff Discussion Paper, National Competition Paper, July 2002.

Sheehan, J. (2002) "Property Rights: The pursuit of a definition of and method of valuing water." Paper presented to ANCID 2002, Griffith, September 2002.

Tan, Poh-Ling (2002) "Legal issues relating to water use." Issues paper No. 1. Murray Darling Basin Commission Project MP2004.

Tinbergen, I. (1950) *On the theory of economic policy*. Elsevier, North Holland.

Young, M.D. (1999) "The design of fishing-right systems - the NSW experience." *Ecological Economics* 31:305-316

Young, M. and Hatton MacDonald, D. (2000) "Who Dares Wins: Opportunities to improve water trading in the South East." Final report to the South East Catchment Water Management Board by the Policy and Economic Research Unit, CSIRO Land and Water, Adelaide, Australia.

Young, M.; Hatton MacDonald, D.; Stringer, R. and Bjornlund, H. (2000) *Inter-State Water Trading: A 2-year Review*. Policy and Economic Research Unit, CSIRO Land and Water, Adelaide, Australia.

Young, M.D. and McCay, B.J. (1995) "Building equity, stewardship and resilience into market-based property-right systems." In Hanna, S. and Munasinghe, M. (eds) *Property-rights and the environment: Social and ecological issues*. The Beijer Institute of Ecological Economics, Stockholm and the World Bank, Washington, D.C.

NOTES

1 See, for example, Brennan & Scoccimaro (1999); DNRE (2001); Eigenraam and Stoneham 91998); NCC(2002); Shadwick (2002); Young et al. (2000) and Young & Hatton MacDonald (2001).

2 See Carmicheal, A. and Cummins, T. (No date)

3 Strictly, all common-pool resources – a sub-set of common property.

4 Carmichael and Cummins (no date).

5 Hassall and Associates in Association with Musgrave (2002).

6 See, for example, Brennan & Scoccimaro (1999); Eigenraam and Stoneham 91998); NCC(2002); Young et al. (2000) and Young & Hatton MacDonald (2001).

7 See Bjornlund (1999) and, also, Bjornlund and McKay (2000).

8 See Shadwick (2002)

9 The copy of the signed original act is at http://www.foundingdocs.gov.au/places/sa/sa8.htm.

10 The Tinbergen Principle is concerned with the possibility that there might be a robust way to efficiently manage conflicting issues in a dynamic environment. Tinbergen identified the necessary conditions for a robust solution. It is necessary to carefully examine the proposed set of instruments to determine whether or not the combination of instruments chosen will produce a solution that will stand the test of time (see Tinbergen 1950).

11 Sometimes conditions pertaining to use and obligations to third parties are best separated.

12 That is, the more a government sets up barriers to trade, the more classes of reliability and means to access water it needs to offer. In a perfect market where transaction costs are trivial, efficient resource use can be achieved with the unit interest defined in a single manner.

13 See Hartman and Seastone (1965) for a thorough discussion of the importance of ensuring that trade does not result in the transfer of return flows that are already being used by some one else. For Australian information on the scale of this issue see MacDonald & Heaney (2002) and Heaney and Beare (2002).

14 Drip irrigation systems tend to be relatively efficient but most other types of irrigation return significant proportions of water to the river via drainage and groundwater processes. That which returns via groundwater can involve considerable time lags. Local soil conditions, the nature of aquifer arrangements and distance to the river also influence the extent of the time lags involved.

15 MacDonald & Heaney (2002) estimated that if water use efficiency in the Murrumbidgee system is increased by 10% and all the savings are retained by irrigators then the mean flow rate at Morgan in South Australia declines by 0.5%. However, if all the savings are returned to the River, the mean flow rate at Morgan increases by 2%.

16 The dearth of legal precedent in the area of water law in Australia suggests that very few water licences are fully specified. Essentially, most are one-sided contracts. Licensee obligations are fully specified but those of the government incompletely specified.

17 One way of progressing conversion from a volumetric system to a share entitlement system would be for agencies to begin by simultaneously labelling licences in both terms. A 3,000 ML high security licence, for example, might also be defined as representing 300,000 shares in the quantity of water periodically defined as being available for distribution to those people who hold high security shares. Related implementation issues are the questions of the spatial extent of the rights that are shared and the number of classes of share issued.

18 Federal Court of Australia. Minister of Primary Industry and Energy and Australian Fisheries Management Authority v's Davey et al., 1993.

19 See Natural Resource Management Council (2002) prepared by Marsden Jacob Associates. The statement is not strictly correct as the licences could always be cancelled.

20 If there is a need to assign priority in the delivery system then we consider it more efficient to allocate and distribute channel capacity separately.

21 In law, effectively this is the difference between a defeasible interest and a conditional interest.

22 See Aretino, et al. (2001), Sheenan (2002), NFF (2002), & Scott (1999).

23 The simplest and most economically way of doing this that we are aware of is to require each entitlement holder to surrender a proportion of their entitlement each year and then put this amount up for auction. Known as a "return-to-the-community," if the aim is to charge a 1% on the gross value of the entitlement, then 1% needs to be surrendered and sold. Similarly, if the aim is to collect 2% of the economic rent then 2% needs to be sold. The main advantage for this method, which is used in some forestry and some fishing systems, is its simplicity and the fact that the industry is forced to self-assess value. The mechanism also significantly deepens the market for the resource and makes values very transparent (Young 1999; Young and McCay 1995).

Research Report on Using Existing Legislation To Recover and Protect Environmental Flows in the River Murray

Megan Dyson

Including material prepared by John Scanlon
Megan Dyson and Katherine Wells

Murray-Darling Basin Commission Project Board
Environmental Flows and Water Quality Objectives in the River Murray
June 2002 Adelaide, Australia

Project brief

This Research Report reviews legal aspects of retrieving and protecting water for environmental flows under current legislation: the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the *Murray-Darling Basin Agreement and Acts*, and State1 water resource management legislation in South Australia, Victoria, New South Wales, Queensland and the Australian Capital Territory.

The Report draws on research on existing legislative provisions contained in an Attachment (available from the MDBC, see below), and assesses the ability of those provisions to deliver any of a number of options for recovering environmental flows, and to subsequently protect and manage those flows for environmental purposes.

The Report contains:

- a summary of legal issues with a bearing on interpretation and application of the legislation generally (Chapter 2);
- State-by-State discussion of legislative provisions for (and impediments to) protecting environmental flows (Chapter 3);
- discussion of the potential to use existing legislative provisions for reducing consumptive rights[2] to provide environmental flows under each of five different scenarios[3] (Chapter 4).

Authorship

The brief for this Report was to amalgamate two earlier reports prepared for the Murray-Darling Basin Commission Project Board on Environmental Flows and Water Quality Objectives in the River Murray ("the Project Board").

The first report, *Using legislation to achieve environmental flows in the River Murray* (September 2001) was prepared by John Scanlon, with Megan Dyson and Katherine Wells. The second report *Using legislation to protect environmental flows in the River Murray* (September 2001) was prepared by Megan Dyson. Copies of the original reports remain available from the Murray-Darling Basin Commission.

Availability of the full report

This report reproduced here does not include the Attachment which analyses 'Existing legislative mechanisms for retrieving and protecting environmental water'. The Attachment (and the full report) can be obtained from the MDBC: Ph: 1800 687 044; www.thelivingmurray.mdbc.gov.au; The Living Murray Initiative, MDBC, GPO Box 409, Canberra ACT 2601.

SUMMARY

Foreword

The Project Board has sought an overview of existing legislation. By its very nature, this Report is therefore general.

The Report is provided for the use of the Project Board and the MDBC for the purpose of explaining the availability of options for retrieving and protecting environmental flows under existing legislation. It is not intended to be relied upon as legal advice to individuals as to the operation of the provisions examined in any particular circumstances.

This Report reviews legislative mechanisms only, and no comment has been requested as to the many other issues which may determine the respective viability of methods for retrieving and protecting water for environmental flows.

Overview: retrieving and protecting environmental flows across disparate legislative provisions

The Report reviews the existing legislation, assessing its capacity to retrieve and protect environmental flows, but concludes that given the disparity in existing legislation in each State, no single model for retrieving and protecting environmental flows could be implemented across all jurisdictions under the existing legislation.

Protecting environmental flows (Chapter 3)

Chapter 3 reviews each jurisdiction's existing legislation for protecting environmental flows, in particular examining how environmental flows can be protected from future reduced inflows, for example as a result of changes in climate or land use. Key points from Chapter 3 are:

- A regime of 'adaptive management'[4] is the most likely to provide a managed approach to protection of environmental flows. However, adaptive management regimes may be slow to respond to changes in conditions as they entail consultative planning processes.
- All States have legislative provisions that could be used to protect and/or quarantine environmental water. All States now include provisions for an adaptive management regime involving a consultative planning process, at least to some extent. There are significant variations between regimes in terms of the extent to which plans must specify and provide for environmental needs, the timeliness of the adaptive response, and the obligation to respond at all[5]. The SA, NSW and Qld systems are similar in so far as provisions for environmental water needs are made through the planning hierarchy, amendments to which may result in reductions of consumptive entitlements. ACT has a system similar to SA and NSW in terms of planning, although reduction of consumptive use is not tied to the planning regime.
- NSW and SA have provisions that allow the Minister to amend consumptive rights in certain circumstances without going through the prescribed consultative process. (In NSW this remains within the planning framework, while in SA the powers exist outside of that framework.)
- A system of allocation of consumptive entitlements as shares of the available resource rather than as fixed volumes offers flexibility for accommodating future variations in the total available resource. Fixing environmental requirements and allocating consumptive use by share of the remaining pool could effectively protect the environment from the impact of reduced inflows without needing to resort to lengthy plan amendment processes or compensatory schemes. However, States' provisions as to allocating by share vary considerably.
- In general terms, existing environmental water and unallocated water is protected from being allocated for consumptive use in the future through Schedule F of the *Murray-Darling Basin Agreement* (the Cap on development). However, the Cap is designed to stem consumptive use at 1994 levels of development (as defined). While there are mechanisms for altering the Cap, it is not expressed in such a way as to be automatically responsive to reductions in inflows, nor does it have an automatic impact on consumptive use by individuals.
- Commonwealth legislation is of limited application to the protection of environmental flows through other than financial schemes.

Reducing consumptive water rights (Chapter 4)

Chapter 4 reviews existing provisions for reducing consumptive entitlements, in the context of each of five different scenarios for reducing entitlements ("the Lewis report").

Amongst other things, Chapter 4 reveals that:

- The systems in each of the four State jurisdictions operate disparately. SA, NSW and Queensland bear the closest comparison to one another in terms of statutory scheme and flexibility in compulsory reduction of consumptive use rights. Victoria has the least flexibility, in legal terms, for compulsory reduction of rights.
- Only the non-compulsory schemes for reducing consumptive rights, such as market purchase and investing in improved efficiencies, would be able to be implemented in each jurisdiction without legislative amendment (subject to the proper expenditure of Government funds).
- Implementation of any of the compulsory schemes would require amendment to legislation in at least two of the State jurisdictions, depending on the approach used.
- The ability to achieve a reduction in rights in NSW, Victoria and Queensland is constrained by the duration of entitlements or statutory management plans (of 10 to 15 years) coupled with the consequences of 'early' modifications. NSW and Queensland address the issue of 'early' changes through providing for the payment of compensation.
- There is no relevant Commonwealth legislation specifically empowering the Commonwealth to acquire water rights compulsorily.
- The *Murray-Darling Basin Agreement* and *Murray-Darling Basin Acts* in each jurisdiction, while arguably permitting the development of a measure for the reduction of consumptive water rights, do not contain the powers necessary to implement such a measure. Whether the Agreement would *require* States to legislate to enable the implementation of such a measure is debatable.
- The Report's findings against each of the five methods for retrieving consumptive entitlements mentioned in the Lewis report are summarised in paragraph 4.1.

2. SOME UNDERLYING LEGAL ISSUES

There are a number of legal issues which have a general bearing on the interpretation and application of legislation. Some are discussed in this Chapter, rather than being raised separately in discussion on particular provisions.

2.1 Implementation of provisions for environmental flow protection

This Report reviews existing statutory provisions for protection of water for the environment. In terms of legal consequences of the provisions, two questions arise – what obligation is there on a government to utilise the various powers that exist in order to protect environmental water; and what options does a government have if it does choose to act?

The latter question requires a detailed look at provisions in each State and is dealt with in Chapter 3 below. The first question can be answered in general terms as follows.

Most of the State legislation considered in this Report includes broad environmental objectives. However, the specific legislative powers and obligations in relation to protection of environmental water needs are generally of a discretionary nature. Where obligations (for example, to amend management plans or to prepare environmental water rules) are expressed as mandatory, an alleged failure of a Minister or other decision maker to fulfil the obligation would generally be subject at most to judicial review rather than civil enforcement or other review provisions.

The phraseology used in each piece of legislation is different. Obligations to protect environmental water are expressed both explicitly and implicitly as a part of the overall planning regime. However, there is nothing specific enough in any of the legislation reviewed that would be likely to force the translation of an assessment of environmental impacts of reduced inflows into clear requirements on governments to reduce consumptive entitlements.

The rules of administrative law regarding the exercise of statutory powers would probably prevent decision makers from approving a water planning instrument[6] that *increased* consumptive entitlements in the face of clear evidence of reduced inflows,

particularly given the stated objects of the legislation reviewed. A person with sufficient standing could take judicial review proceedings seeking an injunction against such a plan being approved[7]. However, it is less clear that those rules would require the Minister to amend a plan to *reduce* consumptive entitlements.

The strength of any argument for judicial review for a failure to act, or for positively acting contrary to environmental needs, would depend on many factors including:

- the weight of evidence before the Minister or other decision-maker as to environmental needs;
- the terms and specificity with which the obligation to protect environmental needs was expressed;
- any specific provision regarding the weight to be given to environmental considerations in exercising powers under the Act[8]; and
- the objects clause (including, for example, inclusion of the precautionary principle and the manner in which it was expressed).

The issue will not be further discussed in this Report. Public involvement in enforcement of water law is discussed by Dr Poh-Ling Tan in the paper entitled *"Legal Issues relating to water use"*[9].

2.2 Compulsory vs. non-compulsory reduction of rights

In looking at existing legislative provisions for retrieving water from consumptive users, Chapter 4 examines each of the five methods described in the Lewis report. However, for the purposes of legal analysis, the issue may be separated into just two parts - compulsory and non-compulsory reduction of consumptive water rights. The Attachment analyses compulsory and non-compulsory provisions in each jurisdiction[10].

In general terms, *compulsory* removal of rights requires clear legislative power. Where the power is being exercised by the Commonwealth, and there is an acquisition of property (as opposed to an extinguishment - see below) compensation must be payable in order for the law, and its exercise, to be valid. States are under no such constitutional compunction.

In general terms, *non-compulsory* removal of rights does not require legislative power. Governments are, subject to the proper appropriation and expenditure of funds, capable of making many varieties of agreements with individuals to acquire property. State and Commonwealth legislation relating to Government financial management will be applicable. Where a statutory body (whether or not an agency of the government) proposes to *acquir*e property, extra care will need to be taken to ensure that the statute establishing the body allows such an acquisition. No further comment is contained in this Report on methods by which governments may acquire property outside of a particular statute.

However, some of the legislation examined in this Report contains specific provisions authorising Governments to give financial assistance in order to achieve the objects of the legislation. In some circumstances these could be used to *acquire* water rights, and/or to compensate for the removal or extinguishment of rights. Additionally, specific legislation, such as the *Natural Heritage Trust Act* (Commonwealth) exists which has as its sole aim the use of financial assistance to obtain environmental benefits.

Legislation governing the granting of water rights also sets out specific processes governing non-compulsory removal or surrender of rights, such as the method by which water licences may be surrendered or allocations transferred. Such legislative provisions are noted in the Attachment[11].

2.3 Water licences as 'property'

Legal advice on the ability to provide more water for the environment through reducing consumptive rights under existing legislation cannot be definitive unless and until the relevant provisions in each jurisdiction have been litigated. This Report can only discuss in general terms the options presented by the relevant legislation.

The scope provided by the various legislative provisions will often depend on the nature of the interests under discussion, and the extent to which a particular entitlement may be characterised as a 'property right'. The extent to which provisions in an Act for 'water for the environment' may temper the characterisation of those proprietary interests, and whether the removal of rights amounts to an *acquisition* or *extinguishment*, may also be relevant.

Some discussion on these issues is included below. However, much has been written on the particular

topic of water rights as 'property'[12], and remains to be debated in other forums.

2.4 Compulsory acquisition – difference between States and Commonwealth

While the Commonwealth's power to make laws to acquire property is limited to doing so on "just terms"[13], there is no such limitation on a State Parliament's legislative power. States are free, at least in constitutional theory, to resume property compulsorily without paying compensation[14]. However, Courts apply a legal presumption that legislation does not intend to alienate or interfere with vested proprietary interests without adequate compensation. The presumption may be rebutted by clear language in the legislation, and is weaker in its application to statutory rights than to vested, common law rights[15].

The case of statutory rights granted pursuant to a scheme that also sets out the limitations to those rights is a special one. In such cases, the very nature of the 'property' in the statutory right is limited by the provisions of the Act. This is reflected in the approach of the Courts to the question whether a right is being acquired or extinguished (see below).

The question whether a State Act intends that compensation should be payable for removal of rights (whether by acquisition or extinguishment) will depend on the construction of the legislation as a whole. A Government's right to legislate to regulate access to and management of water resources is long accepted[16]. It seems likely that where statutory powers to remove rights exist as a part of a scheme for management (particularly where the legislation provides for the removal of rights to water entitlements in circumstances where there is clearly no acquisition of that property by the Government, but rather an extinguishment of statutory rights) the presumption discussed above would be effectively rebutted, or not arise at all.

2.5 Difference between acquisition and extinguishment of rights

The nature of rights to access water, and the extent to which particular rights may be characterised as a species of defeasible statutory entitlement (as opposed to common law rights) and therefore subject to the effects of subsequent administration of, or changes to the legislation, depends on the terms of the relevant legislation.

The removal or modification of certain statutory rights may not be properly characterised as an acquisition of property. This point was discussed by the Federal Court at some length in *Bienke v Minister for Primary Industries* (1996) 63 FCR 567, and subsequently by the High Court in *Newcrest Mining (WA) v Cth* (FC 97/036, 14 August 1997) and *Commonwealth of Australia v WMC Resources Ltd* [1998] HCA 8 (February 1998)[17].

Bienke concerned the amendment of a Commonwealth Fisheries plan of management for the Northern Prawn Fishery ("NPF 11"). Bienke's fishing boat licence was issued under the *Fisheries Act 1952* (Cth) and was expressed to be subject to the provisions of the NPF Plan. By amendment to the NPF in 1993, the units applicable to Bienke's licence were reduced to such an extent that Bienke was unable to use the licence to take prawns. A market in units existed so that Bienke could have purchased further units in order to keep the licence viable.

The Federal Court found that the amendment of the NPF did not amount to an acquisition of property. In reaching that finding, the Court discussed the nature of the property rights in the licence. The Court held that the permission granted by the licence was inherently susceptible of modification *or even extinguishment*, depending on the amendments to the NPF (author's emphasis)[18]. The Court also held that "an acquisition of property, as distinct from the mere extinguishment of a right" is necessary to attract the provisions of section 51 (xxxi) of the Constitution. Bienke sought leave to appeal to the High Court, but leave was refused.

The cases discussed here are directly applicable only to the Commonwealth's power to legislate to acquire property; they are not directly relevant to the power of a State to legislate to acquire property, or to establish a scheme which creates various property interests through a licensing regime. However, the cases do shed light on proper application of the legal presumption that legislation does not intend to interfere with vested rights without proper compensation.

2.6 Future dealings with the rights -

acquisition vs. extinguishment

The manner in which rights are reduced by a Government may have ramifications for the future dealings with the entitlements. If the intention of a scheme for retrieving rights is that the rights will be allocated to a specified person to manage on behalf of the 'environment', then the legislation being used should specifically provide for this future dealing.

This is a matter that would require more detailed advice if retrieval of rights were to proceed under existing legislation. However, a new legislated scheme could avoid the issues by simply describing the process and outcome for reduction of rights.

2.7 Application of 'natural justice'

This Report contains limited discussion on the *processes* that should be followed in exercising existing legislative power to either retrieve or protect water for environmental flows. However it should be noted that where legislation is used to diminish rights previously enjoyed, courts will examine the legalities of the Government's actions very carefully. Both the specific detail of the legislation and the application of common law principles of procedural fairness will be scrutinised. While this part of the Report contains some discussion of the role of natural justice, specific advice in relation to the manner in which any scheme would utilise existing provisions would need to be obtained before implementing a particular scheme, including under new legislation.

The successful utilisation of any statutory power depends on its correct interpretation and application. One of the principles essential to the proper use of statutory power is that of 'natural justice'.

Natural justice, or procedural fairness, is a set of minimum standards developed by the Courts, which need to be applied when making administrative (including statutory) decisions. The requirements of natural justice are basically that decisions be made 'fairly'. What constitutes fair process in any particular situation will depend on a number of factors.

The need to observe procedural fairness applies to a variety of bodies in a variety of circumstances. For the present purposes, the need to observe procedural fairness applies to Governments and Ministers exercising statutory powers, when the exercise of those powers will deprive a person of the legitimate expectation of some benefit.

While the detail of what will constitute fairness in a particular situation will vary, procedural fairness has two elements:

- A fair hearing - this element requires that:
  - a person should receive notice and sufficient particulars of the proposed decision;
  - a person should have a chance to be heard; and
  - the decision maker must consider all relevant matters put to him or her.

  The amount of notice, whether it is given personally or generally (eg by advertisement in a newspaper), and the manner in which responses may be made (eg written or in person) will turn on factors such as the number of people affected by the proposed decision, the urgency of the decision, any provisions in the legislation that may prescribe such processes.
- An unbiased decision-maker - this element requires that the decision maker is, and is seen to be, impartial. Factors that could affect the actual or perceived impartiality of a decision maker include personal or pecuniary interest in the subject matter or persons affected.

The holder of a statutory water right would undoubtedly have a legitimate expectation that that right would not be removed without the holder being afforded natural justice[19]. The extent to which each element would apply will depend largely on the terms of the legislation.

The more prescriptive legislation is about the manner in which licences may be altered, including the manner in which a hearing will be given, the more likely it is that a court would find that the legislature intended to preclude any further elements of a 'fair hearing', and that the 'fair hearing' element of natural justice will be satisfied where the statutory process is properly followed. On the other hand, where legislation provides a process by which allocations may be removed, but does not mention any elements of the 'fair hearing' rule, care will need to be taken that an appropriate level of hearing is provided.

It would be advisable for each jurisdiction to take independent legal advice on what elements of procedural fairness should be accorded, and what that should entail, prior to acting on the particular legislative powers outlined in this Report.

2.8 Use of regulation-making powers

Regulations must be made within the scope of the Act which empowers them to be made.

Regulation-making powers in legislation are often phrased in general terms[20] sometimes with a specific list of further powers or examples of the scope of the power following the general provision.

Without specific empowering provisions, regulations would not be construed as supporting a scheme to remove entitlements that are granted by the legislation itself, or to impose a levy for compulsory buy-back of entitlements. Unless clearly envisaged by the Act itself, such a regulation would not be seen as reasonably proportionate to the Act, and would be invalid.

As the regulation making powers in the legislation discussed here do not contain words specifically supporting such a scheme, the Attachment does not further discuss their use.

2.9 Taking account of extra-territorial factors

The SA legislation specifically enables the Minister to take action to reduce water rights pursuant to a reduction under the *Murray-Darling Basin Act 1993*, regardless of whether the SA environmental circumstances would require a reduction in consumptive use. It is the only State to do so.

In Victoria, amendments made by the *Water (Irrigation Farm Dams) Act 2002* ("WIFDA") require "every power, discretion, function, authority and duty of the Minister, the Authority and the Tribunal under this Act" to be "construed subject to the *Murray-Darling Basin Act 1993* and the agreement approved by that Act"[21]. Further, the WA(Vic) specifies that this requirement is to operate to ensure that the Agreement "prevails over a right to take or to use water conferred by or under this Act, other than section 7(1), 8(1) or 8(4)(c)"[22]. The possible impact of the section has not been analysed in detail for the purposes of this Report. However, it is likely that the section will operate to give force to an express provision of the Agreement or Act imposing a duty or limit on Victoria.

Legislation in the other States is more general in its reference to interstate matters. NSW and Queensland have provisions requiring management of water resources to reflect government obligations under interstate agreements such as the *Murray-Darling Basin Agreement*[23]. The ACT provisions state that one of the functions of the administering Authority is to implement intergovernmental agreements relating to water resource management. However, the extent to which this may influence the exercise of power to compulsorily reduce entitlements is not clear. It is possible that legislation for compulsory reduction of entitlements in these States would be limited to use where there was a proven environmental need *within that State*, and that Ministers would be prevented from relying upon extraterritorial factors[24].

More detailed advice would be required to determine to what extent Ministers may be prevented from taking into account extraterritorial factors, if retrieval of rights is to proceed under existing legislation.

3. Protecting Water for Environmental Flows under Existing Legislation

3.1 Introduction and Summary

According to the background issues identified in the brief, this Research Report will be used to help identify any legislative constraints to the development and implementation of policies and adaptive management regimes for the provision and protection of environmental water. To what extent can existing legislation protect environmental flows in the long term, and prevent them from being whittled away through reduced inflows to the river system, for example, through the effects of climate change or changes in vegetation?

The legislative schemes in each jurisdiction are very different, ranging from adaptive management regimes to direct intervention outside of a planning system. This Chapter analyses the 'environmental' provisions in each State, rather than attempting to provide general advice applicable to all jurisdictions. The Chapter does not attempt to be comprehensive in listing all provisions that exist, or may be used, for protecting the environment or aspects of it. Rather, it contains an overview of the most direct methods by which environmental water needs for relevant surface water resources[25] may be protected.

The aspects examined are:

1. the legislative provisions regarding the provision and protection of water for the environment; and
2. the legislative options and consequences for reducing consumptive entitlements to protect environmental water from reduced inflows.

While the differences in each jurisdiction are manifest, key points may be summarised as follows:

- A regime of 'adaptive management' (see paragraph 3.2 below) is the most likely to provide a managed approach to protection of environmental flows. However, adaptive management regimes may be slow to implement the changes in entitlements necessary to respond to changes in environmental conditions. Adaptive management regimes that incorporate allocation by share rather than by volume could provide a much quicker response, where legislation allows such an approach.
- All States have legislative provisions that could be used to protect and/or quarantine environmental water. All States now include provisions for an adaptive management regime involving a consultative planning process, at least to some extent. There are significant variations between regimes in terms of the extent to which plans must specify and provide for environmental needs, the timeliness of the adaptive response, and the obligation to respond at all[26]. The SA, NSW and Qld systems are similar in so far as provisions for environmental water needs are made through the planning hierarchy, amendments to which may result in reductions of consumptive entitlements. ACT has a system similar to SA and NSW in terms of planning, although reduction of consumptive use is not tied to the planning regime.
- NSW, SA and ACT have additional provisions that allow the Minister to amend consumptive rights in certain circumstances without a prescribed consultative process.
- A system of allocation of consumptive entitlements as shares of the available resource rather than as fixed volumes offers significant flexibility for accommodating future variations in the total available resource. Fixing environmental requirements and allocating consumptive use by share of the remaining pool could effectively protect the environment from the impact of reduced inflows without needing to resort to lengthy plan amendment processes or compensatory schemes. Each State seems to have provisions that would allow such a system to be implemented, but the legislation varies in its clarity. NSW explicitly establishes a share system, together with provisions for determining, from time to time, the size of the available resource. In Victoria details of the volume represented by the share could be achieved through conditions on the licence or bulk entitlement, while in SA, detail would presumably be provided through the water allocation plan. The ACT regulation-making power appears to envisage providing detail of a 'share' system. The Qld legislation may anticipate such a system being applied through the water allocation plan.
- There is little in the legislation of any State that would provide legal remedy to prevent 'slippage' in environmental water. Legislative provisions for monitoring and subsequently reviewing and reallocating entitlements, and for direct action (outside of the planning framework) to protect environmental water, are generally discretionary rather than obligatory. Even where provisions are obligatory, there are generally no clear remedies apart from judicial review proceedings. The inherent nature of water resources management, scientific uncertainties and the meaning of and role played by the principles of ESD in legislation all diminish the clarity of the obligations.
- Specific State provisions for reducing consumptive rights are set out in Chapter 4. Commonwealth legislation is of limited application to the protection of environmental flows through other than financial schemes, and is mentioned only briefly in paragraph 3.4 below.
- In general terms, existing environmental water and unallocated water is protected from being allocated for consumptive use in the future through Schedule F of the *Murray-Darling Basin Agreement* (the Cap on development). The Cap is designed to stem consumptive use at 1994 levels of development. While there are mechanisms for altering the Cap, the level of the Cap will not respond automatically to reduced inflows. Further, the Cap is an agreement of the parties, and not a law that impacts automatically

on individuals. Recent amendments in Victoria may have strengthened the ability of that Government to implement the Cap.

3.2 'Adaptive Management' and other Methods Protecting Environmental Water Needs

There appear to be three main constructs that can be used to protect environmental flows, elements of which are variously evident in the legislation of each State:

1. allocation of specific environmental flows to a person or body to hold on behalf of the environment; that person or body may be given special rights and obligations, or treated the same as any other entitlement-holder;
2. allocation of consumptive rights through a planning system which allocates for consumptive use only when environmental needs have been assessed and provided for through the plan (ie, allocation takes place within a set cap); the 'cap' may be amended by amending the plan; or
3. allocation of consumptive rights through a planning system as above, but on the basis of shares of the pool identified for consumptive use; reduced pools for consumptive use can be managed on the basis of existing shares rather than requiring plan amendment to vary shares. Plan amendment can be used to alter the sizes of shares as between use-sectors (for example, domestic, municipality, irrigation and environment).

'Adaptive management' in this Report is used to mean management of water resources which includes legislative requirements to undertake a cycle of assessing, planning, allocating, monitoring and reviewing, and which also includes provision for *re-allocation* to accommodate the results of reviews. It is a concept underlying methods two and three above.

Adaptive management regimes now exist, to varying extents, in all States. In SA, NSW, Qld and ACT environmental water requirements are to be determined and subsequently kept under review by management plans. Environmental flows may be protected from future variation by the reallocation of rights within a framework of all entitlements as set out in the relevant management plan. Victoria has recently introduced provisions for management plans which may alter the volumes of water available for consumptive use. However, the provisions do not require the continual monitoring and regular review of management plans, nor make explicit requirements about identifying and providing for environmental water needs, nor do they apply to existing bulk entitlements[27].

The extent to which legislation may protect environmental needs against other demands on the water resource may be affected by the way in which environmental considerations are expressed in the objects of the Act, and the way in which the Act requires the objects to be given effect in exercise of substantive powers in the Act.

Unless legislation specifically sets out how the objects clauses are to be given effect to in the interpretation of the substantive provisions of the Act, objects clauses can have little effect. The manner in which legislation incorporates objects provisions is commented on in the State-by-State analysis below.

3.3 MURRAY-DARLING BASIN

3.3.1 Provisions to protect environmental water

The ability of the *Murray-Darling Basin Agreement* ("Agreement") to provide direct protection of environmental water is limited as the Agreement provides for policy agreement amongst the parties; it does not bind private individuals. However, there are numerous provisions in the Agreement which point to its intentions in terms of protection of environmental water.

The purpose of the Agreement is expressed in clause 1 as "to promote and co-ordinate effective planning and management for the equitable efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin". None of the terms 'equitable', 'efficient' or 'sustainable' is defined. However, the way in which the purpose is intended to be fulfilled is reflected in many provisions of the Agreement including:

- the composition of the Ministerial Council and the Commission, both of which require membership to include representation of jurisdictions' environmental portfolios; and
- the functions of the Commission, in particular in investigations, studies, monitoring and other

activities directed to the equitable, efficient and sustainable use of water, land and other environmental resources of the Basin.

To some extent, both existing environmental flows and unallocated water providing environmental benefit are protected from being allocated for consumptive use in the future through Schedule F. The Cap is designed to stem consumptive use at 1994 levels of development. While there are mechanisms for altering the Cap, the level of the Cap will not respond automatically to reduced inflows.

3.3.2 Options for reducing consumptive entitlements

As rights are not allocated to individuals for consumptive use under the Agreement, the Agreement similarly has no role in the direct reduction of consumptive entitlements.

However, the Agreement has been used to implement Schedule F, which sets a Cap beyond which parties are not expected to allocate for consumptive use. Schedule F provides for the Cap to be varied. Variation could be used to respond to reduced inflows through obliging governments to take action to reduce consumptive use to remain within a lower Cap.

In terms of flexibility to respond to reduced inflows, there appears to be nothing in the Schedule that would prevent the Cap from being expressed as consumptive shares of total flows (or total flows minus specified environmental requirements), although expressing this for each State would have practical difficulties.

Further discussion on using the Agreement, including Schedule F, to reduce consumptive entitlements or to protect environmental flows from future degradation, is contained below in Chapter 4 and in the Attachment[28].

3.4 COMMONWEALTH

The Commonwealth has not legislated to directly achieve or protect environmental flows. Existing Commonwealth legislation is of limited application to the question of using legislation to achieve or protect environmental flows, outside of incentive schemes.

Both the *Environment Protection and Biodiversity Conservation Act 1999* ("EPBCA") and the *Natural Heritage Trust Act 1997* ("NHTA") provide the ability for the Commonwealth to participate in incentive schemes for protection of environmental flows[29]. Schemes under the Acts could be used to purchase, or fund the purchase, of consumptive entitlements to be set aside in trust for environmental purposes.

In terms of Commonwealth power to intervene to prevent environmental water flows from being eroded, it is possible that substantially reduced inflows could increase the likelihood of the EPBCA being triggered[30].

The EPBCA triggers most relevant to the extraction of water from the Murray-Darling system are currently wetlands of international significance, threatened and endangered species and internationally protected migratory species. It is possible that substantially reduced inflows could result in smaller proposals for new use, expansion or intensification of use of water[31] becoming critical enough to pass the "significant impact" test and therefore require Commonwealth approval before proceeding. However, the EPBCA could not prevent the subject water from being allocated in the future, for example, in smaller portions to diverse users.

3.5. SOUTH AUSTRALIA

3.5.1 Provisions to protect environmental water

The South Australian *Water Resources Act 1997* ("WRA(SA)") establishes an adaptive management regime within which water resources are assessed and allocated in accordance with a water planning hierarchy.

The main protection for environmental water needs is provided through this planning framework. Environmental considerations are also given special weight through numerous provisions including the 'object' clause, contents of plans, manner in which allocations to water licences may be made, monitoring of resources and review of plans, and reduction of consumptive entitlements.

The planning framework effectively sets a 'cap' for allocation to consumptive uses. The planning framework requires environmental needs to be monitored, and allows for reviews of the plans to reduce the water available for consumptive use or to reallocate resources as between different kinds of users.

The WRA(SA) requires the Minister to keep the State Water Plan up to date, including in its assessment of the state and condition of water resources and in its

proposals for managing resources so as to achieve the object of the Act. An amendment to the State Water Plan could, if specific enough in its statement of the need to reduce consumptive entitlements so as to protect environmental water requirements, force an amendment to a water allocation plan and to the licences subject to it. Water allocation plans could be amended to provide for allocation of consumptive entitlements as a share of available water rather than as a specified volume. While the relevant provisions are not as explicit as in the NSW legislation, they would seem to enable this approach, providing more flexibility to accommodate reduced inflows.

No formal 'allocations' of water are made to the environment, nor special environmental licences established. However, in practice some 'environmental' licences have been issued as ordinary licences with an allocation that is expressed to be used solely for specified environmental purposes.[32]

All water identified for consumptive use in the River Murray in South Australia has been allocated. Unallocated water in the River Murray remains in the river system for 'environmental' purposes (including evaporation). That water is protected from becoming part of the consumptive use pool by South Australia's obligations under the Cap under the *Murray-Darling Basin Agreement* ("the Agreement"), and through the operation of the planning framework within which water is allocated, outlined above.

3.5.2 Options for reducing consumptive entitlements

Statutory options for the reduction of consumptive entitlements, and consequences for the Government (including compensation) should this be done, are set out in Chapter 4 below. As mentioned there, the South Australian legislation contains flexible provisions for the reduction of entitlements without compensation, where this is done due to an identified environmental need, or because there has been a reduction in the quantity of water available under the Agreement. The latter provision allows upstream environmental considerations to be acted upon in exercising powers to reduce consumptive entitlements, where those considerations are reflected in water availability under the Agreement.

While use of powers within the planning framework depend on a lengthy consultative process, the Minister's powers to reduce entitlements outside of the planning process, provided sufficient evidence exists upon which the Minister can act, could achieve a relatively quick result. However, use of the planning process would be more likely to achieve community support and therefore avoid litigation, and also provide additional or alternate grounds[33] upon which the Minister could then exercise the powers of reduction. Disadvantages of the planning process under the WRA(SA) are that it is lengthy, with plan amendments likely to take at least two years to finalise[34].

Given the way in which the object of the WRA(SA) is expressed, it seems unlikely that reduced inflows could result in a complete quarantine, or isolation, of environmental needs from reduced inflows at the expense of consumptive users.

The extent to which environmental water would bear some reduction (that is, the extent to which consumptive entitlements would also be protected from reduced inflows) would be a question of balance read in light of the object of the Act. The determination of the balance would be undertaken ultimately by the Minister, whose responsibility it is to approve plans and plan amendments. However, the Minister's powers would be exercised in the context of the statutory planning process, which would identify the extent to which the community accepted the evidence of environmental needs. This is somewhat similar to the likely position in Queensland, but can be contrasted with provisions in New South Wales, which seem to provide more strongly for environmental needs to be protected ahead of consumptive uses.

3.6 VICTORIA

3.6.1 Provisions to protect environmental water

The Victorian *Water Act 1989* ("WA(Vic)") has been significantly amended in the area of protection of environmental water needs by the *Water (Irrigation Farm Dams) Act 2002* ("WIFDA"). However in terms of the granting and management of conversion bulk entitlements from the River Murray (which comprise by far the majority of water allocated for consumptive use) the amendments are likely to have little application.

A key feature of the amendments is the Minister's power to declare 'water supply protection areas' and the consequences that may follow such a declaration,

including the development of a management plan and declaration of 'permissible annual volumes' (PAV) limiting the amount of water that may be taken from an area annually.

Granting and management of consumptive use within a water supply protection area will be largely governed by a management plan for the area, created through a consultative process. The object of management plans is to "make sure that the water resources of the relevant water supply protection area are managed in an equitable manner and so as to ensure the long-term sustainability of those resources". Management plans may prescribe a number of things, including specific provisions directed to sustainable management of the resource, such as management of consumptive entitlements.

Approved management plans will be binding on every person unless specified by the Minister. In particular, management plans must be given effect to when determining any application for a new bulk entitlement or section 51 licence[35].

The WA(Vic) also provides specific consideration of environmental needs by allowing for the formal allocation of water licences for instream uses (section 52 licences), and allowing bulk entitlements to be issued for environmental use, as has occurred in respect of the Kerang Lakes.

The legislation does not attach any special rights or obligations to an in-stream licence issued under section 52. It appears that such licences are subject to essentially the same provisions as to issue, conditions, sale, renewal, transfer (except interstate transfer) revocation and surrender as consumptive use licences.

The ability of bulk entitlements (including conversion bulk entitlements) to be expressed as a share of the available resource is a flexible method for accommodating reduced inflows, through whatever cause. While there are no such explicit provisions for section 51 licences, there is nothing that would prevent the expression of entitlement by share. Amendments made by the WIFDA may allow management plans to implement a share-based allocation system for section 51 licences, although this Report does not analyse the new provisions in detail in that respect.

No new section 51 licences or water rights under conversion bulk entitlements are available for consumptive use from the River Murray in Victoria, so the new management planning provisions will have limited impact. Unallocated water that serves an environmental benefit is protected from allocation for consumptive use by Victoria's obligations under the Cap.

The granting of licences for environmental purposes is discretionary. However, new provisions require an applicable management plan to be "given effect to" in the granting of new consumptive entitlements (whether under sections 51 or 52, or by bulk entitlement) and through altering existing section 51 licences.

3.6.2 Options for reducing consumptive entitlements

Statutory options for the reduction of consumptive entitlements, and consequences for the Government (including compensation) should this be done, are set out in Chapter 4 below.

Options in Victoria for reducing consumptive entitlements for protection of environmental water include[36]:

- through contractual arrangements and use of the Minister's power to direct Authorities to apply for review of their bulk entitlement;
- through conditions imposed on transfers of entitlements; or
- for section 51 licences, through a management plan where the resource is a declared water protection area.

It is not clear to what extent environmental considerations interstate (either upstream or downstream) may be taken into account in, for example, amending management plans to reduce consumptive use. Small reductions in inflows to Victorian rivers and tributaries within the Murray-Darling Basin could translate into significant environmental impacts downstream. Amendments made by the WIFDA to require powers and functions, and consumptive water use rights, under the WA(Vic) to be construed subject to the Agreement and MDBA may address this.

3.7 NEW SOUTH WALES

3.7.1 Provisions to protect environmental water

The object and water management principles of the New South Wales *Water Management Act 2000* ("WMA(NSW)") together clearly set out the principles of ecologically sustainable development, and detail the way in which those principles must be applied by those administering the Act. Protection of the environment's water needs is a clear focus of the legislation.

The WMA(NSW) establishes an adaptive management regime within which water resources are assessed and allocated in accordance with a water planning framework similar in many respects to the South Australian system. Environmental considerations are given special weight through numerous provisions including:

- the many explicit provisions of the objects and water management principles;
- the obligation of administrators to give priority to environmental requirements before consumptive requirements;
- the contents of plans (including environmental water rules and bulk access regimes);
- the manner in which access licences are granted;
- audit, review and amendment of management plans; and
- the potential for reallocation of resources including reduction of consumptive entitlements.

Allocations to the environment are effectively made through the environmental water rules and water sharing provisions which must exist in respect of all resources from which access licences are to be issued. However, these are not formal allocations in the sense that the Victorian legislation provides for licences to be issued for instream uses.

Unlike the Victorian system, it appears that access licences could not be granted to formalise an entitlement for non-consumptive use, as the provisions relating to access licences refer to the "extraction" of water.

The planning framework effectively sets a 'cap' for allocation to consumptive users[37]. Provisions for plan review and amendment allow the water available for consumptive use to be reduced, and/or for a reallocation of resources amongst different classes of consumptive users.

The WMA(NSW) provisions that allow for consumptive entitlements to be issued as shares or specified proportions of the total available water are of clear benefit in providing for future variations in the size of the total available, whether the variations are permanent or seasonal[38]. The use of proportionate expressions of licences, together with 'available water determinations' are a flexible method for reducing consumptive use without altering consumptive entitlements. (This may be contrasted with the processes for varying entitlements, which may be associated with compensation requirements[39].)

Management plans are to be subject to both external audit and Ministerial review. While there is no requirement for management plans to be amended to remedy defects shown in an audit, the Minister is required to have regard to the results of the audit when setting the terms of reference for the preparation of a new management plan.

3.7.2 Options for reducing consumptive entitlements

Statutory options for the reduction of consumptive entitlements, and consequences for the Government (including compensation) should this be done, are set out in Chapter 4 below. As mentioned there, the New South Wales legislation contains fairly flexible provisions, at least within the planning framework, for both the direct and indirect[40] reduction of entitlements. Opportunities to limit or reduce consumptive entitlements *outside* of the planning framework are limited. One such provision is the power of the Governor to declare an embargo on applications for access licences from a particular resource, which operates until further notice[41]. An embargo could prevent further consumptive use allocation outside of the planning process, although would not restrict existing use.

While there is no explicit mention of environmental factors as a motivator for the use of those provisions (as there is, for example, in South Australia), the explicit objects and water management principles of the WMA(NSW), and the role and functions of management plans and bulk access regimes, would appear to give clear support for use of the provisions for such purposes.

Statutory options in NSW for reducing consumptive entitlements for protection of environmental water are likely to be relatively slow if the plan amendment process is used, although possibly shorter than in South Australia and Queensland[42]. Ministerial amendment of bulk access regimes outside of the consultative plan amendment process is an option, but would result in compensation being payable to those affected.

The objects and water management principles of the WMA(NSW), particularly the requirement for administrators not only to promote the principles, but also to give priority to protecting the water source and its dependent ecosystems, indicate a fairly strong argument for environmental health water, at least, to be quarantined from reduced inflows at the expense of consumptive users.

It is not clear to what extent environmental considerations interstate (either upstream or downstream) may be taken into account in, for example, amending water resource plans to reduce the share available for consumptive use. Clearly small reductions in inflows in the NSW rivers and tributaries within the Murray-Darling Basin could translate into significant environmental impacts downstream.

3.8 QUEENSLAND

3.8.1 Provisions to protect environmental water

The Queensland *Water Act 2000* ("WA(Qld)") establishes an adaptive management regime within which water resources are assessed and allocated in accordance with a water planning framework similar in many respects to the South Australian and NSW systems. However, in contrast to the NSW legislation in particular, references to environmental requirements are tempered somewhat by the weight of references to the needs of consumptive users and the aim of 'sustainable management'[43], perhaps reflecting the different circumstances of water resources in the States.

There is no overall expression of objects in the WA(Qld); rather, each Chapter separately states its objects in a 'purposes' provision. The purposes of the Chapter dealing with allocation and sustainable management of water resources are set out in some detail, and contain a mix of economic, environmental and social considerations. While the principles of ecologically sustainable development are specifically mentioned, and elements of ESD reflected in various subparagraphs of the purpose, the principles of ESD are not central to the expressed purposes.

Specific provisions for environmental water needs include:

- the contents of water resource and resource operations plans (including monitoring requirements and statements of ecological outcomes for the sustainable management of the water, provisions for adjusting existing water entitlements to achieve the plan outcomes, and environmental flow objectives, environmental management rules and water sharing rules);
- the manner in which allocations are granted – that is, within the context of a resource operations plan;
- audit and amendment of water resource plans (including mandatory amendment where audit shows that environmental flow objectives are no longer appropriate, or not being met); and
- the potential for reallocation of resources including reduction of consumptive entitlements.

Much of the WA(Qld) focuses on an orderly transition to formally defined consumptive entitlements, and on security of supply for existing users. Having said that, environmental water needs are clearly factored into the planning process that is intended to facilitate that transition. There are monitoring requirements for plans, and amendments to plans are mandatory where they are evidently not meeting environmental flow objectives (presumably whether this is through changing conditions or initial miscalculations or mistaken assumptions).

However, the extent to which environmental needs will take priority over consumptive needs should that seem necessary, is not clear. The measure of environmental necessity will be likely to be tempered by the references to 'sustainable management' that seem to give more or less equal priority to consumptive and non-consumptive uses. The flexibility in determining, specifically, environmental flow objectives for a particular resource, would be very difficult to be challenge should there be disagreement over the weight given to various considerations in achieving 'sustainable management'.

Provisions for environmental flows are made through the ecological outcomes and environmental

flow objectives stated in the water resource plans and implemented through water sharing rules and environmental management rules within the resource operations plans. However, these are not formal allocations in the sense that the Victorian legislation provides for licences to be issued for instream uses.

It is doubtful whether water allocations could be validly granted to formalise an entitlement for non-consumptive use, as the definition of 'water allocation' and the provisions for granting refer to the allocation being an authority to 'take' water.

The planning framework could be used effectively to set a 'cap' for allocation to consumptive users. However, it also clear from the planning provisions that resource operations plans are not necessarily obliged to cap the pool for consumptive use, but may simply include "a process for granting, reserving or otherwise dealing with unallocated water to which the draft plan is intended to apply".

Allocations of consumptive entitlements may be expressed as shares rather than volumes[44]. A capacity sharing arrangements currently operates under the St George Interim Resource Operations Licence[45].

The Minister is required to report on the effectiveness of water resource plans, and must amend them if, amongst other things, they are not meeting environmental flow objectives. Following amendment of a water resource plan, resource operations plans must also be amended to ensure that they are not inconsistent with the amended water resource plan. Amendments to resource operations plans are in turn able to force amendments to water allocations.

3.8.2 Options for reducing consumptive entitlements

Statutory options for the reduction of consumptive entitlements, and consequences for the Government (including compensation) should this be done, are set out in Chapter 4 below. The Queensland legislation contains reasonably flexible provisions, at least within the planning framework, for both the direct and indirect[46] reduction of entitlements. The explicit mention of environmental factors as a trigger for amendment of a water resource plan (if environmental flow objectives are not being met) would be likely to support use of the provisions to reduce consumptive entitlements.

Statutory options in Queensland for reducing consumptive entitlements for protection of environmental water are likely to be relatively slow if the plan amendment process is used[47], similar to the position in South Australia and NSW, and very slow (i.e., not within ten years of the last plan) if it is intended to avoid compensation.

It is not clear to what extent environmental considerations interstate may be taken into account or be determinative in amending water resource plans to reduce the share available for consumptive use. Discussion in the Attachment[48] concludes that limited references to extraterritorial considerations may prove a stumbling block to taking them into account.

The way in which reference to the principles of ecologically sustainable development are incorporated amongst an equal focus on the economic development of the State and security of supply for existing users within the purposes of the relevant chapter of the WA(Qld) is significant. The way in which these different purposes are expressed makes it likely that the provisions for reducing consumptive entitlements could not quarantine environmental water needs from reduced inflows at the expense of consumptive users.

3.9 AUSTRALIAN CAPITAL TERRITORY

3.9.1 Provisions to protect environmental water

The objects of the Australian Capital Territory *Water Resources Act 1998* ("WRA(ACT)") essentially reflect the principles of ecologically sustainable development, although the precautionary principle is not stated.

The Act requires that it be "construed and administered" in accordance with the objects. Additionally, the Authority must "have regard to" the objects when carrying out his or her functions.

Specific environmental considerations are given special weight in various provisions including:

- a requirement to prepare environmental flow guidelines for ascertaining the flow necessary to maintain aquatic ecosystems;
- a requirement to prepare and maintain a water resources management plan dealing with allocations for consumptive use;
- considerations to be taken into account when granting or refusing allocations or licences; and
- the potential for reduction of consumptive

entitlements to respond to environmental needs.

Provisions for environmental flows are made through the environmental flow guidelines and water management plan on the basis of which allocations and licences are granted. An allocation for consumptive use cannot be made unless it is provided for in the management plan.

It is possible that allocations could be granted to formalise an entitlement for non-consumptive use, although it would not be possible (or necessary) to issue a licence, as licences authorize the 'taking' of the water[49].

The WRA(ACT) would appear to allow consumptive entitlements to be issued as shares or specified proportions of the total available water are of clear benefit in providing for future variations in the size of the total available.

There are no obligatory audit or review requirements under the WRA(ACT) for either environmental flow guidelines or the water management plan. However, both documents in practice contain internal review requirements.

3.9.2 Options for reducing consumptive entitlements

Statutory options for the reduction of consumptive entitlements, and consequences for the Government (including compensation) should this be done, are set out in Chapter 4 below. The ACT contains a single provision, similar in many respects to a provision in the South Australian WRA, which allow for the direct reduction of allocations where there is an identified environmental need to do so.

It is not clear to what extent environmental considerations interstate (either upstream or downstream) may be taken into account in reducing allocations. Small reductions in inflows in the ACT tributaries to the Murrumbidgee could translate into significant environmental impacts downstream. However, only 15% of the resource identified as being available for consumptive use has been allocated in ACT, so reductions in allocations may not be available, under the existing legislation, as a response to reduced inflows.

4. Retrieving Water for Environmental Flows Under Existing Legislation

4.1 Introduction and Summary

The various methods of retrieving water for environmental flows outlined in the Lewis report may be summarised as follows[50]:

1. Reduction of entitlements without the payment of compensation;
2. Reduction of entitlements with the payment of compensation;
3. Closing down uneconomic areas of irrigation;
4. Investing in achieving efficiencies and retaining the water savings; and
5. Purchasing water on the water market

However, each category bears hallmarks of one or other of a simpler categorisation:

- the removal of rights compulsorily by Governments, either with or without the payment of compensation, or
- the giving up of rights by the holder voluntarily, through government inducement in the form of straight purchase on the open market, or more complex schemes such as investing in savings from restructuring.

This Chapter discusses how each of the five methods may or may not be capable of implementation in each jurisdiction. The Attachment (available from the MDBC) sets out, on a State-by-State basis, detail of the existing provisions for compulsory and non-compulsory reduction of rights.

The findings of this Chapter in respect of each of the five methods may be summarised as follows:

1. Compulsory reduction of rights without compensation

- SA, NSW and ACT have the most flexible provisions for the compulsory reduction of water rights without payment of compensation.
- The circumstances in which these provisions can be used varies, but they include reductions based on a proven environmental need to reduce rights, and reductions after a public planning process has resulted in an amendment of a management

plan which alters water sharing rules.

- Victoria has provisions for compulsory reduction without compensation, but they are limited, applying to section 51 licences in accordance with the terms of a management plan in a declared water protection area, or reliant upon the transfer of rights, or, in some circumstances, at least fifteen years after the last licence amendment. However, the conditions of River Murray bulk entitlements do appear to have allowed a variation in share to reflect Victoria's Cap obligations.
- Queensland has provisions for compulsory reduction without compensation but they are limited to use upon a ten-year review of a water resources plan, or possibly, upon transfer where allocation 'docking' is provided for under the resources operations plan, or otherwise imposed as a condition of transfer.

1a. User-funded buy-back

- Only SA has levying provisions that could be used to implement a user-funded buy back scheme.
- NSW has provisions which could possibly be used for this purpose, but further advice would be required on the point.

2. Compulsory reduction of rights with compensation

- Only NSW has explicit powers to compulsorily acquire water licences, with payment of compensation. Compensation is also payable in NSW in certain other circumstances where rights may be reduced compulsorily.
- SA, Victoria, Queensland and ACT have no similar compulsory acquisition power. (State acquisition of land legislation is not applicable).
- Queensland has provisions for compulsory reduction of rights with payment of compensation where a water resources plan is amended within ten years of last amendment.

3. Close down 'uneconomic' areas of irrigation

- Only SA has legislation specifically aimed at compulsorily closing down uneconomic areas of (in-district) irrigation.

4. Invest in savings (improving efficiency)

- None of the State legislation would prevent the reduction of rights by agreement with the rights-holder (subject to various State legislation regarding proper appropriation and expenditure of public funds, and any limits on the powers of the particular body to hold and deal with water rights).

5. Buy entitlement on the market

- None of the State legislation would prevent the purchase of water rights by appropriate bodies (subject to various State legislation regarding proper appropriation and expenditure of public funds, and any limits on the powers of the particular purchasing body, for instance a Minister or statutory authority).

5a. Compulsory portion of trade

- None of the State legislation provides for the compulsory sale (or offer of sale) of a proportion of all transfers to the Government, or at all.

4.2 Reduction of Entitlements Without Compensation

4.2.1 Outline and characterisation of method

Entitlements to water could be reduced without compensation through a number of methods, of varied applicability according to different States' allocation systems. A NSW example of providing lower seasonal allocations is given. The method in general may be characterised as a *compulsory removal or extinguishment of rights*.

Also raised in the Lewis report under this method is a levy on water users to pay for a buy-back. This also may be characterised as a *compulsory removal or extinguishment of* rights, with either no or some compensation, depending on the size of the levy and the extent of Government contribution to top up any funds derived from a levy.

4.2.2 Direct reduction in rights

Murray-Darling Basin Agreement

There is no power in the Agreement or the relevant ratifying MDBAs that would empower the Commission, Council or Contracting Governments to reduce the

consumptive entitlements of individuals. An attempt to address this with a new measure or Schedule under the Agreement would be faced with limitations[51].

If a new Schedule were passed by Parliaments, and State legislation located through which to implement a reduction in consumptive rights, would the provisions of the Agreement or MDBAs have a bearing on the payment of compensation? The answer is probably not; as measures are given effect through State legislation, it is the relevant State legislation that must be considered[52].

If State legislation did require the payment of compensation, the effect of clause 83 of the Agreement (which obliges equal contributions by Governments for certain compensation paid by a Constructing Authority) in these circumstances is unclear[53].

Commonwealth

The Commonwealth has not legislated to provide for the compulsory acquisition of water entitlements. The EPBCA could be used to prevent specific allocations or transfers of allocation, but contains nothing that could be used to reduce the total amount of water available for consumptive use.

South Australia

The WRA(SA) contains a variety of provisions capable of being used to remove water entitlements without the payment of compensation[54]. This includes a provision specifically directed to a reduction of water available pursuant to the MDBA(SA)[55]. Apart from the latter, use of the provisions depends on the presence of sufficient evidence of over commitment of water to consumptive uses, and on following various statutory processes and any requirements of natural justice. Importantly in the present context, the Minister is empowered to reduce entitlements because of a reduction of water available pursuant to the Agreement (for example, a reduction in the Cap under Schedule F), without necessarily requiring any evidence of insufficiency of water within SA.

Provisions under the South Australian Irrigation Act appear to allow for a reduction in allocation to be passed on the individual irrigators within districts. No compensation would be payable[56].

Victoria

The WA(Vic) is characterised by high-security water rights, in respect of both section 51 licences and bulk entitlements. The legislation has been recently amended to allow compulsory reduction in section 51 licence entitlements in declared water protection areas, where necessary to comply with an approved management plan[57].

Other provisions available for compulsory reduction appear to be consequent upon the transfer of rights, either:

- in the case of section 51 licences, irrigators' rights and bulk entitlements, through the application of transfer rules5[8] at the time of transfer; or
- in the case of section 51 licences and bulk entitlements, by amendment of the licence[59] or bulk entitlement[60] at the time of transfer.

Reduction of volume upon transfer relies on the voluntary transfer of entitlements as a trigger for the claw-back of water, and therefore appears to be of limited use in the context of a scheme for the compulsory reduction of entitlements of any magnitude.

In practice, the conditions of bulk entitlements do appear to allow a variation in share to reflect Victoria's Cap obligations[61].

Apart from where reduction is necessary to ensure compliance with an approved management plan, the WA(Vic) generally does not nominate the considerations that must be taken into account by the Minister before making any reduction in the circumstances discussed here. However, recent amendments made by the WIFDA will require the Minister and Authorities to exercise their powers subject to the Agreement and MDBA.

New South Wales

Under the WMA(NSW), the Minister may acquire licences in the public interest. Compensation will be payable[62].

It appears that water could also be retrieved through the Minister making an "available water determination" reducing the amount of water available to licensees within the relevant area[63]. Such a determination would have the effect of reducing the pool to which licensees have a share entitlement, and would not result in an allocation being held by the Minister for reallocation. It appears that it would also not attract any liability to pay compensation64. While the use of available water determinations has its limitations (it appears they are used for seasonal adjustments only, and not as permanent reductions in entitlements), they have the advantage that they can

"fine-tune" water allocations depending on seasonal flows. They are apparently already used to limit extractions to assist NSW to meet its Cap requirements within the Murray-Darling Basin.

Available water determinations seem to be the process by which NSW could "indirectly reduce the reliability of entitlements", as mentioned in the Lewis report.

Amendment of the relevant bulk access regime could also alter the way entitlements were to be distributed or other rules about allocation and use, thus effectively reducing the amount of water that could be taken. If the bulk access regime was altered by way of Ministerial order in the public interest, compensation would be payable. In a number of other circumstances, such as amendment of a bulk access regime following a consultation process and amendment of the relevant management plan, compensation would not be payable. However a bulk access regime will normally remain in force for 10 years and mid-term changes are likely to attract the requirement to pay compensation[65].

While the Act does not contain provisions specifically enabling the Minister to take into account extra-territorial matters such as the state of the water resources of the Basin as a whole, it is likely that the State Water Management Outcomes Plan could be used to enable the Minister to take into account obligations under the Agreement when exercising powers to reduce entitlements[66].

Queensland

While the WA(Qld) contains a variety of different entitlements, the main category considered useful in terms of reducing consumptive use is that of water allocations.

Water allocations could be compulsorily amended in a manner that would reduce entitlements, either:

- through amendment of the applicable water resource plan, and subsequently a resource operations plan and water allocations subject to that plan. If the amendment to the plan takes place within ten years of the last plan being amended, compensation is payable. If the amendment occurs outside that time (ie upon a ten year review of the plan), compensation is not payable[67]; or
- upon transfer, if a water resources plan and resource operations plan were amended to implement a method of 'docking' allocations upon transfer[68]. While the question is unclear, it is at least arguable that this type of amendment to a plan may not attract a liability for compensation.

The Act contains provisions requiring the Minister to "consider" factors including "national, State and regional objectives and priorities for promoting sustainable development" when making a water resource plan. The requirement is not as strong or explicit as in some other jurisdictions' legislation. However, it is likely that they would support a requirement in a water resource plan for the Minister to take into account obligations under the Agreement when exercising powers to reduce entitlements.

Australian Capital Territory

The WRA(ACT) allows direct reduction of consumptive entitlements, without payment of compensation, if there is sufficient evidence of over commitment of water to consumptive uses[69].

4.2.2 User-funded buy-back

General comment

A user-funded buy-back such as mentioned in the Lewis report is in the nature of a tax rather than a fee or charge for services rendered. A tax is a compulsory exaction of money by a public authority for public purposes and is not a payment for services rendered. A Government cannot impose taxes except by authority of statute, and as a matter of statutory interpretation, taxing statutes are read literally[70].

What this means is that absent a clear intention to tax, fees and charges provisions in legislation are just that - allowances for a body to require payment for services rendered. As set out below, only NSW and SA contain provisions of the necessary specificity to raise a levy.

Commonwealth and Murray-Darling Basin

Neither the Commonwealth legislation nor the Agreement or MDBAs contain provisions relevant to levying for a user-funded buy-back scheme.

South Australia

The WRA(SA) allows levies to be imposed on water licensees. The scope of the legislation would appear to enable imposition of a levy to contribute to a user-funded buy-back scheme in some circumstances. The fund could be used to either purchase water rights or pay (ex gratia) compensation for the removal of rights.[71] The Irrigation Act would allow an irrigation

authority to pass on to its irrigators any levy imposed on its licence via the WRA(SA)[72].

Victoria

There appear to be no levying provisions capable of implementing a user-funded buy-back scheme[73].

New South Wales

It is possible that a "water investment contribution" could be levied from access licensees for use by the Water Investment Trust to fund a buy-back scheme[74]. This would require more detailed advice as the provision is not clear, and it is possible that contributions may only be levied in respect of a program for constructing physical works.

Queensland

There appear to be no levying provisions capable of implementing a user-funded buy-back scheme[75].

Australian Capital Territory

There appear to be no levying provisions capable of implementing a user-funded buy-back scheme[76].

4.3 Reduction of Entitlements *with* Compensation

4.3.1 Outline and characterisation of method

This method is described as a variant on the above, with the removal of water attracting compensation. In legal terms, it may be characterised as compulsory removal, with compensation.

4.3.2 Reduction of entitlements with compensation

The ability of each Government to compulsorily remove water rights is as described above in paragraph 3.1. The payment of compensation does not give any greater power to compulsorily remove the rights than what is presently set out in the legislation.

A Government could make a policy decision to pay compensation for compulsory removal as an ex gratia payment, irrespective of any legal requirement to pay, or power not to pay, as the case may be. Ex gratia payments may be governed by Treasury policies and/or legislation[77].

As mentioned above, only legislation in New South Wales[78] specifically provides for the compulsory acquisition of rights, *with* the payment of compensation.

Land acquisition legislation in each State relates only to the acquisition of land, and is not relevant to the reduction of water rights in the present context[79].

4.4 Closing down Irrigation Areas Compulsorily

4.4.1 Outline and characterisation of method

The method is described as one of 'compulsory adjustment': removing water entitlements from irrigators in specific areas, preventing future allocations of water for use in that area, and effectively closing down infrastructure.

Leaving aside the question whether restructuring in this way is a question of pricing or resource management, in legal terms, it can be characterised as *either compulsory or non-compulsory removal*, depending whether it were to be achieved voluntarily or not. Either approach could be taken. Specific legislative power would need to be located for compulsory closing down.

The ability of Governments to close down areas through *non-compulsory* means is similar to Governments' ability to make investments in on-farm savings, discussed in method 4 below. Where restructuring irrigation areas through voluntary arrangements would result in the closure or downsizing of an irrigation district, conditions as to the fate of the district, including future maintenance etc of the infrastructure would need to be clearly agreed to protect against any future claims relating to the way in which the district would operate post-restructuring.

4.4.2 Closing down irrigation areas compulsorily

The ability of each jurisdiction to remove rights *compulsorily*, from either or both irrigation districts or the irrigators who comprise those districts, is discussed above in relation to compulsory reduction of entitlements.

'Closing' of irrigation areas, in the sense of shutting off or reducing the extent of infrastructure to prevent future irrigation in the targeted area, would raise further legal issues about the power and process for closing irrigation districts. Where a compulsory approach is used, it is possible that compensation would be payable not only in respect of the allocations,

but for the proprietary interest of either Trusts or individual irrigators in the irrigation infrastructure. States approach in-district irrigation differently.

Commonwealth

The only statutory provisions relevant to Commonwealth involvement in closing down uneconomic irrigation areas are in voluntary restructuring, where financial contributions could be made through a scheme under the NHTA[80].

South Australia

Uneconomic irrigation areas, or portions of them, may be 'shut down' under provisions of the *Irrigation Act* that were specifically designed for this purpose, and used during the restructure of Government districts during the 1990s[81]. Compensation is payable to owners of land which is excluded through these arrangements.

Victoria

The WA(Vic) makes no provision for compulsory excision of land or removal of water rights from holdings within irrigation districts[82].

New South Wales

There appear to be no provisions that would allow for compulsory restructuring of an irrigation district, or areas within it[83].

Queensland

Irrigation authorities in Queensland appear to be managers of the water allocations of those irrigators attached to their distribution systems, in accordance with their own resource operations licence and supply contracts with the irrigators. There appear to be no provisions directed specifically to closing down irrigation areas.

The viability of any particular irrigation district is seen as a matter related to price, rather than resource management, and therefore as an issue between service providers and their customers, privately or through pricing regulation[84].

Australian Capital Territory

ACT has no in-district irrigation. Other than powers to reduce allocations for environmental reasons, there are no powers directed to preventing commercial irrigation.

4.5 INVESTING IN IMPROVING EFFICIENCY AND RETAINING THE WATER SAVINGS

4.5.1 Outline and characterisation of method

This method is understood to mean the purchase of water savings from restructuring or on-farm improvements through an agreement whereby a Government contribution to restructuring or improvements is 'repaid' by irrigators (either private or in-district) through Government acquisition of any water savings. It may be characterised as a *non-compulsory removal of water entitlements*.

4.5.2 Investing in on-farm improvements

As discussed in the Attachment[85] and Chapter 2 above, there is essentially no impediment to a State Government reducing entitlements (either by extinguishment or acquisition) through agreement with the holder of the entitlement.

Murray-Darling Basin Commission

Both this method and the following (purchase on the market) raise the issue of the power of the MDBC to hold and manage environmental water entitlements separately from its role in managing flows generally. Its ability to do so would depend in part on the provisions of State legislation to allocate water to such a body for such a purpose. The State legislation under discussion provides only for water rights to be granted to "persons", rather than "any other body". It is likely that the personality of the Commission would need to be more clearly stated in order for it to apply for and be granted water rights under State legislation.

Commonwealth

The Commonwealth could enter a written agreement with a person or State under a relevant program, under the NHTA for the provision of financial assistance in return for achieving on-farm efficiencies and resultant water savings[86]. A condition of the assistance could be specification of the fate of the 'saved' water - that is, whether it would be transferred to a State Minister or other body.

South Australia

Both the WRA(SA) and the Irrigation Act contain provisions which allow the owner of the water right to

transfer the right to another person[87], thus facilitating a voluntary transfer of water 'saved' as a result of improved efficiencies.

WRA(SA) licensees may transfer allocations or licences (where the water right is to be bought), or surrender licences and their allocations (where surrender may be a condition of receipt of financial assistance for restructuring). Upon surrender, any allocation remaining on the licence vests in the Minister. Alternately, licensees may consent to a variation of the licence - ie in the present context, a reduction in allocation, also, for example, as a condition of receipt of financial assistance. Under the first two methods, the Minister or other purchasing body will be left holding a water property right under the WRA(SA). Under the last, where there has been a consensual reduction in allocation, there will be no resultant allocation held by the Minister.

Both irrigation districts and individual irrigators within districts may dispose of water allocations under the *Irrigation Act*. The provisions could be used to effect an agreement to either sell or retire allocations upon payment of financial assistance.

Victoria

The WA(Vic) contains provisions allowing the owner of various water rights to transfer them[88].

Holders of section 51 licences may surrender them to the Minister. The Act is silent on the fate of the water entitlement represented by the licence once surrendered (that is, whether the water right is extinguished or returns to the 'pool' for allocation or simply to improve security of other rights).

The WA(Vic) contains no provisions specifically empowering a body to undertake functions such as those envisaged for the NSW Water Investment Trust (see below).

New South Wales

The WMA(NSW) contains provisions allowing the owner of access licences to transfer them[89]. Access licences may also be surrendered to the Minister. The Act does not mention the fate of the water allocation held on a surrendered licence.

The WMA(NSW) establishes a Water Investment Trust whose functions include activities such as construction of works for improved efficiencies on-farm, business restructuring and water industry adjustment, all of which are directed to the type of scheme under discussion here[90].

Queensland

The WA(Qld) contains provisions for amendment of allocations at the instigation of allocation holders, and also for the transfer of allocations[91].

There is no provision for a body such as the NSW Water Investment Trust, with the specific function of undertaking activities such as encouraging on-farm improvements.

Australian Capital Territory

The WRA(ACT) contains provisions allowing the owner of allocations and licences to transfer them[92]. Holders of licences may also surrender them. The Act is silent on the fate of the water allocation of a surrendered licence (that is, whether the allocation is extinguished or returns to the 'pool' for allocation).

4.6 Purchasing Water on the Water Market

4.6.1 Outline and characterisation of method

The method described in the Lewis report is simply to purchase water on the market. It may be characterised as the voluntary relinquishment of rights by the holder.

Also raised in the Lewis report under the description of this method is the possibility that a Government could require a proportion of all sales to be made available to it at the main sale price, in order to minimise the effect on the market of Governments purchasing large amounts of water. This may be characterised as compulsory acquisition with payment of compensation.

4.6.2 Voluntary trade

As discussed above in relation to method 4 (investing in savings), there is nothing to prevent Governments from purchasing allocations, provided relevant limitations are observed[93]. Provisions in the legislation of each State set out methods by which entitlements can be surrendered or transferred voluntarily.

4.6.3 A 'compulsory trade price' component of sales

None of the State legislation reviewed in the Attachment provides specifically for the compulsory sale (or offer of sale) of a proportion of all transfers to the Government, or at all[94]. Specific legislation would be required to implement such a scheme.

The WRA(SA), WA(Vic) and WA(Qld)[95] contain provisions that enable the Minister (chief executive, in the case of Queensland) to effectively 'dock' a proportion of water traded in certain circumstances. The measure does not result in any liability for payment of compensation[96], and would not result in the Minister holding any part of the 'docked' allocation; it appears the measure would result in an extinguishment of the amount of allocation removed[97].

Selected Bibliography

ARMCANZ 1995, *Water Allocations and Entitlements: A National Framework for the Implementation of Property Rights in Water*, October 1995

Clark, S, *Divided power, co-operative solutions*? in *Uncharted Waters*, MDBC, to be published in 2002

Cox, W and Baxter, P, *Setting the Cap Report of the Independent Audit Group* MDBC, November 1996

Department of Natural Resources and Environment (Victoria), *Entitlements to the Murray*, August 1999

Department of Water Resources (SA), *State Water Plan 2000*, September 2000

Pearce, *Statutory Interpretation in Australia*, Butterworths 1996

Scanlon, J, *Managing for Environment Flows*, prepared for the MDBC Environmental Flows Project Board, February 2001

Selway, B, *Constitution of South Australia* The Federation Press 1997

Tan, PL, *Irrigators come first: Conversion of existing allocations to Bulk Entitlements in the Goulburn and Murray catchments, Victoria* EPLJ Vol 18, no 2, April 2001

Tan, PL, *Legal Issues relating to water use*, Issues Paper no 1, MDBC Project MP2004: Agriculture and Natural Resource Management in the Murray-Darling Basin: A Policy History and Analysis (Institute for Rural Futures, April 2002)

Young, E, *Provision of legal water rights to the environment: a comparative analysis of the approaches in Victoria and South Australia* January 2000, Masters Thesis (unpublished)

Young, M; Young, D; Hamilton, A and Bright, M, *A preliminary assessment of the economic and social implications of environmental flow scenarios for the Murray River System*, CSIRO Land and Water for MDBC, February 2002

APPENDIX A

EXTRACT FROM THE LEWIS REPORT – DESCRIPTION OF FIVE METHODS

A. Governments could reduce entitlements without compensation

In implementing the Cap some States in order to accommodate activation of sleepers have pulled back seasonal allocations, clamped down on off-quota, introduced restrictions on trade, and put in place environmental flows.

Such measures have been carried out at least partly to *protect* the underlying reliability and value of entitlements in the face of rising usage – though NSW has gone further in some valleys, pulling overall usage below the Cap.

One approach to retrieving flows would be simply to cut the Cap first, and then use lower seasonal allocations etc to live within the lower Cap. In this case, the reliability of some entitlements is being deliberately *reduced*, using various indirect actions.

This might be okay in NSW, but it might not work in States where the reliability of entitlements is high and well defined. Victoria does have "sales" water, which is further down in the Independent Audit Group's hierarchy of rights, but this has already been cut back almost to the basic levels irrigators were traditionally advised to develop on.

Thus, rather than just hauling back seasonal allocations further, letting the reliability of entitlements slide – especially if this meant devaluing water rights – Victoria might prefer some kind of levy on water users to pay for buy-back (which probably would necessitate legislation).

States do already have legal powers explicitly to reduce water entitlements if there is a shortage or for environmental reasons – generally after an open review process. This normally requires evidence of worsening environmental degradation at current levels of use. (Note that in the last two approaches – user-funded buy-back and direct reduction in rights – as in all the mechanisms below, the Cap can be cut *after* rights have somehow been cut.)

Any devaluing or reduction in entitlements will entail some economic and social costs for farmers, and thus ultimately for the broader community. Whatever way it is done, putting some of the pain on water users is likely to be much more contentious than the original task of setting the Cap (which is not yet complete).

B. Governments could reduce entitlements, but provide some compensation

This is a variation on mechanism A, but with government funding. It is not clear what powers would be used. This would seem to be a blunter method than buying on the market, with higher opportunity costs because water would be acquired from highly productive as well as from marginal water users.

C. Governments could close down uneconomic areas of irrigation

Some irrigation areas should be closed down, e.g. since they are in the wrong place in terms of salinity or the upgrading they need would be too expensive. Often irrigators are already selling water out, leaving the challenge of dealing with the ones left. Quite apart from retrieving flows, power to stop supplying water is needed (requires legislation).

This mechanism accelerates the process, undertaking "targeted structural adjustment". It overcomes the scatter-gun problem of mechanism B, since it focuses on the least economic irrigators. As well as their rights, it claws back the water lost in supplying them.

If the desire to accelerate the process means that quite a few of the farmers in an area are still irrigating, instead of just one or two, then there will be more resistance to the change. Governments have tended to avoid compulsory adjustment.

D. Governments could invest in savings

Savings can sometimes cost less than the market value of water – e.g., the cheapest component of the package for the Snowy being considered in Victoria at present is the metering of high-use domestic and stock supplies, at $670 a ML.

However, there is only 16 GL available at this cost. The average cost of savings for the Snowy will probably end up being around $1,500. With the most economical savings already taken, any further savings are likely to cost more again – perhaps $3,000 or $5,000 a ML, so 100 GL could cost as much as $500 million.

There is major scope for improved water efficiencies on-farm, but it can be quite difficult for governments to capture these savings.

E.g., it is hard to quantify water saved by automatic flood irrigation systems, especially if re-use systems are installed. Farmers are adopting this technology anyway, to save labour and for lifestyle reasons.

The best way to capture on-farm savings may be the next option, buying on the market.

E. Governments could buy entitlement on the market

This mechanism is relatively simple to implement. A concern with it is that, used heavily, it will drive up the market price of water. This would slow down the development of new irrigated agriculture enterprises and regional development.

This mechanism accelerates the movement of water away unprofitable enterprises. Irrigation communities losing water may be sensitive, but it means the lowest possible economic cost and it achieves change by individual choice.

Perhaps there are ways of minimising the effect on the market. E.g. a government could require 10% of all sales be made available for it to buy at the same price. Given trade across the Basin is running at 60 GL a year, retrieval would be quite slow, at 6 GL a year.

NOTES

1 In this Report, 'State' includes ACT unless otherwise indicated

2 This Report uses the terms 'consumptive rights' (or 'consumptive entitlements') and 'consumptive use' to mean water removed or entitled to be removed from a river and consumed - for example, for domestic, stock, irrigation or other commercial purposes. Their opposites in this report are 'non-consumptive', 'instream', or 'environmental', which are used to refer to water remaining in the river system to serve environmental purposes

3 The methods are as described in a report prepared by David Lewis prepared for the Project Board, an extract of which forms Appendix A.

4 That is, management of water resources which includes requirements to undertake a cycle of assessing, planning, allocating, monitoring and reviewing resource requirements, allocations and management practices

5 Victoria has only recently introduced a planning framework for allocation and management of rights. There is limited explicit reference to environmental water needs in that planning framework, and the new regime will have no impact on the management of bulk entitlements from the regulated river system. See further paragraph 3.6 below.

6 The management plans go by different names in each State

7 Standing rules for judicial review, and for other types of review, such as civil enforcement, vary from State to State. In South Australia, for example, there are provisions in the WRA(SA) for any person to apply to the Environment, Resources and Development Court for leave to seek civil

remedies against a person who has engaged, or is proposing to engage, in conduct in contravention of the Act, or who has refused to take action as required by the Act (section 141). The WMA(NSW) contains even more open standing, as standing is granted as a right, without the need to seek leave of the court

8 The South Australian *Water Resources Act 1997* for example requires the Minister to take account of the needs of ecosystems depending on a water resource when making decisions about allocation. The NSW Water Act 2000 gives specific priority to environmental needs when administrators exercise functions relating to water sharing as between environmental and consumptive uses.

9 Issues Paper no 1, MDBC Project MP2004: *Agriculture and Natural Resource Management in the Murray-Darling Basin: A Policy History and Analysis* (Institute for Rural Futures, April 2002)

10 Available from the MDBC: Ph: 1800 687 044; www.thelivingmurray.mdbc.gov.au; The Living Murray Initiative, MDBC, GPO Box 409, Canberra ACT 2601.

11 Available from the MDBC.

12 See, for example, discussion in *Setting the Cap, report of the Independent Audit Group*, November 1996; ARMCANZ 1995, *Water Allocations and Entitlements: A National Framework for the Implementation of Property Rights in Water*, October 1995; Young, Elizabeth *Provision of legal water rights to the environment: a comparative analysis of the approaches in Victoria and South Australia* January 2000, Masters Thesis, Department of Water Resources (SA), *Who Owns Water?* State Water Plan 2000 Explanatory Documents

13 Constitution, section 51(xxxi): "The Parliament shall, subject to this Constitution, have power to make laws for the peace, order and good government of the Commonwealth with respect to: - The acquisition of property on just terms from any State or person for any purpose in respect of which the Parliament has power to make laws"

14 See, for example, discussion in Sackville and Neave, *Property Law*, 3rd edition, Butterworths, Chapter 8 *Acquisition of proprietary interests*. However, resumption of *real property* is provided for *with* the payment of compensation through legislation: SA, *Land Acquisition Act 1969(SA)*; *Land Acquisition and Compensation Act 1986 (Vic)*; *Land Acquisition (Just Terms) Act 1991 (NSW)*; Queensland

15 See discussion in Pearce, *Statutory Interpretation in Australia*, Butterworths 1996

16 Some commentators argue that water has been 'nationalised' in Australia – that is, the only rights that remain are those specifically permitted under the diversion licensing statutes - since the late 1800s. See, for example, PN Davis, *Nationalisation of water use rights by the Australian States* in UQLJ Vol 9, No 1

17 There are many other cases in support of this proposition, including *Georgiadis v Australian and Overseas Telecommunications Corporation* (1994) 179 CLR 297 at 305-306

18 See also similar discussion in *Minister for Primary Industry and Energy v Davey* (1993) 47 FCR 151 at 165 where the Court held that a similar amendment to an NPF "is not a dealing with the property; it is an exercise of powers inherent at the time of its creation and integral to the property itself"

19 See, for example, *Banks v Transport Regulation Board* (1968) 119 CLR 222; Hodgson *Licensing and the Legitimate Expectation* (1985) 9 Adel Law Review 465; Selway, *The Constitution of South Australia*, at 247

20 For example: "The Governor may make such regulations as are contemplated by this Act or as are necessary or expedient for the purposes of this Act"

21 WA(Vic) sub-section 6(1)

22 WA(Vic) sub-section 6(3). The sections referenced are: 7(1) – Crown rights to water; 8(1) – stock and domestic rights; 8(4)(c) - water flowing over land (but not in a watercourse). The clause notes for the WIFD Bill shed little light on the relevant clause, stating that: "section 6(3) will make it clear that the specified interstate agreements prevail, to the extent of any inconsistency, over a right to take or use water conferred by or under the Water Act except [the previously indicated rights]"

23 The NSW provisions are more specific and onerous than the Queensland ones

24 The issue is discussed in the Attachment (available from the MDBC) in relation to each jurisdiction.

25 No reference is made in this report to measures for protection of groundwater

26 Victoria has only recently introduced a planning framework for allocation and management of rights. There is limited explicit reference to environmental water needs in that planning framework, and the new regime will have no impact on the management of bulk entitlements from the regulated river system. See further paragraph 3.6 below.

27 See discussion of new Victorian provisions in the Attachment paragraph 4.2

28 See paragraphs 1.2 and 1.3 of the Attachment (available from the MDBC)

29 See paragraph 2.3 of the Attachment (available from the MDBC)

30 An explanation of how the EPBCA is triggered is set out in paragraph 2.2.2 of the Attachment, available as above.

31 Where the use met the definition of 'action' under the EPBCA – the EPBCA is limited in its retrospective application by the definition of 'action', see EPBCA sections 523, 524

32 A number of licences have been issued under the WRA(SA) for environmental purposes (for example, wetland preservation). More are planned under the River Murray Catchment Water Management Plan: personal communication, SA DWR officer, 2001. It is possible that the validity of such 'licences' could be challenged as the licensing provision refers to licences as authorising the 'taking' of water, rather than being for instream use.

33 As discussed in Chapter 4 and in the Attachment paragraph 3.4.3 (available from the MDBC), the Minister can amend licences at any time where there has been an amendment to the water allocation plan, or at any time in order to reflect an environmental need. Evidence for the latter could be provided by the material gathered during amendment of the water allocation plan.

34 Personal communication, SA officer DWR, 2001

35 However, management plans do not apply to conversion bulk entitlements - see discussion on management plans under the new Victorian provisions in the Attachment, paragraphs 4.2 and 4.4.3 (available from the MDBC)

36 See discussion in Attachment paragraph 4.4 (available from the MDBC)

37 Further, the Governor may declare a permanent 'embargo' on applications for access licences from a particular resource: WMA(NSW) section 81

38 See Attachment paragraphs 5.2.5 and 5.4.3.2(b) for a description of available water determinations (available from the MDBC)

39 WMA(NSW) section 87, and see Attachment paragraph 5.4.3.2 (available from the MDBC)

40 That is, through use of transfer rules to dock allocations. While there is no explicit mention of this as a purpose for the provision, there appears nothing that would preclude it from being used in this way. See sections 20 (establishing transfer rules within management plans) and 71 (Minister's transfer principles)

41 WMA(NSW) section 81

42 The statutory processes for amendment of plans mean that it would be likely to take at least 6 months, although probably more, to amend a water management plan and bulk access regime. This would be likely to be the case even where the focus of the amendment was very clear, such as a reduction in the overall volumes of water available.

43 For example, the Minister is under a special obligation to carry out the planning and allocation functions to meet Queensland's future requirements, including protection of natural ecosystems and security of supply to water users.

44 See discussion in Attachment paragraph 6.2.5 (available from the MDBC)

45 Personal communication, Qld NRE officer, 2002

46 Such as using transfer rules to dock allocations. Similar to the NSW and Victorian legislation, there is no explicit mention of this as an intended use of the provision for transfer rules, but there appears to be nothing that would preclude it from being used in this way.

47 The statutory processes for amendment of plans mean that it would be likely to take at least 18 months, and is estimated to take more like 2 years at least, to amend a water resource plan and resource operations plan (even though it appears that some of the preparation processes can be undertaken concurrently). This would be likely to be the case even where the focus of the amendment was very clear, such as a reduction in the overall volumes of water available: personal communication Qld ENR officer, 2001.

48 Attachment paragraph 6.4.1.4 (available from the MDBC)

49 The WRA(ACT) separates allocations and licences.

50 An extract of the Lewis paper describing each method is contained in Appendix A.

51 See Attachment paragraph 1.3 (available from the MDBC).

52 See further discussion on compensation provisions under the MDBAs in Attachment paragraph 1.3.2, as above.

53 See discussion in Attachment paragraph 1.3.2.2 (available from the MDBC.)

54 Attachment paragraph 3.4

55 Attachment paragraph 3.4.3.1(c)

56 Attachment paragraph 3.4.4.1

57 See Attachment paragraph 4.4.3

58 See discussion in Attachment paragraphs 4.4.3.2 and 4.4.5.2 and WA(Vic) section 22 (power of Minister to Order rules for adjustment volumes upon transfer)

59 WA(Vic) sections 62(6)(b), 56; Attachment paragraph 4.4.3.1

60 WA(Vic) sections 46(6)(b), 43; Attachment paragraph 4.4.5.2

61 Attachment paragraph 4.4.5.1

62 Attachment paragraph 5.4.3.1

63 WMA(NSW) section 59; Attachment paragraph 5.4.3.2(b)

64 WMA(NSW) section 60(4)

65 Attachment paragraph 5.4.3.2

66 However, see discussion in Chapter 2 paragraph 2.9 and Attachment paragraph 5.4.1.3

67 Attachment paragraph 6.4.4.1

68 Attachment paragraph 6.4.4.1

69 Attachment paragraph 7.4.3

70 See discussion in Selway *Constitution of South Australia*, pp125, 126 (paragraph 9.3)

71 Attachment paragraphs 3.4.3.3 and 3.4.4.3

72 Attachment paragraph 3.4.4.3

73 Attachment paragraph 4.4.7

74 Attachment paragraph 5.4.5

75 Attachment paragraph 6.4.6

76 Attachment paragraph 7.4.4

77 See for example the *Public Finance and Audit Act (SA)*, section 41. Where payment is to be made by a statutory authority, care will need to be taken to ensure that it is within the board's statutory power to make such a payment

78 WMA (NSW) section 79; Attachment paragraph 5.4.3.1

79 See for example the *Land Acquisition Act 1969 (SA)*, which applies only to the acquisition of land "or an interest in land". While some unlicensed water access rights may be characterised as a right or privilege amounting to an interest in the land for the purposes of that Act, licensed water rights under the WRA(SA) are specified as personal property (as opposed to real property) and therefore not subject to provisions of the *Land Acquisition Act*

80 Attachment paragraph 2.3.1

81 Attachment paragraph 3.4.4.2

82 Attachment paragraphs 4.4.4, 4.4.6

83 Attachment paragraph 5.4.4.2

84 Personal communication, Qld NRM officer, 2002

85 Attachment: Cth paragraph 2.3; SA paragraph 3.5; Vic paragraph 4.5; NSW paragraph 5.5; Qld paragraph 6.5; ACT paragraph 7.5 (Available from the MDBC)

86 Attachment paragraph 2.3.2, available as above

87 Attachment paragraph 3.5.1, available as above

88 Attachment paragraph 4.5.1 (available from the MDBC)

89 Attachment paragraph 5.5.1 (available from the MDBC)

90 Attachment paragraph 5.4.5 (available from the MDBC)

91 Attachment paragraph 6.5.1 (available from the MDBC)

92 Attachment paragraph 7.5.1 (available from the MDBC)

93 See discussion in Attachment (available from the MDBC) for each jurisdiction. Essentially, Ministers need to ensure that expenditure is lawful. The power of a Minister to subsequently deal with the allocation, if this was intended, would also need to be considered

94 Possible market-based measures are expanded on in Young M, Young D, Hamilton A and Bright M, *A preliminary assessment of the economic and social implications of environmental flow scenarios for the Murray River System*, CSIRO Land and Water for MDBC, February 2002, and include a 'compulsory tender' scheme whereby entitlement holders would be obliged to offer a portion of their entitlement on the market regularly, although not obliged to sell it

95 Note that there could be some argument over the ability of transfer rules to operate this way in Queensland: see Attachment paragraph 6.4.4.1 (available from the MDBC)

96 In Queensland, the issue of compensation is not so clear – see Attachment paragraph 6.4.4.1 (available from the MDBC)

97 See in relation to South Australia, Attachment paragraph 3.4.3.1(b); in relation to Victoria, Attachment paragraphs 4.4.3.2, 4.4.4.2, 4.4.5.2 (available from the MDBC)

Institutional Reform in Rural Australia: Defining and Allocating Property Rights[1]

Tony Gleeson and Kirstie Piper[2,3]

Abstract

The current debate on the use of property rights as an instrument to progress ecologically sustainable development in rural Australia is circumscribed by agricultural fundamentalism, by commodification and by command and control processes in rural programs. This reinforcing loop constrains our progress by making more difficult the creative processes that are essential to problem definition and solution.

This paper explores some of the constraints we place upon ourselves in dealing with these problems. The central theme of the paper is that our mindscapes, the pictures we have of rural Australia, are agricultural centric, based on questionable analyses, and are reinforced by our institutional cultures, structures, and processes.

Introduction

> *"It is not enough to teach people how to swim better in a tide, a time comes when people have to do more than swim more effectively. They have to get together and say- This river seems to be going in the wrong direction and somehow it has to be stopped—-and it has to be redirected" (Wiseman, 1998).*

In the decade since publication of the Australian government policy on ecological sustainable development there have been countless pronouncements, conferences, workshops and legislative initiatives to give effect to the policy. There is a focus currently on the definition and use of property rights as an instrument to achieve improved environmental management, especially in relation to water.

The purpose of this paper is to highlight the importance of the broader institutional settings within which policy instruments are applied and the dangers inherent in placing too great a reliance on a particular policy instrument.

The paper begins by describing the meaning of environmental management and institutions and the importance of concepts. There follows an analysis of the economic foundations of rural policies leading into a discussion of some aspects of an institutional framework within which to define and allocate property rights; and hence to progress the goal of ecological sustainability.

What is Environmental Management?

Environmental management or natural resource management is defined as the management of the potential and realised impacts of people on the environment with the purpose of attaining ecologically sustainable development (ESD); that is using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (Commonwealth of Australia, 1992).

The core objectives of the national strategy for ESD are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations; and
- to protect biological diversity and maintain essential ecological processes and life-support systems.

The guiding principles adopted in Australia for achieving ESD are:

- Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations.
- Where there are threats of serious or irreversibly environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- The global dimensions of environmental impacts of actions and policies should be recognised and considered.
- The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection should be recognised.
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised.
- Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms.
- Decisions and actions should provide for broad community involvement on issues that affect them.[4]

The key points arising from this interpretation of environmental management are that:

- Environmental management is about the impact of people on resources rather than the management of resources per se.
- Individuals and corporate entities, including landholders are responsible for the management of their impacts on the environment.
- The broad community has a right to be involved in decisions and actions impacting on the environment.

What are institutions?

Institutions are the determinants of human behaviour that act beyond the individual.

Institutions include traditions and the norms and practices of groups. Institutions include the organisations formed by government, industries and communities and their policies and programs. Institutions include laws, regulations, codes of practice and the operation of markets (after Ball 1996; Mobbs and Dovers 1999).

The institutional framework is the overall network of institutional arrangements that has the capacity to influence group and individual behaviour at various levels. The institutional framework influences and enables individuals to act in the public good (Saul 1997) and it is the institutional framework that enables governance, the exercise of political power to manage a nation's affairs (Weller 2000).

Whilst there are economic and technical dimensions to the deteriorating ecological and social conditions in rural Australia it is fundamentally a challenge of governance. It is the challenge of how we use political power in the public, private and community sectors to manage our affairs. And it is a problem for which the solutions are not readily apparent. It is in fact a problem requiring considerable insight and creativity.

The importance of concepts

Institutional frameworks reflect our beliefs, values and ideas and when shared these concepts constitute culture, a socially constructed-shared system of meanings.

Seventy-five percent of Australians believe in a distinctive Australian culture and sport and the bush are the major single determinants of this culture (Bennett, Emerson and Frow 1999).

Concepts, like institutions also may be arranged in frameworks that reflect their interrelationships and interdependencies. These frameworks signpost how we move from one reality to another.

> *"Concepts are tools for thinking not only about how reality gets made, but about how else it could possibly be made—-without concepts all we have is nostalgia for how things once were, or impossible, unobtainable ideals" (Wark1999).*

Institutional arrangements in and for rural Australia have been designed primarily on our beliefs in commodification (pricing of goods for exchange) and in agriculture. In turn these beliefs are reinforced by the institutional arrangements they spawned as is illustrated by the following quote from one of the nation's most influential rural analytical bodies:

> *"Australia is a country defined by its agricultural sector. Agricultural products were among the first goods traded by this country and remain a critical element of our current and future international trade. Our quality of life is enhanced by the wealth generated by the agricultural sector and the clean, green quality of our food and agricultural products" (ABARE 2000).*

Agricultural Performance and Farm Adjustment

Particularly since the late 1980s analysts have increasingly focused on the environmental and social impacts of farming. The agricultural sector's economic importance, performance and ability to adjust are taken as a given. However it is in these arenas that myths and fixation are most evident. These myths need to be dispelled so that more insightful approaches to developing rural policies might evolve.

Notwithstanding increasing emphases on the environmental and social impacts of farming, rural policy in Australia remains guided primarily by assessments of the economic importance and performance of the agricultural sector. This approach is based on and reinforces beliefs that agricultural policy equates to farm and rural policy and that the sole or principal purpose of farming is to contribute to national economic growth through the production of food and fibre. Additionally as it is understood that the vast majority of agricultural production is exported there is a belief that above all else Australia must be competitive in global markets for agricultural products. Hence the need to increase the productivity and the value of agricultural production, albeit in an ecologically sustainable manner, becomes by far the most dominant driver of agricultural and land management policy and practice.

The economic performance of the agricultural sector is at best moderate as will become evident from the following analysis. However more fundamentally the need for institutional reform is established by the failure of analysts to move beyond a narrow agricultural- centric and commodified conceptual framework.

The chosen issues for analysis are:

- The aggregate economic performance of the agricultural sector
- The export performance of the agricultural sector
- Adjustment in the farm sector.

The aggregate economic performance of the agricultural sector

Our agricultural support organisations encourage us to believe that Australian farmers are doing a good job in achieving their economic goals.

For instance an inter-governmental assessment of Australia's recent performance in sustainable agriculture (SCARM 1998) concluded that:

> *A long-term downward trend in terms of trade has been largely offset by increases in productivity.*

And that:

> *The real net value of farm production is slowly declining over time—the slight downward trend in real net farm income needs to be interpreted in conjunction with a measure of farm productivity.*

In 1999 the Australian Bureau of Agricultural and Resource Economics reported that:

> Between 1955-56 and 1998-99, the volume of farm production rose by 187 percent. Despite falling real prices for farm product, the real gross value of farm production rose by over 25 percent[5]...with rising costs of production, the net value of farm production fell by around 54 percent in real terms.

These statements are basically correct. However it is the language that paints the picture and it is a picture of success against adversity.

An equally correct contrasting picture is that, from the early 1950s there has been virtually no change in the real gross value of Australian agricultural output (Gleeson, Russell and Woods 1999;Mullen 2002). Aggregate real net farm income in the mid- 1990s was

only one third of what it was twenty years earlier despite comparable growth in the real value of world trade in agricultural products of about 250 percent. Over the past twenty years there has been substantial growth in GDP and little or no change in the real gross value of agricultural production, the real net value of agricultural production and the real costs of farm inputs (Figs 1, 2, 3).

Gains in productivity have arisen primarily from increases in the physical volume of production. This increase in the volume of production is associated with substantial increases in the areas sown to crops and introduced pastures (Dunlop 2002), increased irrigation, increased farm size and with technological and managerial innovation.

Clearly against the benchmark of aggregate economic performance agriculture is a poor investment. Increasing productivity through increasing the volume of production is a failed strategy. We need new approaches. However the creativity needed to develop new approaches is constrained by our reluctance and /or inability to develop new mindsets, to develop new institutions.

The export performance of the agricultural sector

Export performance is perceived generally within the Australian psyche to be a desirable characteristic of industry and considerable prominence is given to the export performance of the various industry sectors.

The presentation of the export performance of the agricultural sector provides another illustration of the fixation by analysts, intentional or otherwise, on providing a positive spin on the economic performance of the agricultural sector.

It has been widely reported that between 70 to 80 % by value of Australian agricultural products are exported (ABS 1996; DPIE 1997; SCARM 1998; National Land & Water Resources Audit 2001; O'Brien 2002) leading to several impressions including that:

- Primary production activities, and by association primary producers are more worthy than less export dependent activities and those responsible for them;
- The domestic market is relatively small for most agricultural commodities (SCARM 1998); and that
- Australian taxpayers cannot afford to financially support Australian farmers.

Comparable production, export and import statistics across individual industry sectors are not readily available. However the proportion by value of exported agricultural products is inflated by comparing the value of production at the farm gate with the value of processed exports (Gleeson, Russell and Woods 1999; McGovern 1999). Analyses that take this factor into account conclude that the proportion of agricultural products exported directly or embedded in manufactured products lies between 33 (DITAC 1993) and 50 percent (ABS 2000). The results of these analyses are pertinent to the development of agricultural policies but they have received very little attention.

A similar picture emerges from an examination of the export statistics for the food and fibre industries which together account for about 30% of Australian merchandise exports. Over the ten years to 1996/97, the ratio of imports to exports of non-manufactured food and fibre products[6] was about 1:4.5, that is, values of imports equated to about 23% of exports. In the manufactured food and fibre products industries[7], the ratio was approximately reversed, with exports equating to about 18% of imports (ABS 1998). Overall, the value of Australian food and fibre imports are about half as much as the value of food and fibre exports, with net exports in 1996/97 being valued at about $12 billion.

The strength of the fixation on the artificially elevated degree to which agricultural production is exported and hence on our dependency on export markets is evident when one considers the incredibility of the corollary. The corollary of the assertion that about three quarters of agricultural production is exported is that, to account for domestic consumption, about half of the value of domestic consumption of non-manufactured food and fibre products (of about $11 billion) must come from imports. One could only wonder at the strength of the agro-political outrage were this to be reality.

No up-to-date, comprehensive analysis is readily available on the competitive position of Australia as an exporter of food. However available data on trade in unprocessed food reveal that Australia slipped from seventh to seventeenth place as a world exporter over the period 1989-1992. In processed food exports, Australia went backwards: its ranking in the world's top 30 exporters slipped over three decades from sixth to eleventh place in 1967-1987 and from thirteenth to fourteenth place in 1989-1992 (Heilbron and Larkin, 1995).

The position of Australia in key Asian food markets is bleak. Penetration of the Japanese and Korean food markets has been disappointing overall. Australia's share of the Japan food market in 1995, for example, was 6.8%, and was erratic over the previous five-year period. Australia was not among the top suppliers in any of the big, high-growth categories of Japan's food imports over this period (Heilbron and Larkin, 1997).

Another widely held misconception is that Australians rely heavily on 'rural' exports. However sectoral inter-dependency is a feature of maturing economies. The most recent available and comprehensive Australian data on this issue relate to the mid-1980s. At that time, when both direct and indirect inputs are taken into account, the service sector contributed about 40% of the value added to Australian exports compared to about 14% from the agricultural sector (Deeley, 1991). More recently the ABS has estimated that approximately 50 % of the contribution of agriculture to exports is represented by agricultural value embedded in manufacturing exports though it should be noted that many such products are exported in an early stage of manufacture.

Adjustment in the farm sector

The interrelationship between agricultural and non-agricultural household activities, particularly but not exclusively for farm households is an important determinant of the future economic, ecological and social health of rural Australia.

The purpose of this analysis is to highlight the need for policy analysts and others to go beyond an agricultural perspective in their considerations of farm and rural adjustment.

Although the Australian Farm Survey series segregates on and off farm income data, the focus of analyses of the changing structure of farming remains agriculturally oriented. For instance the Department of Transport and Regional Services was advised recently that:

> *Farmers approaches (to adjustment pressures) have been to become more efficient through adoption of new methods of production, technologies and labour saving machinery; changing the mix of commodities produced; and leaving agriculture (Lindsay and Gleeson 1997; Haberkorn et al 1999; ABARE 1999).*

However the same report presents data showing the off farm income of broadacre farm families was 38, 83 and 45 percent of total family income in 1986-87, 1991-92 and 1996-97 respectively. In 1996-97, wages and salaries on the one hand and self-employment and investment on the other, contributed equally at about 45% of off farm income with Commonwealth social support making up the other 10%. In 1995-96, approximately 42% of broadacre households received Commonwealth social security payments, 39% received income from wages and salary, and 75% of broadacre households received income from off-farm businesses and investments (Garnaut & Lewis 1997). Between 1994-95 and 1999-00 the proportions of farm household income derived from off-farm (non-agricultural) sources for all broad-acre industries varied between 25.7 and 29.3 with the average being 27.8 percent (ABARE Australian Farm Surveys Reports 1997 to 2001).

A starker picture emerges when off- farm income is compared to farm cash income[8] for different farm size categories (Fig. 5). For the period 1995-96 to 1997-98 approximately half of all broadacre farms, those with lower gross farm receipts, earned 69% of farm household income off- farm. This fact has important implications for agricultural and rural and urban policy.

In contrast to the situation in Australia, there is an extensive literature on part-time farming in Europe and North America (Cawley 1987, Whatmore et al 1987, Gasson et al 1988, Carter 1999). Zhou (1999) reports on the practical options open to part-time farmers in bimodal farm structure situations in both the USA and the OECD; and on the implications to both the agricultural and non-agricultural sections of rural economies. Marsh (1991) discusses the incidence and implications of part-time farming in Europe and the increasing bi-polar distribution of farms primarily reflecting differences in the dependency of farm households on agricultural income.

There is some Australian research on the importance of off farm income in relation to the changing roles of women in agriculture and in society generally (Garnaut 1998). However most Australian research on the multiple sources of income for farm households takes an agricultural perspective. Farmers are perceived to be utilising off-farm income as a forced reaction to adjustment pressures, to support

entrance into farming, to leave farming, or to support an unprofitable farm enterprise (Stayner 1997).

The varied and interrelated reasons for engagement in off farm income are invariably reduced to a singular (negative) stereotype which ignores the potentially valuable contribution that such activity has on the farm household, on the local and regional communities and on the bio-physical environment. Furthermore agricultural policies and support programs rarely reflect the multi-functional nature of Australian agriculture let alone the equally important multi-functionality of Australian farm households.

Writing about off farm income in the United Kingdom, Gasson (1988) offers several reasons for farmer diversification and earning off farm income, including:

- allowing families to continue to stay in rural areas when otherwise they would be forced to leave;
- continuing contribution to rural communities;
- less need for direct income payments; and
- lack of addition to production surpluses.

Gasson (1988) asserts that it is too narrow a view to suggest that solutions to rural problems lie in the prosperity of farming. However views such as Gasson's are rarely canvassed in Australia where a singular focus on productivity within the agricultural sector commonly excludes more lateral considerations of rural adjustment. In fact in many research and development organisations consideration of adjustment in the farm sector is further constrained by fixations on existing ownership and land tenure arrangements and a mono-cultural approach to a particular agricultural enterprise, such as wool or beef production.

The concept of farm viability, that is the capability of the farm's agricultural activities to continue to financially support a farm household, is another constraint on how we think about farm (rural) adjustment.

The Soldier Settlement Scheme was perhaps the most infamous of schemes based around the idea of viability, as translated into the idea of a minimum living area. The same basic idea of a minimum living area and the related concept of the 'genuine' farmer have been carried forward into several recent and contemporary programs.

The 1997 mid-term review of the Rural Adjustment Scheme (DPIE 1997) accepted $50000 of farm cash income as being the threshold for long-term farm viability even though at that time most broadacre farm households would have gained more net income from non-agricultural activities than from agricultural activities.

The Queensland Land Act 1994 (see Caltabiano, Hardman and Reynolds 1999) defines a 'living area' as the area of grazing or agricultural land that will be adequate to enable a competent person to derive from the working of the land, according to the use for which the land is suited, an income adequate to ensure a reasonable standard of living for the person, the person's spouse and dependent children, as well as provide a reserve to meet adverse seasons and the cost of developing and maintaining the land at a sustainable rate of production throughout average seasons , having regard to (a) the locality of the land; and (b) the nature of the land; and (c) the potential of the land for sustainable development; and (d) the distance of the land from transport facilities and markets.

The concept of farm viability leads to the belief that those who chose to operate an agricultural business should be able to earn a living from that business. Furthermore these ideas fortify the belief that the function of agriculture is to financially sustain the farm household and contribute to economic growth and exports.

Coincidental with the growing recognition of the need to integrate agricultural and environmental policy and practice the activities conducted by farm households are increasingly expanding beyond agriculture. In fact in some catchments many rural property holders do not classify themselves as farmers in the traditional sense of farmers being defined as producers of agricultural and related products (Curtis et al 2001; Reeve 2001). Furthermore developments in transport, communication and technology enable agricultural and other farm activities to be increasingly integrated into the income streams of town and urban households.

In summary, productivity improvement in the agricultural sector has not been sufficient to sustain farm household income and the economic drive for adjustment in the agricultural sector will continue if not accelerate.

Institutional reform

Current approaches to the allocation of property rights are analogous to taming lions by pulling their tails—

inevitably someone will get bitten. Rather than focus on the selection of the policy instrument –for example the property right –there initially needs to be a focus on the broader institutional environment. As outlined earlier this institutional framework includes the traditions, the values and the norms and practices of groups, organisations formed by government, industries and communities and their policies and programs and laws, regulations, codes of practice and the operation of markets.

Value based reforms

We need to better understand the values that should influence what happens in rural Australia. We need conceptual and institutional frameworks less constrained by past values, more reflective of current values and more embracing of the fact that values change.

Superficially it appears that our values, what we believe to be right and important, are subject to rapid change. For instance, we may have moved from the development ethos of the '50s and '60s to the mantra of ecological sustainable development thrown up in the '80s and the '90s. And now there may be emerging a nature-related spiritualism, at least in country Australia. However our thinking and importantly our innovation systems remain firmly rooted in a framework of commodification; that is in a framework driven by the desire to produce or acquire products that are priced for exchange.

We channel most if not all of our thinking and analyses through market based prisms. We operate within a commodified culture wherein an idea, an action, a plant, an animal has no value if it can't be priced. We seek to ensure that agriculture is market driven ignoring the reality that farming occurs within social and cultural contexts. We over state the economic contribution of agriculture and deny the critical linkages and interdependencies between different economic activities. We deny the cultural significance of landscapes and the place of food in our culture. We limit ourselves by denying our own spirituality and that of others.

Our continued belief in the capacity of this framework of commodification to give expression to our values is reflected in our choice of policies and policy instruments. We establish mechanisms for market forces to determine the priorities and processes for public investment in education and innovation. We strive for productivity gains in existing agricultural industries in the belief that these gains will deliver better ecological and social outcomes. We use water-pricing policy as an instrument for water allocation without critically examining the exploitative context within which the instrument would operate. Without accounting for opportunity costs we assert that the gross value of an economic activity, for example irrigated agriculture equates to the cost of cessation of that activity.

According to Frow (1997) commodification has three effects. First, it directs (narrowly) the use of resources. Second, it selects the generation of profit as the purpose of production. Third, it transforms previously (or potentially) common resources into private resources. Additionally commodification breaks down the social constructs that guide and strengthen the actions of communities. It is not the inclusiveness of the common property right that leads to the tragedy of the commons but rather the breakdown of the social norms that might have governed the use of those resources held in common.

Wark (1999) highlights the difficulty of the task of aligning values and policies in discussing the interplay between the urban, suburban and rural parts of Australian culture, and in particular the resistance in the suburban hinterlands and rural and remote areas to urban culture and its values. Mackay (1999) sees us as a society deeply divided on economic and employment grounds where depression is the fifth most common disorder treated by general practitioners. An eclectic mix of values is aligned on the one hand to materialism, security, and the traditional family and on the other to the post-modern values of uncertainty, relativism, and a more inclusive spirituality.

These ideas are foreign to agricultural policy. We begin and end in innovation policy (and elsewhere) with the premise that if we had perfect markets all our aspirations would be fulfilled. Once we accept this premise it is a simple step to define the role of government in terms of market failure. And then we attempt to define social and ecological advantages and disadvantages in monetary terms. We apply competition as an end in itself, become disillusioned and reject competition policy. But competition and competition policy aren't the problem. Rather the problem is that we have not agreed on what we want them to achieve.

Oxley (2000) believes that the perpetual problem in managing the environment lies in balancing respect for environmental values with economic values. More broadly we develop the notion that there are three spheres of policy: the economic, the environmental and the social - the "triple-bottom-line".

But this is muddled thinking. The economy doesn't have values. It is a tool to help us achieve our aspirations, aspirations that reflect our individual, social and spiritual values. The environment, on the other hand, is a natural construct which, depending on our culture, affects our individual, social and spiritual values.

The real struggle according to Frow (1997) is not between the ecological and the economic but between what can be properly bought and sold and what cannot.

We have been progressing from property rights that confer limited rights of exclusion to the concept of a property right as essentially the right to exclude all others. As more and more values are commodified, an expectation arises that the right to exclude and to alienate becomes the expected norm for all forms of value. We move from a right of access, through to a right of use, through to a right of ownership, through to a right to exclude all other current and future accesses and uses. We move from attenuated rights to absolute rights. We seek absolute rights notwithstanding that change in community values, knowledge and the environment are inevitable.

We need to balance the current and future needs of the community with the current and future needs of the users of community resources- the air, the water the soil and the vegetation upon which life depends. But we need to do so knowing that both these sets of needs will change, knowing that we do not adequately understand our ecosystems, knowing that we cannot treat components of ecosystems, such as water, in isolation from the remainder of the ecosystem.

Irrespective of the outcomes of scientific reviews (and of reviews of reviews) there remains the need to deal with the certainty of change - of change in the social constructs within which rights are allocated and removed, of change in knowledge, of change in biophysical circumstances. We need to apply the precautionary principle but we need to go further to deal with the certainty of change. We need to adopt adaptive management frameworks whereby we focus more on the processes for renewal of property rights and less on the static allocation of absolute rights. Investors and communities alike need a degree of predictability. Part of the predictability equation is having processes to deal with change.

Language and leadership

The fixation on agriculture in farm and rural analyses may arise in part because of the language we use. Agriculture, farming and rural are used interchangeably. Agricultural policies and support programs become synonymous with farm policies and programs and in fact, even more expansively, with rural policies and programs.

The interchangeable use of the terms rural, farm and agriculture leads to confusion, the classic being the assumption that agencies termed 'rural' actually deal with rural when in reality their charter is restricted to agriculture. For instance we have the 'rural' research and development corporations although almost without exception they are concerned only with agriculture and even then only partly.

The terms 'rural' and 'farm' delineate place with rural being used to describe all things and activities occurring outside metropolitan areas. The definition of 'farm' is more problematic but it is tentatively defined as the place on which farming (see below) occurs. Agriculture and farming are forms of activity.

Davis and Goldberg (1957) defined the agribusiness sector to be the sum total of all the operations involved in the manufacture and distribution of farm supplies, production operations on the farm, and the storage, processing and distribution of farm commodities and the items made from them. However by common usage agribusiness is frequently interpreted as referring only to off farm activities hence limiting its utility as a term to describe the whole agricultural system.

In a review of agricultural and related education McColl, Robson and Chudleigh (1991) defined agricultural systems as the production, processing and marketing activities based on land utilisation and soil, water, and forest conservation and management. Land utilisation was described as agriculture, horticulture and forestry but excluding mining. Godden (1996) adopted a similar economy-wide view of agriculture proposing that it be comprised of farms and all their linkages with the rest of the economy, especially the linkages between farm production and natural resources.

The linkages between farm production and natural resources are important in agricultural systems but they are not exclusive to agriculture and mining. Additionally we should not fail by default to consider other key factors, such as people skills and policy settings. Definitions of agricultural systems need also to reflect that the relative importance of these factors is likely to vary greatly between different systems and over time and that production is only one of the component activities of such systems.

Furthermore some food and fibre systems, most particularly forestry and fishing, predominantly are not farm based and future food and fibre-producing systems increasingly may not involve a land or marine environment as they are conventionally conceived.

Given these considerations, the following output-based definition of agricultural systems is proposed:

Agricultural systems are comprised of the economic, social and biophysical activities involved in the marketing, handling, processing, and production of food, fibre, and related products such as plant and animal-based pharmaceuticals and floriculture.

The use of an output based definition of agricultural systems enables a distinction to be drawn between agricultural and non-agricultural farm-based activities.

The term 'farming' encompasses all those activities which occur solely or principally on farms, including, for instance, agricultural activities, off-reserve conservation, management of investments which might be on or off farm, and farm tourism.

Agricultural activities on farms are part of agricultural systems but they do not necessarily equate with farming systems. Non-agricultural farm pursuits are related to but are not included in agricultural systems.

The term 'farming systems' is the purposeful management of farming including the economic, social and cultural determinants of this behaviour (after McCown, unpublished).

The important points here are that the proposed definitions:

- distinguish between rural and farm, and between farm and agriculture;
- allow for natural resources to have intrinsic and exploitative values beyond farming and mining;
- allow for the activities encompassed by farming to extend beyond agriculture;
- allow for the development of synergistic agricultural and non-agricultural farming pursuits; and they
- provide for the desirable integration of the farm and non-farm elements of agricultural systems.

The multi-functionality of farming and of agriculture

Since the beginning of white occupation agriculturists have had a major influence on the policies and practices affecting the development and use of Australian resources, particularly the natural resources. Organisations and policies have developed to serve the particular needs of agriculturists. Together with the geographic separation of most Australians from farming these institutional arrangements have enabled agriculture to operate largely within its own self-contained institutional framework.

The emphasis in agricultural policy has been and continues to be on using natural resources for the production and sale of food and fibre. Politicians and community and industry leaders encourage farmers to believe in the special importance of their contribution to economic growth and exports. Farmers, their organisations and their public support agencies build on these cultural norms, closing their minds and those of the nation to other ways of conceiving of rural Australia. However it is now time to re-represent the roles of agriculture so as to align them with current and probable future realities.

Conceptually de-coupling natural resources from agriculture, as proposed above, will enable the imagining of a wider spectrum of uses of those resources, including non-exploitative uses. Additionally such a de-coupling will enable a greater understanding of the potential for involvement by a wider range of users of those resources, for both agricultural and non-agricultural pursuits.

Irrespective of the economic performance of agriculture it can be argued that the influence of agriculture needs to outweigh its economic significance. Agriculture is multi-functional and has a unique place in the wellbeing and culture of all Australians. For many people food has value beyond its intrinsic nutritional value. Food is central to social activities and plays a role in the self-identification and self -sufficiency of societies.

Ironically Australia denies this multi-functionality in international trade forums and elsewhere. 'Clean and

green' and more recently 'clean and safe' are adopted as marketing tools to enhance exports but little is done to protect and strengthen the role of agriculture in sustaining local identity and custom. If agriculture is to have an influence beyond its economic significance, then government and industry adjustment and innovation policies need to be directed towards broadening and enhancing the multi-functionality of agriculture. This would be in contrast to policies directed narrowly towards enhancing agricultural output. Multi-functionality has as much to do with purpose as it has with means and it should not be seen as simply an expansion of the options available to enhance economic growth.

The multi-functionality of agriculture needs to be set within the broader canvass of the multi-functionality of farming systems. Too often the multi-functional possibilities presented by farms, and in particular the provision of eco-services and landscape design features, are judged wrongly to be inseparable co-products of our agricultural systems.

The key points of this discussion are that there is a need to:

- adjust our perceptions of the economic contribution of agriculture to accord with reality and the likely future constructs of the maturing Australian economy;
- recognise that agriculture and farming systems are multi-functional both in purpose and means; and there is a need to
- explore how resources can be combined and managed in ways that enable the expression of multi-functionality.

Governance and creativity

The challenge of rural Australia is how to use political power in the public, private and community sectors to manage our affairs. Whilst there are important economic and technical dimensions to deteriorating ecological and social conditions what we have is fundamentally a challenge of governance. It is a challenge for which the solutions are not readily apparent. It is a challenge requiring considerable insight and creativity.

Through the '80s and 90's we developed concepts and strategies for ecological sustainable development. However we failed to build institutional capacities for environmental management. We fragmented the efforts of community, industry, and government. We fragmented efforts within government, fragmented the use of policy instruments and fragmented environmental legislation. We have programs that are about not much more than seeking and distributing financial grants. We have failed to transfer powers and resources to local, community-based and responsive institutions. We have too many overworked and under-resourced committees. Importantly we have failed to develop planning and accountability processes that acknowledge the critical importance of social norms, of intrinsic motivation and of creativity.

The farmer now is not the farmer of yesterday. The farmer now is both a knowledge worker focused on ideas and a manager focused on people and work. The 'knowledge worker' farmer needs to be schooled in the use of concepts and information. S/he needs to be as concerned about effectiveness (doing the right thing) as about the quantity and quality components of productivity. The knowledge worker farmer needs to adopt a habit of continual learning. In short the knowledge worker farmer needs to be enabled, not managed. Farming today and tomorrow is an information-based activity ill suited to command and control based relationships with support institutions. And as argued by Drucker (2001) management by self-control requires complete rethinking concerning our use of reports, procedures, and forms. Reports and procedures are necessary tools but their most common misuse is as an instrument of control from above.

Various authors (see Karim 1999; Drucker 2001) trace an evolution from the agricultural age through the industrial age to the emerging knowledge age. From an agricultural viewpoint however it is not so much a transition from agriculture as a transformation within it; from manual, through industrialisation to the emerging knowledge based agricultural era. The knowledge era is, as observed by Harley and Sewell (2001), not so much about an 'old' and a 'new' economy as it is about new ways of doing old things.

Fixations on agriculture and an undervaluing of intuition are important obstacles to insight. Analysts seem to be unwilling and/or unable to encompass a broad range of values and activities. Additionally the dominance of scientific and economic disciplines often leads us to seek an explanation based solely on analysis of facts. The valuable potential contributions of imagination and intuition are lost.

We may learn from what has been but we will not move forward by adopting the thinking and strategies that have led us to where we are. We need to be continually re- representing the problem. We need to imagine different futures. To do this we need to remove obstacles to insightful thinking. We can do this by increasing the diversity of innovation systems and by promoting continuous learning through for instance environment management systems.

Increasing the diversity of innovation systems

The nature of innovation is predetermined by the characteristics of the innovation systems we create. If the innovation system is highly planned and controlled then we will produce innovation products that make incremental changes to existing systems. Such changes are necessary but alone they are unlikely to represent the range of innovation products needed to meet changing requirements in rural Australia.

Innovation systems for rural Australia lack diversity and are risk adverse. They are driven by short term narrowly-based commercial imperatives and they are managed by command and control processes.

Public support for innovation in rural Australia is largely directed towards agricultural R&D, in the order of $1 billion per year. The execution of agricultural R&D is principally confined to the public sector and has a technological emphasis, patterns begun in the mid - 1850s, with the establishment of experimental farms staffed almost exclusively by agricultural and veterinary scientists. This trend has persisted for over 150 years despite (or because of) frequent reviews and restructuring of State Departments of Agriculture.

The Rural Research and Development Corporations account for at least two-thirds of the influence on the direction of agricultural R&D (Gleeson, Russell and Woods 1999). They are focussed primarily on optimising the profitability and environmental sustainability of existing agricultural enterprises.

Continuous learning through environmental management systems

A 'control and command ' approach underpins many of the policy and program developments (and reward schemes) for improved environmental management. Through prescriptive and detailed processes industry and community groups are required to commit to achieving outcomes and to specifying the procedures whereby those outcomes will be achieved. In most cases a 'higher' authority specifies both the nature and the level of the outcome and 'expert' gatekeepers judge the appropriateness of the proposed methodology.

This form of governance is exemplified by the application of environmental outcome standards across a catchment or sub-catchment notwithstanding that such universally applied environmental outcome standards:

- Cannot reflect the diverse values, aspirations, and capabilities of the land stewards and hence a socio-political climate against adoption or compliance is established.
- Fragment the interactive elements that comprise both the ecosystems and the interface between extractive activities and those ecosystems.
- Require in their construction confidence in our understanding of the ecosystem which history frequently shows to have been misguided.
- Detract from the motivation and capability to achieve beyond compliance.
- Constrain the learning and creativity required for continuous improvement in meeting current and emergent environmental challenges.
- Provide an opportunity for uninformed or doctrinaire external influences to have unwarranted impacts on environmental management.
- Are open to be used as barriers to trade.

Environmental management systems provide an alternative approach for improving environmental management on farms. An environmental management system is a systematic process used by an organisation to improve its impact on the environment.

Given the commitment to continuous improvement and the capacity to take into account the particular features of each farm (including the aspirations and capabilities of the farm management team) environmental management systems seem to be a particularly useful tool. However in the final analysis the policy and program frameworks that they operate within will largely determine their usefulness.

Governments need to recognise and respond to the potential for environment management systems to

assist in the delivery of public responsibilities, policies, and programs.

Community organisations, including catchment management groups, conservation groups and consumer organisations, need to lend their advocacy, intellectual and practical support to the implementation of environment management systems.

Industry needs to understand the essential nature of environment management systems and how they differ from quality control and best management systems. Industry also needs to recognise the potential for environment management systems to enable a responsible partnership to build between their members and the broader public.

Conclusion

The ecological future of rural Australia and its relationship with suburban and urban Australia require a fundamental reassessment of the role, nature and performance of Australian agriculture.

The central theme of the paper is that our mindscapes, the pictures we have of rural Australia, are agricultural centric, based on questionable analyses, and are reinforced by our institutional cultures, structures, and processes.

Past reliance on increased agricultural production has been ineffective in meeting economic, social or environmental goals and it is likely to be so in the future. There needs to be a refocusing onto profitability and the multi-functional nature of agriculture and of farming more broadly.

The desirable direction and pace of change require a greater understanding of the impact of dominant conceptual frameworks and of innovation systems. Such understandings should lead to greater diversity in institutional arrangements, particularly as they relate to agricultural, farm and rural innovation.

There are many institutional tools including leadership, education, organisations, policies, regulations and markets that can be used to foster ecologically sustainable development. The challenge is to design and use these tools so that they reflect community values, so that they have complementary impacts and so that they can be modified to cater for changes in values, in biophysical circumstances and in knowledge.

A property right is a right to use a resource. In an ecologically sustainable development framework such a right must be allocated and used in ways that improve environmental management. Property rights need to reflect:

- Our changing understandings of ecological systems
- Landscape values and aspirations of the community
- Legitimate aspirations of property holders
- The certainty that there will be a need to modify the property right to reflect changes in values and knowledge.
- The need to capture synergies within the mix of interfacing policy instruments.

These multiple objectives cannot be achieved through an unfettered market based allocation of property rights or through an analytical process assigning prices to non-material values. Political judgements need to be made about the broad mix of policy instruments and about the design and allocation of property rights. In addition to the points listed above these political judgements need to be informed by independent analysis of their probable net environmental and social impacts.

Finally there is a need to emphasise that the path towards sustainability will be built on interconnected actions across whole communities, not solely on policies directed towards the stewards of resources. Currently these stewards operate within a policy framework designed to achieve employment and economic growth principally through increased per capita consumption. This paradigm will not lead to ecological sustainability.

REFERENCES

Australian Bureau of Agricultural and Resource Economics (1999) Changes in Non Metropolitan Population: Jobs and Industries, Report to the Department of Transport and Regional Services.

Australian Bureau of Agricultural and Resource Economics (2000) *Sustaining the Nation: Celebrating 100 Years of Agriculture to Australia*, ABARE, Canberra.Australian Bureau of Statistics (1996)

*Australian Agriculture and the Environment, A*BS, Canberra.Australian Bureau of Statistics (1998) *International Merchandise Trade,* ABS, Canberra.

Australian Bureau of Statistics (2000) Agriculture Australia, ABS, Canberra.

Ball, R. (1996) *Institutions of Innovation and Prosperity*, Occasional Papers 58, The Centre for Independent Studies, St Leonards.

Bennett, T., Emerson, M. and Frow, J. (1999) *Accounting for Tastes: Australian Everyday Culture,* Cambridge University Press, Cambridge.

Caltabiano, T., Hardman, J. R. P. and Reynolds, R. (1999) *Living Area Standards,* Department of Natural Resources, Queensland.

Carter, S. (1999) `Multiple Business Ownership in the Faun Sector: Assessing the Enterprise and Employment Contributions of Farmers in Cambridgeshire' in *Journal of Rural Studies 15 1999,* pp417-429.

Cawley, M. (1987) `Part Time Farming in Rural Development: Evidence from Western Ireland' in *Journal of Rural Studies, 1997*

Commonwealth of Australia (1992) *National Strategy for Ecologically Sustainable Development A*GPS Press: Canberra

Davis J. H. & Goldberg R.A, (1957) *A Concept of Agribusiness*, Division of Research, Harvard Business School.

Deeley, M. (1991), *Manufacturing in the 1990's' in Australian Industry- What Policy?* Southwood Press, Sydney.

Department of Industry, Technology and Commerce, University of Sydney's Australian Centre for Innovation and International Competitiveness (1993), *Innovation in* Australia's *Services Industries, A*GPS, Canberra.

Department of Primary Industries and Energy, Mid-term Review of the Rural Adjustment Scheme 1997, Rural Adjustment: Managing Change, AGPS, Canberra.

Drucker, P. F. 2001, *The Essential Drucker: Selections from the Management* Works *of Peter F. Drucker,* Harper Collins Publishers Inc, New York.

Dunlop, M. 2002, *What will Australian agricultural landscapes be like m 50 years,* Contributed paper to the Australian Academy of Science's Former Conference on the Environment; Agriculture for the Australian Environment, *30* July- I August 2002, Canberra

Frow, John (1997) *Time & Commodity Culture -Essays in Cultural Theory and Postmodernity, Oxford* University Press Ire., New York, Clarendon Press ISBN 0-19-815948

Garnaut, J. and Lewis J., (1997), `Farm Households - Commonwealth social support payments', *Farm Surveys Report 1997,* ABARE, Canberra

Garnaut, J and Lim-Applegate, H. (1998), *People in Farming*, ABARE Research Report 98.6, Canberra.

Gasson, R.,Crow R., Errington, A., Hutson, J., Marsden, T., Winter, D. M. `The farm as a family business; a review' in *Journal of Agricultural Economics (1988*) Vo169 (2)

Gasson, R. `Farm Diversification and Rural Development' in *Journal of Agricultural Economics (1988)* Vo169 (2)

Gleeson, T., Russell, G., and Woods, E. (1999), *Creative Research Environments: Environmental Factors Affecting Creativity in Agricultural Research in Australia*, Report for the Rural Industries Research and Development Corporation, Canberra.

Godden D. (1996), *Agricultural and Resource Policy - Principles and Practice,* Oxford University Press, Melbourne, Australia.

Haberkorn, G., Hugo, G., Fisher, M., Aylward, R. (1999) *Country Matters, Social Atlas of Rural and Regional Australia*, Bureau of Rural Sciences Australia.

Karim, M. R. A. (1999) *The Impact of the Knowledge Age on Governance*. 1999 National Conference Papers, Institute of Public Administration Australia in conjunction with The Commonwealth Association for Public Administration and Management.

Lindsay, Ray, and Gleeson, Trish (1997) *Changing Structure of Farming in Australia*, Australian Farm Surveys Report 1997.

Mackay, H. (1999) *Turning Point: Australians Choosing Their Future*, Picador Pan Macmillan, Sydney.

Malcom, Bill, Davidson, Brian and Vandenberg, Ed, (2000) *The Rural Adjustment Scheme, Its Role, Operation and Effectiveness* RIRDC Publication No 99/19

Marsh, John, et al (1991) *The Changing Role of the Common Agricultural Policy: The Future of Farming in Europe* Pinter Publishers

Mobbs, K., & Dovers, S., Eds (1999) *Social, Economic, Legal, Policy and Institutional R&D for Natural Resource Management.- Issues and Directions for LWRRDC (Occasional Paper 01/99)* Canberra: LWRRDC

McColl, J., Robson, A. and Chudleigh, J. (1991) *Report of the Review of Agricultural and Related Education*, Volume 1, AGPS, Canberra.

McGovern. M (1999) 'On the Importance of Exports to Australian Agriculture', *Australian Journal of Regional Studies, Volume 5*, Number 2.

Mullen J.D.(2002), *Sustainable resource use may impose costs on future as well as present generations.* Contributed paper to the Australian Academy of Science's Fenner Conference on the Environment; Agriculture for the Australian Environment, 30 July- I August 2002, Canberra

National Land & Water Resources Audit 2001, *Australian Agriculture Assessment 2001, Volume* 2, National Land and Water Resources Audit, on behalf of Commonwealth of Australia.

OECD (1989) *Integration of Agriculture and Environmental Policies*

O'Brien, P (2002) *Agriculture at the crossroads: planning an environmentally, socially and economically vibrant future.* Paper for the Australian Academy of Science's Fenner Conference on the Environment; Agriculture for the Australian Environment, 30 July- I August 2002, Canberra.

Oxley, A. (2000) *Seize the Future: Australia Can Prosper in the New Century* Allen & Unwin, St Leonards.

Reeve, I. (1999) *Property Rights and Rural Land Resource Management: an Institutionalise and Discourse Analytic Perspective*, an unpublished paper, the Rural Development Centre, Armidale, NSW.

Saul, J., R 1997, *The Unconscious Civilisation*, Penguin Books, Victoria.

Standing Committee on Agriculture and Resource Management (1998), *Sustainable Agriculture: Assessing Australia's Recent Performance,* A Report to SCARM of the National Collaborative Project on Indicators for Sustainable Agriculture, SCARM Technical Report 70.

Stein, Paul L. (2000) *Public Participation in Water Policy,* 1st Australasian Natural Resources Law and Policy Conference, 27 & 28 March 2000, Canberra.

Stayner, R. A. (1997) Families and the Farm Adjustment Process in a Legacy under threat? Family Farming in Australia Jim Lees University of New England Press, Armidale.

Wark, McKenzie (1999) Celebrities, Culture and Cyberspace, the Light on the Hill in a Postmodern World, Pluto Press, Australia.

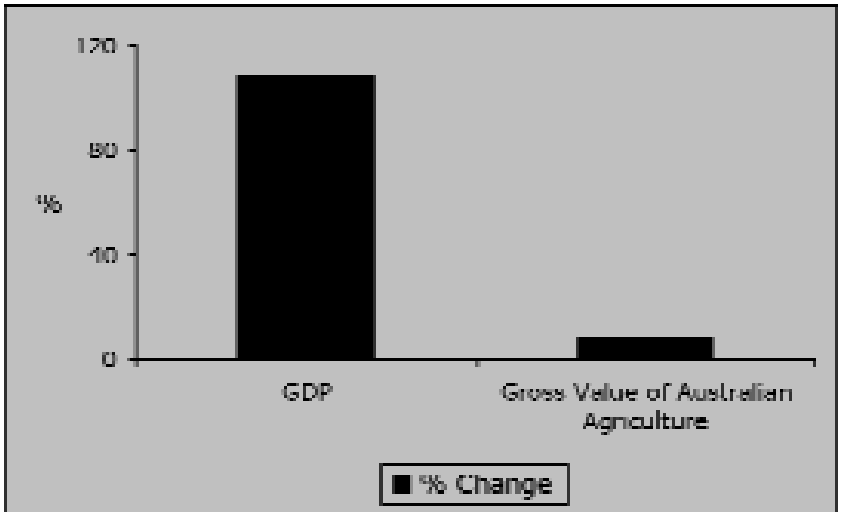
Weller, P (2000), 'In Search of Governance' in (eds) Keating, M. and Davis, G. (2000) The Future of Governance: Policy Choices, Allen and Unwin, St Leonards.

Whatmore. S., Manton, R., Little, J., Marsden, T. (1987) `Towards a typology of farm businesses in contemporary British agriculture' Sociologia Ruralis 1987 Vol XXVIT-1

Wiseman, J. 1998, Global Nation? Australia and the Polities of Globalisation, Cambridge University Press, Cambridge.

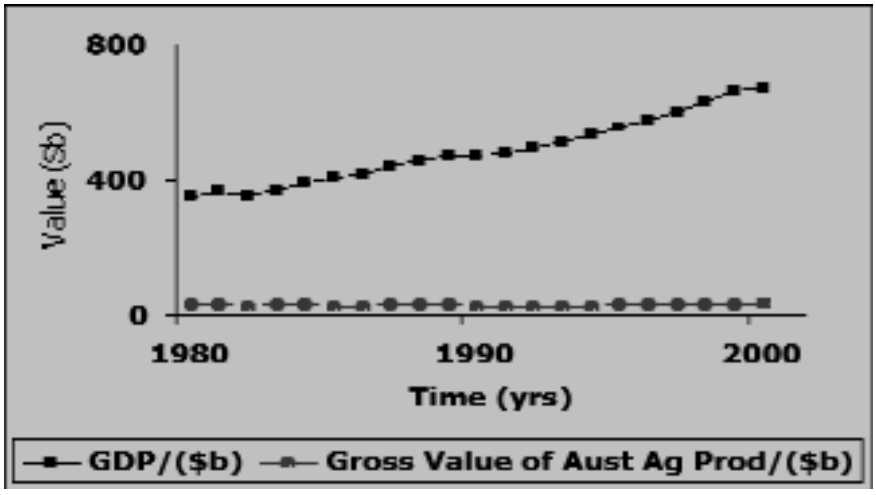
Zhou, J. M. (1999), Preserving Small While Strengthening Large Farmers in the USA and OECD, Second National Small Farm Conference, Selected Paper, St Louis, Missouri, 12-15 October, 1999, pp 1-20.

Figure 1.1 Change in GDP and Gross Value of Agricultural Production, 1980\81 to 2000\01[1]



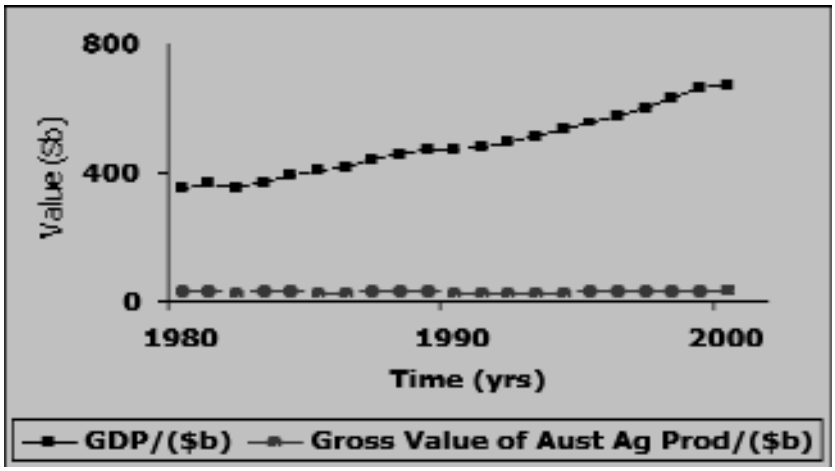
1. 2000\01 dollars
Source: Reserve Bank and ABARE ACS 2001

Figure 1.2 Trend in GDP and Gross Value of Agricultural Production 1980\81 –2000\01[1]



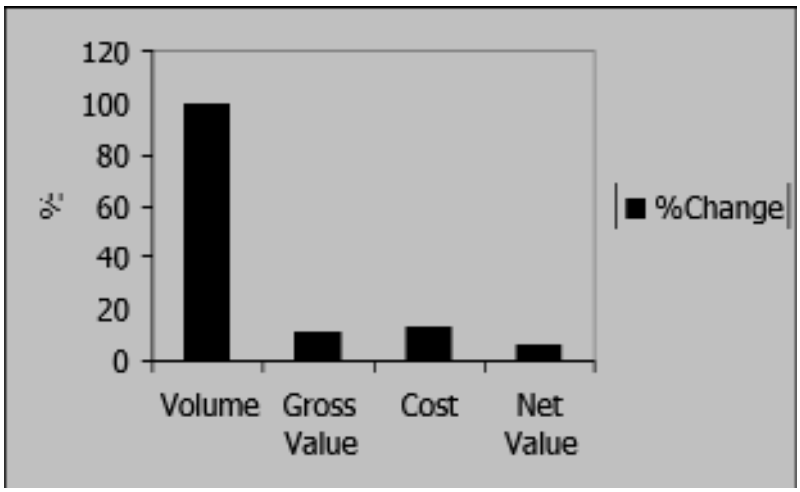
1. 2000\01 dollars
Source: Reserve Bank and ABARE ACS 2001

Figure 2.1: Trends in Agricultural Performance 1980\81-2000\01[1]



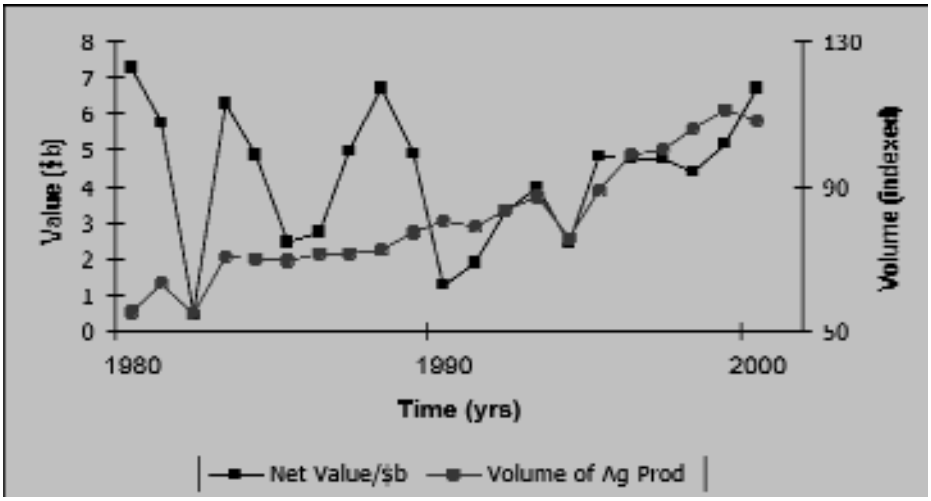
1. 2000\01 dollars
Source: ABARE ACS 2000\01

Figure 2.2: Agricultural Performance 1980/81-2000\011



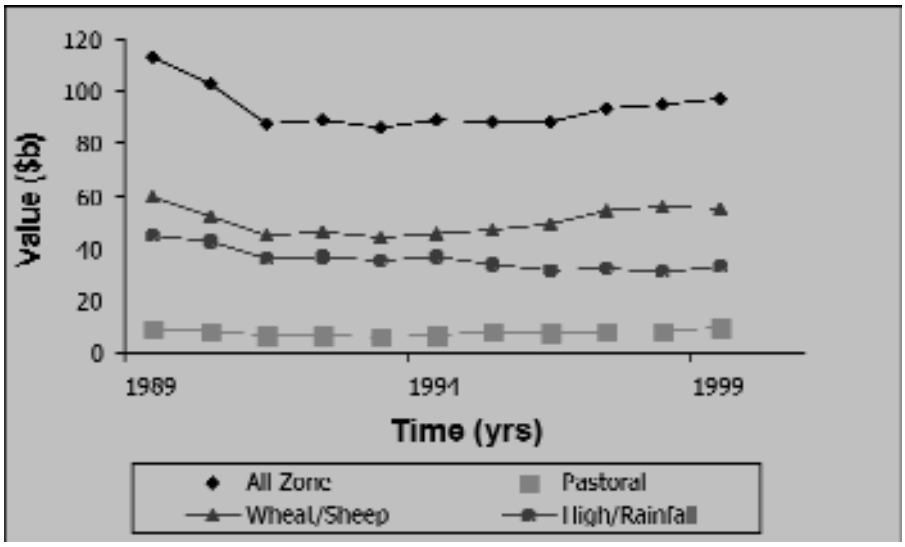
1. 2000\01 dollars
Source: ABARE

Figure 2.3: Net Value of Production and Volume of Agricultural Production 1980\81-2000\01



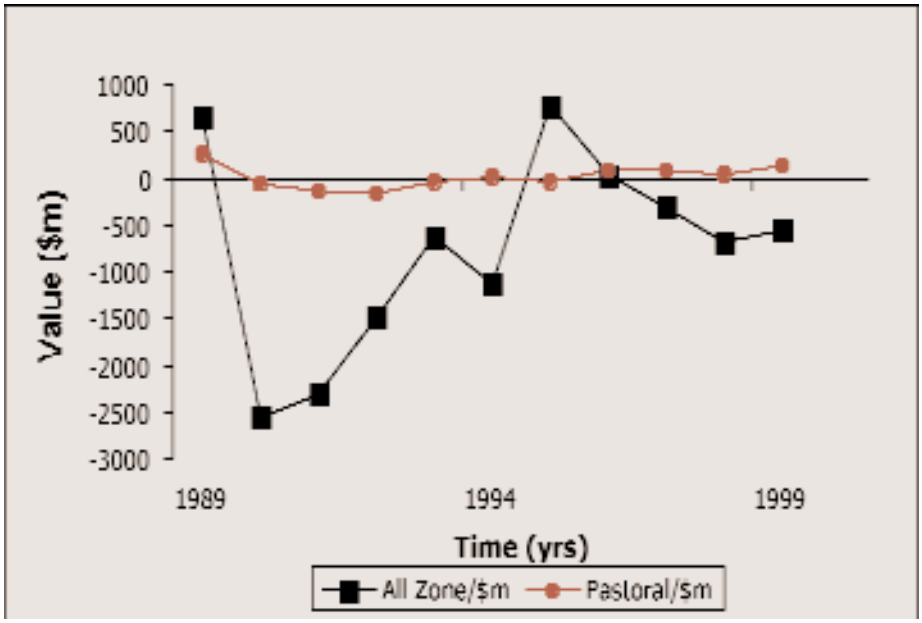
1. 2000\01 dollars
Source: ABARE ACS 2000\01

Figure 3.1: Assets Used on Australian Farms1, 1989\90 –1999\002



1. The value of all assets used on a farm, including the value of leased items but excluding machinery
2. 2000\01 dollars
Source: ABARE

Figure 3.2 Business Profit1 in the Broad Acre Industries, 1989\90 to 1999\00[2]



1. Business Profit is farm cash income plus build-up in trading stocks, less depreciation and the imputed value of the owner manager, partner(s) and family labour.
2. 2000\01 dollars

Source: ABARE Ag-Surf 2002 data

Figure 4 Export Performance

* The agricultural statistics in this figure differ somewhat from the more recent estimates provided by the Australian Bureau of Statistics (ABS 2000)

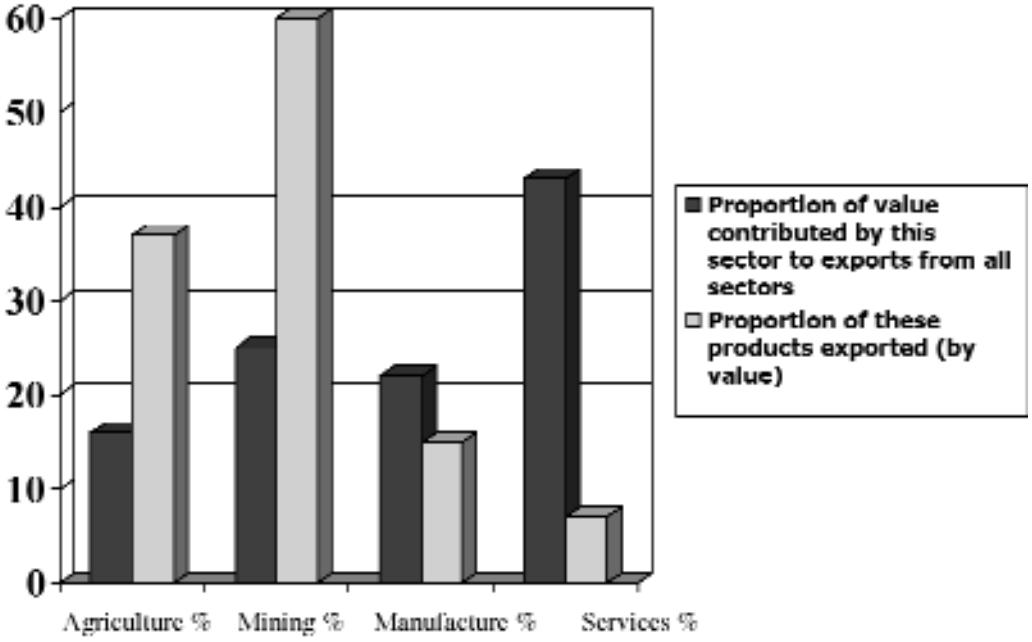
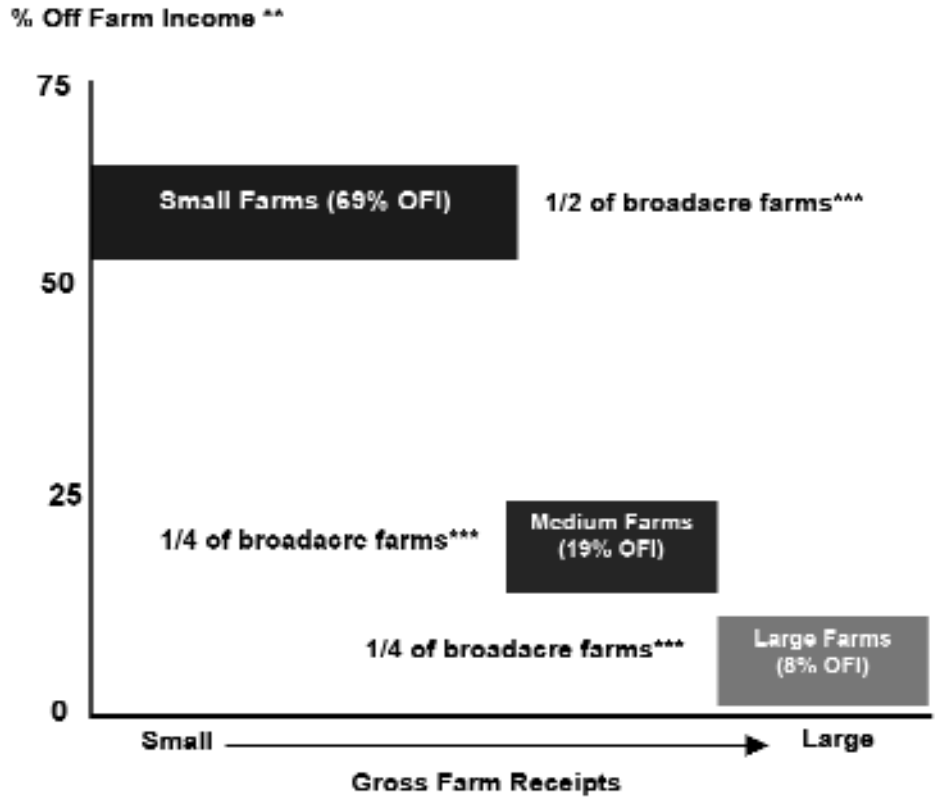


Figure 5 – Contribution of off farm income according to size of farm business* annual average for 1997–98



* Farm business: broadacre farms with estimated value of production (EVAO) of $22 500 or more
** Off farm income: as a proportion of farm cash income + off farm income
*** Average gross farm receipts for small, medium and large farms of $59 000, $176 000 and $477 000 respectively

NOTES

1 Paper presented to the Arid Land Administrators Conference, Emerald, Queensland, 7th August 2002 and to the Murrumbidgee Landcare Forum, 16th August 2002.

2 Synapse Research & Consulting received financial assistance from the Queensland Department of Natural Resources and Mines, the Rural Industries Research & Development Corporation and Land &Water Australia in preparing this paper but the paper does not necessarily reflect the views of any of those organisations or of the Murrumbidgee Landcare Association.

3 Synapse Research &Consulting , PO Box 3746, South Brisbane Qld 4101 Phone:0738442370 Email: syncons@ozemail.com.au Web site: www. synapse consulting .com. au

4 This principle, as discussed by Stein (2000), is reinforced by Principle 10 of the Rio Declaration on Environment and Development, 1992 that states that environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings including redress and remedy shall be provided.

5 A rise in real gross value of 25 percent over 43 years is 0.58 percent annually. Depending on the chosen time frame the actual rise in real gross income can more closely approximate zero.

6 Standard International Trade Classifications 0, 1, 2 except 27 and 28.

7 Standard International Trade Classifications 61, 62, 63, 64, 65, 84 and 85.

8 Farm cash income is the difference between the total cash receipts of the farm (agricultural) business and the total cash costs incurred by the farm (agricultural) business. It does not account for changes in trading stocks, depreciation, or the real or imputed value of labour provided by owner managers and their families. The derivation of this statistic is a key factor in this analysis. To reflect the cash available to a farm household as closely as possible off-farm income is compared in these analyses with farm cash income rather than, as is commonly done, with farm business profit (see Garnaut and Lewis 1997). Farm business profit includes allowance for an imputed farm wage for the farmer and his/her spouse.

Property Rights Instruments:
Transformative Policy Options

Robin Connor and Stephen Dovers

Project ANU 24, Case Study 5, Report to Land & Water Australia, Canberra.

Centre for Resource and Environmental Studies,
Australian National University, ACT 0200. Ph: 02 6125 0669
email: c/ dovers@cres.anu.edu.au

Context

This paper is a case study on the application of property rights instruments reported in Land & Water Australia's Social and Institutional Research Program Project ANU-24 – 'Implications for Australian natural resource management of international experiences in institutional change and reform arising from sustainable development' – undertaken through the Centre for Resource and Environmental Studies, The Australian National University.

In summary, the aim of the project was to explore operational institutional lessons of relevance to Australia, gleaned from institutional change in other countries driven by the post-WCED (1987) and UNCED (1992) policy agenda of sustainable development. The primary output of the project is a summary report (Connor and Dovers 2002a) supplemented by a background paper and case studies. The background paper (Connor and Dovers 2002b) defines what is meant by 'institutions' and offers a framework for understanding institutional change and learning based on conceptions developed in the New Institutional literature (eg. North 1987). The case studies comprise:

- The development of integrated environmental policy in the European Union, as the leading example of inter-governmental integration of environmental and, more recently, sustainability policy (Connor and Dovers 2002c);
- The formulation and implementation of the New Zealand Resource Management Act of 1991 (RMA), as an early and internationally significant attempt to embed and integrate sustainability across a wide range of policy, planning and resource and environmental decision making processes (Connor and Dovers 2002d);
- National Councils for Sustainable Development (NCSDs) and equivalent bodies, created in many countries since 1992 as multi-stakeholder partnerships for policy discourse and development (Dovers and Connor 2002a);
- Proposals for and to a lesser extent implementation of strategic environmental assessment (SEA) over the past thirty years, representing a major option for policy integration (Dovers and Connor 2002b); and
- (as reported here) Market based instruments and the property rights dimensions of these, as a strongly advocated and potentially transformative means of policy integration, drawing particularly on increasingly documented experiences with individual transferable quota in the fisheries sector.

1. Introduction

Over the past two decades, coincident with the rise of the sustainability discourse, the application of property rights instruments (PRIs) to natural resource management has been advocated as a means to efficiently allocate scarce resources. PRIs here refer to entitlements to resource use that have been endowed with characteristics of property interests, such as the ability to trade them in a market and capture changes in their value. Often these are quantified entitlements. Such instruments have been implemented for the control of sulphur emissions from fossil fuel burning power stations, in controlling discharges into rivers affecting water quality, for the allocation of water abstraction, and most notably in marine fisheries management. Such policy instruments have been proposed in other areas, including carbon emissions and sequestration, and biodiversity conservation. Although often characterised as *just another tool in the policy toolbox,* this case study argues that, in many cases, PRIs involve a fundamental change in distributional logic and in the culture of resource use.

Property rights are a fundamental component of a society's institutional systems. They arise and are conditioned by rules in constitutional documents, statute law and the doctrines and precedence of Common Law. Informal rules – social norms – also sanction property rights. Property rights provide the backbone of incentive structures that reduce uncertainty about the behaviour of others and make higher levels of coordination and social organisation possible. Property rights are so basic to natural resource use as to be inherent where they are not specified, in the sense that the lack of property rights is a recognisable regime, that is, *open access*.[1] Hence the introduction of PRIs in a given resource use situation is not so much the *de novo* introduction of property rights, but represents a change to the existing property rights regime.

Changes in property rights, in turn, change incentives for individual behaviour and the logic collective action. In the transition from one property rights regime to another, a transformation takes place in the nature of relations between individuals and resource use, and in the modes of work and social relations of individuals. Depending on the *context* of each situation, this transformation may be more or less profound, personally, socially or economically. Depending on the *processes* through which change is introduced, it may be disruptive of, or contribute to, social cohesion, which may be more or less important to stakeholders than the economic changes involved. Finally, these management policy processes will have profound impacts on how changes are accepted by stakeholders and on the costs of implementation, monitoring and enforcement.

Above all, a change in the property rights regime changes the logic of access to resources and how that access is distributed and redistributed. In so doing, it drives a transformation in the social construction of fairness or equity. Under PRIs, ecological integrity and economic efficiency achieve parity with, and may altogether trump equity, as the traditional first priority in distributional logic of resource access. Although economic efficiency is central to the dynamic logic and history of PRIs, in the sustainability era it is generally ecological integrity that is put first, not least due to uncertainty about interactions, irreversibility, and long term impacts.

Thus the equity notion must itself adapt to the new constraints of sustainability in order that the world should seem fair. In this new situation under a new set of rights and incentives, what comprises *fairness* in terms of a set of conditioning rules, and in terms of resultant distributions of costs and benefits is up for negotiation. With precaution applied to the environment, concessions to existing constructions of equity are generally at the expense of potential efficiency gains. Such a *trade-off* in the name of sustainability is more likely to be accepted and adopted by stakeholders and community when an informed discursive management policy process has occurred to arrive at an agreed regime change.

This case study paper explores these issues in an effort to bring to attention the broader complexity of property rights change. Policy advocates favouring market instruments take for granted that efficiency is the first priority social goal, and therefore, to them, such proposals represent an evolution of means to achieve *what we all want* – increases in net social benefits. Implicit is the assumption that other, subsidiary, goals will be better able to take care of themselves if we get the economics right. The portrayal of PRIs as policy instruments with universal application and predetermined natural characteristics tends to set them apart from the normative discussion. By not being included in the sustainability

discourse, where expectations over value preferences can be aligned, their application to NRM and consequent transformative impacts can be, or at least can be perceived as, hostile to sustainability principles.

The paper proceeds in several parts. The first section briefly introduces a framework for understanding property rights regimes in relation to the use of *common pool* natural resources. The second part describes the historical origin of *cap and trade* property rights instruments in applied economics, and explains the linkage with the concerns of sustainable development. This section goes on to discuss the use of PRIs to establish an *environmental bottom line*, and the problems with the *leave it to the market* approach. In the third section we turn to the social construction of equity and links to culture in natural resource use. Here frontier culture is contrasted with that of the commons to establish a continuum on which a new culture might be constructed for sustainable resource use, with the transformation being assisted by a property rights regime change. In this context, the importance of process and path dependence is briefly discussed. Next, a simple addition is made to the conceptual model built thus far, in including the prior longevity of an established property rights framework, as a negative correlate of the adaptability of equity notions to regime change. In the final section, the conditions for success in using PRIs are traversed in drawing lessons from the case study.

2. Property Rights and Common Pool Resources

Confusion in concepts and terminology is endemic in the discussion of property rights and natural resource use. An example of this in the Australian context can be found in the current discussion of *market-based instruments* (MBI) for natural resource management. Investments in development of MBI for the National Action Plan for Salinity and Water Quality are currently being made, informed by a background paper discussing the logic of MBIs and documenting those in already place or proposed in Australia.[2] The documented examples classified as MBIs include environmental labelling, levies, philanthropic purchase of land for conservation, pollution credit systems, and cap-and-trade resource rights regimes. There are enormous differences between these initiative types (some not policy instruments at all) in terms of their intent, design and implementation requirements, and in the degree to which their implementation equals a potentially transformative intervention in the institutional system. We argue here that property rights instruments (such as cap and trade permit or quota schemes) are different in kind, due to the required change to a deeply socially embedded set of institutional relations. Such a broad grouping of initiative types as that listed by the MBI program as related, can only serve to further obscure important differences between policy options. With such potential confusion at hand, an explication of the nature of property rights instruments in natural resource management seems timely.

The term *common property resource* has been used erroneously from the earliest modern analysis.[3] In fact, the expression is analytically meaningless as it conflates the nature of the resource with the property regime prevailing. To assist in clarification of these issues the term *common pool resource* has been specifically coined[4] and is used extensively in the informed literature, although some authors persist with the old terminology.

> *A common pool resource is a valued natural or human made resource or facility that is available to more than one person and subject to degradation as a result of overuse. Common-pool resources are ones for which exclusion from the resource is costly and one person's use subtracts from what is available to others.*[5]

The nature of common pool resources (CPRs) is distinguished from two other classes of economic goods, private goods and public goods, as indicated in Table 1.

Table 1: Relation of Common Pool Resources to Other Classes of Economic Good

	Excludable	Subtractable
Private goods	**Yes**	**Yes**
Common pool resources	**No**	**Yes**
Public goods	**No**	**No**

Common pool resources generally comprise a resource complex such as a fishery or forest that often has multiple uses and multiple products. Often, although exclusion is not theoretically impossible, the costs of ensuring exclusivity are so high as for it to be

both uneconomic and impractical. Subtractable resource units are appropriated from the resource complex by individuals and thus become unavailable to other appropriators. This relationship is often referred to in the economic literature as rivalry in consumption.

Common pool resources can be managed under a range of different property rights regimes. These fall on a continuum but may be classified under four headings: private property; common property; state property; and open access (non-property). Table 2 sets out the basic characteristics of these regimes.

Table 2: Four Property Regime Types.

Open access	**Absence of well defined property rights, often unregulated and free to everyone;**
Common property[6]	**Resource held by community of users, excluding outsiders, may self-regulate, appropriate uses may still be defined by larger society or external power;**
State property	**Resource rights held by government that may regulate access and exploitation, may grant free public access, and use force to enforce rules;**
Private property	**Individual has right to specified uses of the resource and to exclude others from those uses, and to sell or rent the property to others.**

Source: Burger et al. 2001.

The costs of exclusion from extensive resource complexes has made private ownership of many CPRs rare, although forests are one resource regularly held under all four types of property regime. Although often hailed as *private property rights*, or *privatisation of public resources*, PRIs such as tradeable permits or quotas do not fit neatly into the above schema. They generally comprise a socially constructed right to a benefit stream from the resource, and hence are a species of property right or property interest. However, in relation to a CPR in its entirety, PRIs relate to only one stick in a bundle of rights pertaining to an ownership and management regime of one of the types set out in Table 2. A general characterisation of the rights involved in CPR ownership is provided in Table 3.

Table 3: Property Rights to Common Pool Resources

Access	**The right to enter a defined physical area and enjoy non-subtractive benefits (eg hike, canoe, scuba dive, etc).**
Withdrawal	**The right to obtain the resource units or products of a resource (eg catch fish, take water, etc).**
Management	**The right to regulate internal use patterns and transform the resource by making improvements**
Exclusion	**The right to determine who will have an access right, and how that right may be transferred.**
Alienation	**The right to sell or lease either or both of the above collective choice rights.**

Source: Ostrom & Schlager 1996.

The operational level rights of access and withdrawal may be allocated to individuals and hence made subject to a system of PRIs. So, while sitting in the broad institutional setting characterised in the schemata above, PRIs specify a socially sanctioned exclusive right to the described benefit stream associated with withdrawal of resource units from the resource complex. The holder of the alienation right owns the resource itself. In the case of a privately owned forest or irrigation scheme, alienation may be viable. However, for fisheries, aquifers and surface water the ownership right generally is ultimately attenuated by some sort of constitutional rule. For example the public trust doctrine as developed in the USA holds the state as the trustee of such resources on behalf of the citizenry, and thus is unable to alienate the resource. For small community owned resource complexes, a socially and culturally bound understanding often pertains that recognises the ultimate survival and meaning of the group is dependent on retaining resource ownership.

Between ownership rights and use rights lie the *collective choice* rights of management and exclusion. These rights may be exercised by the owner or delegated to an individual or group. For example they may be held by a government agency, a council of community members or of resource users, or perhaps by a single senior resource user such as a master fisherman. These rights are very powerful as they affect the conditions under which the operational rights may be exercised.[7] For example, holders of these rights may control at what time of the year and with what technology the resource may be harvested, how much may be taken, and who may be allowed to be an operational level right holder. The management right is perhaps the most important stick of the rights

bundle to think about when considering a change to the property rights regime for natural resources. Whether PRIs are used or not at the operational level, who gets to participate in the management decision-making, what processes are used and the transparency and accountability of these, are crucial to the welfare of all parties and the sustainability of resource use.

Finally, having located PRIs in a broad framework for considering property rights for natural resources, we might consider the qualities of such a quantified withdrawal right. The basic requirements of a meaningful property right are that they be well defined, secure, divisible and transferable. Defining a withdrawal interest in a CPR can be as easy as stating a fixed number of resource units may be extracted in a given time (e.g. per year), as long as the definition of the unit is uncontestable. Measuring the valued dimensions of some resources can be difficult – for example, soil fertility. In practice, PRIs are often effectively specified as a share of a variable available harvest. In most cases the total availability is estimated before start of the harvest season, and shareholders then know the actual quantity they may take through the year.

Security is a key issue in establishing incentives through property rights instruments. If the right is able and likely to be revoked at any time, it is little value in structuring incentives. Likewise if its exclusivity is not enforced against others without rights. Divisibility in relation to CPR entitlements refers to the ability to divide up the rights to harvest a quantity or share of resource units, and sell or lease any amount. This provides the ability to adjust holdings of rights to intended harvest levels so as better to match other production inputs. And transferability allows resources to flow to their highest valued use. Sale of rights, allows those wishing to exit from resource use to take with them the capital stake implied by the expected income stream from harvesting, encouraging less efficient resource users to leave and be replaced by the more efficient.

3. Property Rights Instruments: Origins and Objectives

Historically, the development of the sustainability idea can be viewed as a convergence of three largely separate spheres of concern with respect to the use of common pool (CP) resources: ecological integrity, economic efficiency, and social justice (equity). The nexus of these concerns formed, with the realisation of their inextricable interdependence, in the emergence of the sustainable development concept in the 1970s and 1980s. The development of property rights instruments predated the Brundtland Report,[8] but, by the same token as that report can be judged a fountainhead for ideas that had been incubating within global civic society for several decades, PRIs had been one of the interim responses to a subset of the same issues.

Sustainability itself is an holistic concept that by definition *integrates* the three component concerns. This integration takes place at a conceptual level, but for sustainability to be implemented, more detailed and contextualised articulation of values, problem definitions, and policies, need to be worked out. Part of the policy process involves the selection of appropriate instruments to effect policy objectives, supporting the agreed set of value priorities. In the context of the original development of PRIs as a policy instrument, the holistic conception had not yet occurred. However, a partial synthesis had occurred involving economic and ecological (or, at least, biological) concerns in natural resource management, just as similar joint concerns have long been active for the interaction of social and economic values. The environmental justice concern is the third partial synthesis.

A key early bio-economic analytical integration on the road to the sustainability concept was that of the economist H. Scott Gordon[9] in the 1950s. Gordon drew together a biological model of logistic growth for a single-species fish-stock biomass and the impacts of fishing mortality, with an economic analysis of costs and benefits of fishing. It is the interaction of the economic incentives controlling fisher behaviour, and thereby harvesting effort, with the model of stock response to fishing mortality, that produces the so-called *bio-economic equilibrium*. This analysis assumed that there were no institutional impediments to fishing effort – that is, no rules or property rights

exist. This is the *open access* condition. This bio-economic analysis made it clear that, without rules, and under increasing scarcity (that is higher demand and prices for product), exploitation of biologically renewable resources was capable of both depleting resource productivity, and being economically wasteful.

In a further relevant theoretical development, Ronald Coase[10] highlighted the notion of *negative externalities* in resource use in relation to the definition of property rights. The problem of the inequality of private and social cost brought economic attention to such environmental issues as air and water pollution. Again, these issues were recognised as joint and inseparable problems for economy and environment, with an underlying factor being the lack of institutional rules defining property rights.

Economists engagement with the pollution problem in particular led quite quickly to the development of ideas for PRIs. Having realised that the uncontrolled dumping of industrial wastes into common waterways and the atmosphere – long recognised as a danger to public health – actually comprised an economic cost to society, but that there were also benefits derived from the production processes involved, economists sought means by which these costs and benefits might be balanced so that the net benefits to society would be maximised. Thus the idea of *optimal* pollution levels was conceived. This notion, a difficult one for many to accept, posits that the socially optimal level of pollution occurs when the production of one more unit of goods yields a social benefit equal to the additional social costs imposed by the polluting production process.[11] This is *optimal* in the sense that, at any other level of pollution, greater or lesser, society would be less well off in total. This proposition is underpinned by the standard economic assumptions that, with increasing quantity, marginal costs increase and marginal benefits reduce. However, while the external costs remain so, more production and more pollution than the optimal level will occur. The policy implication is that, in order to achieve such an optimal equilibrium, a mechanism is required to bring the full social costs of production to bear on the producer. Such policies are said, in the jargon, to internalise the externalities.

The seemingly most obvious way to achieve this internalisation is for the direct charging of the external costs to the producer by way of a tax on production. This mechanism is known to economists as a Pigovian charge, proposed first by A.C. Pigou[12] as a general mechanism for equating private and social cost.[13] By adding to the costs the producer faces, such charges cause a reduction in the polluting activity. The problem is to accurately estimate the external costs in order to set the charges appropriately. A moment of reflection on environmental pollution issues provides its own explanation. Not only would calculation of direct financial losses from pollution be difficult to estimate and would be very context specific requiring a great deal of data collection and analysis, but non-use values need to be counted as well. We must then add some allowance for uncertainties of ecological interactions and threshold effects and so on. There turn out to be a range of technical difficulties with this approach apart from estimation of the damage function, and it seems the potential for estimating the correct level of charges (*getting the prices right*) for social optimality is unlikely to be realised.

Once we turn away from optimal charges, having raised the issue of the uncertainty of ecological interactions and long term outcomes, these considerations tend to take over from the issues of immediate social cost, and a logical approach seems to be to set a quantitative limit on resource use. For pollution this may be represented by a minimum standard of air or water quality, but given more than one polluter, the aggregate outcome is out of the individual polluter's control, and is subject to great variability in time and space. A charging system can be applied together with a standard. Here adjustments would be made to charges until the desired standard is attained, but the resulting uncertainty about the eventual costs of production will distort investment and upset stakeholders. The political risks associated with frequent changes in resource use charges to industry may mean that once the initial (usually soft) implementation is in place, further adjustments may be avoided, with little net affect of the policy.

An alternative to charges is to set a total limit to resource use, and allocate fractions of that allowable limit to individual users as a quantified use entitlement. For pollution this means a total amount of particular pollutants is specified as allowed for each emitter. This introduces significant costs of monitoring and enforcement, and hence is suitable for such large point-source emitters as power generation

utilities, but not so for, say, private vehicles. Once individual entitlements are established, if, as is usual, reductions in total emissions are desired, making the entitlement tradeable allows such reductions to be made at least cost.

In the case of pollution, if it is assumed that different firms will have different costs of abatement, then the social cost of reducing pollution by a certain amount is minimised if those with lower costs reduce pollution first. If all pollution quotas are all cut proportionately when the cap is lowered, to be able to keep producing at the same level as before, each firm must either reduce pollution technically or obtain more permits from others. If information about costs flows freely among the participants in the market for permits, those with the lowest costs of abatement will reduce pollution and sell excess permits to those for whom abatement is most expensive. Some may choose to close down production altogether and sell their quota to others, but it is possible that the incentives introduced will stimulate innovative technologies that can clean up production at a low cost. Then production can continue with reduced pollution levels.

Finally, the opportunity costs of holding permits with an asset value will be reflected in output prices (i.e. prices of goods and services will rise) and this is likely to reduce demand for the *dirty goods*. Consumers will tend to switch to alternative goods (substitutes) based on the price signal about the social costs of production. The widespread adoption of such price signals based on the environmental costs of production has the potential to shift general production and consumption patterns onto a more sustainable path.

4. An Environmental Bottom Line

Limits to resource exploitation or pollution in *cap and trade* type permit or quota systems such as this, tend to be set on the basis of concerns for whether they are environmentally sustainable first, before the maximisation of benefits is considered. In most cases this a complex enough problem without taking on the problem of a social optimum within that primary constraint. This can be characterised as an *environmental bottom line* approach: set the maximum quantum of resource use acceptable on environmental grounds, and then try to maximise the value of resource use within that constraint. For pollution, that involves estimating assimilative capacity and encouraging least cost abatement. For renewable resources such as fisheries, or ground and surface water abstraction, environmental bottom lines are at least as contestable, if not more so, than for pollution. At whatever level exploitation takes place, the ecological systems involved are disturbed with, for all practicable purposes, unknowable ultimate consequences. Each resource type has its own distinctive characteristics and complexities.

In fisheries for example, according to generally used concepts and models of fish population dynamics, fish stocks initially respond to fishing mortality by increasing their biomass growth rate as the reduced population level releases niche space.[14] As the stock is reduced the growth rate increases further until a maximum is reached, commonly when stocks are about one third of their original biomass. At this point, the annual increase in biomass of the population is higher than at any other population level, and this annual growth, it is assumed, can be harvested sustainably (the so-called *maximum sustainable yield*), while maintaining the population at a steady level. This is the standard model used in estimating suitable catch levels in commercial fisheries. It does not take account of interspecies interactions and ecosystem dynamics, but treats the subject species in isolation. This approach is both over-simplified and somewhat contradictory, given that the growth logistic is based on assumptions about resource niche constraints, but the impact of reducing the population by two thirds on competitors for these resources is ignored. However, the information required for just basic stock biomass estimates is, on its own, difficult and costly to assemble. In general, data for estimating stock condition is derived from catch and effort time series data supplied to management agencies by commercial fishers, from which an index is compiled. Unless validated by fishery independent sample survey techniques and other methods, catch per unit effort analysis is problematic, as the measured parameters of *effort* are generally very crude and do not account for technological change, a factor that has been conspicuous in increasing fishing power in recent decades.

Even if we assume that enough information is available to accurately estimate the sustained yield curve for a fishery or other resource, and assuming

this is stable or predictable over time, this does not in general solve the problem of selecting a point on that curve as a management goal. In fisheries this is a point of stable biomass with a (theoretically) stable annual surplus production available for harvest. For a river this is the equivalent of maintaining a particular flow level, or flow regime with required minimum and peak levels and associated frequencies of extreme events, so as to maintain particular ecological processes. Again, with water resources there are many linkages with the wider hydro-geological and ecological systems that may be more or less important in particular circumstances to the health and integrity of the greater system. But, as with fisheries, even a first cut estimate of sustainable water yields is difficult, costly and inherently uncertain. Hence, in effect, the environmental bottom-line approach becomes a matter of *strategic risk management* that attempts to minimise the risk of irreversible environmental change while encouraging economic activities to shift away from damaging practice and over exploitation.

For all the economic and scientific theory and data collection and analysis, in all these common pool resource issues there remain some basic management problems. By the time that particular circumstances draw serious policy and management attention there is generally a problem evident as resource depletion or conflict among resource users. Baseline data may not be available and ecological change is likely to have occurred. In this type of situation a realistic management goal is to try to get things moving in the right direction rather than attempting to estimate some ecological goal state or an economic optimum. However, the basic messages of the original economic analysis need to be kept in mind, in particular that economic waste is generally occurring where resource use is free. The consequent external costs imposed on others are then not being counted as production costs, and hence more production occurs and more external costs are generated than would be the case if these costs were internalised. Thus policy instruments that adjust the rules and incentives so as to bring at least some of these costs into the producers accounting framework may offer a way forward. Despite the problems with quantification of the resources and choice of a management goal in terms of a quantified environmental bottom line, cap and trade property right instruments can, if well designed, provide these incentives and thus jointly address economic and ecological concerns.

5. Leaving it to the Market

Before moving on, we comment on the often-heard approach to property rights instruments that extols the virtues of the market in establishing suitable goal states. This *leave it to the market* argument approaches the externality problem as evidence of incomplete property rights. This is based on the work of Coase[15] mentioned earlier. It argues that if property rights were completely specified – that is, if all resources including water in rivers, air and fish *in situ* in the oceans were privately owned – any externality issues would be taken up by the owners offended against. For example, if a factory owner discharges waste into a river they do not own, the river owner would sue for damages. In anticipation of such action, the factory owner would engage in prior negotiation with the river owner, and offer to compensate them for the costs imposed, if they grant permission for the discharge to go ahead. Likewise, any downstream impacts on other property owners would be negotiated between the river owner and affected parties until all social costs are incorporated and sheeted back to the polluter. Given such complete specification of property rights, and costless negotiation, contracting and enforcement (i.e. no transactions costs), such a scheme could attain the goal of a socially optimal level of pollution we discussed earlier.

However, there are at least three major problems with this approach. First, there are problems with specification of property rights; secondly, transactions costs are significant; and third, markets have shown themselves to be unable to cope well with long-run time horizons. The specification problem is intuitively obvious to many. The large number of attributes of common pool natural resource complexes such as rivers and other ecosystems, and even the atmosphere, many unknown in character and unpredictable in interaction with other natural and human induced factors, make full specification of a rights system a practical impossibility. Transactions costs, only focused on by economists relatively recently, have been estimated to comprise over 40 per cent of the economy of the United States.[16] In fact, analysis of common pool resource management problems, using the same economic principles and

arguments that give rise to the *complete property rights* position, show that property rights systems have not developed primarily because of high transactions costs. However, the social capital of our complex society can be brought to bear on such situations to reduce transactions costs and organise a rights system if required, and new valuations of the risks associated with not controlling excessive resource exploitation can justify such a social expenditure. And this brings us around to the third problem, that of market myopia. Perhaps the market ideal is best exemplified in the real world in the global financial markets. Price signals are clear, huge amounts of information are readily available, transactions are cheap, formalised and generally legally fire-proof, and hedging instruments are widely used to insure against unpredicted variability. These markets have become very much more sophisticated and stable since the Great Depression, and yet speculative bubbles, crashes and instability in these markets send shudders through the global economy on a daily basis. So, even if a reasonable level of rights specification was possible, leaving sustainability entirely to the market could only ever be equivalent to an act of religious faith.

However, as discussed above, the environmental bottom line approach to PRIs in the form of cap and trade instruments, offers a means to act in a precautionary manner in accordance with available knowledge of the environment, while gaining some traction on the problem of economic waste associated with unpriced resource use. In general, given reasonable availability of information, these PRIs will tend to allow access to resources to flow to its highest valued use. Even with very limited anecdotal information on sale prices, such markets have been shown to operate to redistribute access to increase gains from limited resources available under the cap.[17] The value of the access rights provides a set of incentives for resource users to increase the value of each unit used as much as possible or minimise resource use per value unit of output. Hence incentives are produced for irrigators to apply water in a manner that is most effective per litre, and to drive the development of cheaper and more efficient irrigation technology. A price for water encourages a re-examination of the economics of one crop or mode of production against another, with those using less water per unit of final revenue gaining an advantage, and so on.

These incentive effects have been discussed at length elsewhere[18] and it is not our purpose to explicate these arguments in detail, but merely to examine how the operation of cap and trade PRIs addresses the concerns of sustainability. As we have shown, these instruments can usefully tackle the joint problems of ecological over-exploitation and economic waste. However, in doing so, the incentives established change the dynamics of resource allocation and open up new potential for social structural change. This in turn creates uncertainty for communities and individuals in terms of economic viability of traditional resource uses and thus for established patterns of use, social opportunity, cultural norms and life patterns. Particularly when under economic stress already, such uncertainty can unsettle resource users to increase their resistance to the introduction of PRIs even when potential economic gains overall are evident.

6. Equity Concerns

Wherever groups of people have jointly utilised common pool resources, the first issue in any concern for coordination of use is that of resource sharing, based on some notion of fairness – that is, a concern for equity. Some examples of rules or norms that might be applied to sharing include *first in best dressed*, *might is right,* a hierarchy of priority access based on hereditary social status or historical use, equal access for all members of a defined group – possibly constrained by season or area closures, and so on. Such formal or informal rules of fairness are linked strongly to local culture, and can in turn have a strong affect on social structure. For example, in animistic cultures, hereditary social status and power relations may be based on strong links between ancestors and totemic animals, landscape features, natural resources or their spirit guardians. Status positions in the social group may carry responsibility for resource management and authority for imposing restrictions on harvest. In fishing towns on the coast of the US state of Maine, patterns of work and social interaction, social and local government structure are all directly related to exploitation of the lobster resource.[19] A good lobsterman gains the respect of his peers, but history of family fishing practice and community membership as well as professional

prowess all help to determine precedence in allocations of access to resources.

Although aware that using a model idealised community of small producers, tightly integrated and co-dependent, is not very realistic in contemporary Australia and has its dangers, we believe using such a model to think through some of the issues of PRIs can be helpful. Similarly, the issue of dispossession of indigenous peoples of their land and resources by colonial power, and the often seen result of social and cultural collapse, can help us understand fear and resistance to profound contemporary changes to natural resource allocation patterns, and the logic behind them. Any insights from such conceptual exploration need to be tempered with the realities of context, and context is a key issue with PRIs. We assert that both the usefulness and success of the application of PRIs depends just as much on context and process as it does on the incentives created by the re-specification of the social goals of management.

It is the logic of allocation patterns, and the social meaning associated with them that is the nub of the matter. When instruments such as PRIs are applied, they have the potential to change both the social goal and the associated social logic of allocation and resource use behaviour. The socially constructed equity norm, located in a specific time and place, with an inheritance of historically grounded meaning is likely to be profoundly contradicted. Depending of the context, this may threaten social cohesion, and, even where resource users are relatively independent of community, it may undermine individual self image and self-respect by rendering less valuable the knowledge and skill sets developed in a life's work.

People with any social interdependence sense a danger to the cohesion of their group under these circumstances. The logic of PRIs is fundamentally modernist. It creates a relation, an exclusive property right, that privileges and focuses economic self-interest on the individual with respect to resource use. This relation is one sanctioned by the state in an effective contract with each right holder. Other individuals are excluded and the community and its needs are bypassed. Potential is created for individuals to sell out part of what has historically bound the community together, and possibly to powerful outside interests that could further threaten established ways. The primary policy objective is generally articulated as economic efficiency through allocation of resources to their highest valued use, but as discussed here, PRIs are able to jointly address the ecological-economic concern.

However, arguments made from an economic perspective maintain that PRIs are also particularly good for addressing equity concerns. Where equity is viewed simply as a matter of the redistribution of wealth according to some given, politically derived formula, the creation and allocation of PRIs is an opportunity to address equity concerns, although not often enough used.[20] One case where this has been used for the dramatic settlement of long-standing equity grievance is in the New Zealand fisheries, where the indigenous Maori people have acquired large amounts of fish quota from the government in recognition of historical dispossession. Much of this was bought back from the existing fishing industry by the government so as not to create further inequity.[21]

Most applications of PRIs have allocated quotas or permits such that the existing distribution of rights is altered as little as possible, through so-called *grand-fathering*. Grand-fathering consists of the allocation of resource use rights free of charge to existing users in the same quantity as their historical use, or at least the same proportional share of a reduced total. This too can be viewed as equitable, as any change in distribution of access is voluntary, by way of stakeholders selling their shares, either to each other or to new entrants. Such a one-dimensional view of the notion of equity indicates a limitation of the assumptions of a purely economic rationality. Equity involves more than the distribution of wealth, because it is constructed from a base of values and beliefs about who we are and what we are here for. Hence equity is context bound, and different for each context. Significant change in the basic logic and goals of life and work, especially in the incentive structures for economic behaviour, is likely to clash with existing notions of what is fair and equitable. However, where established patterns of allocation and use of resources have brought about the situation where institutional change has been initiated because of threats to resource sustainability, change of some sort is inevitable.

Instrumentalities that do not change allocation patterns and logic may not threaten social cohesion or cultural norms as much as PRIs, but they may not be very effective either. This has been demonstrated time and again in fisheries around the world. Regulatory

controls on fishing effort, so-called *input controls*, have been used as standard management instruments for decades. These attempt to put the brakes on to existing methods of exploitation without actually changing the incentive structure or behaviour patterns. They merely restrict behaviour for which incentives are active and hence serve to frustrate the energies of resource users. Typically, controls are applied to a single parameter of the mode of exploitation at a time, and another added when this proves ineffective. The existing incentives for each individual to try to capture a greater share of available fish drives the displacement of effort around the large range of effort parameters available. Hence if boat days are restricted, boats work longer hours per day; if gear size is restricted, effort may be directed to new net design; if hull size is restricted, engine power may be increased; and so on. The best that can be said in most cases where technological change is active, is that input controls can slow the rate of increase in resource exploitation. In the process they tend to exacerbate economic waste, because their logic is to make fishing less technically efficient.

Thus it could be argued that a contributing cause to sustainability problems has been an absolute priority for maintaining existing constructions of equity as a social goal in regulating resource use, and thereby both ecological and economic concerns have been under-emphasised. Property rights instruments turn the tables on this priority, and the application and enforcement of precautionary hard limits on resource use can assert an environmental bottom line as the primary concern.

An additional normative force at play is integral to the sustainability debate. That is the internationalised norms of human rights and social justice that combine with environmental and resource access issues in the *environmental justice* partial synthesis of sustainability concerns. Thus inequity in resource distribution and control may occur under current property rights regimes, viewed through this normative lens. This clash of equity cultures is yet another example of the normative change demanded by sustainability principles. Recognised dangers of the introduction of PRIs include the concentration of ownership of access rights, and this may also lead to marginalisation of vulnerable groups. Because both property rights regimes and equity norms are socially constructed, the characteristics of each may be adjusted so as to produce a fit with the social consensus. Property rights are always conditioned by rules, and PRIs in practice often involve extensive rule sets to protect social and cultural values. Again this makes them less transformative, and highly constrained PRI regimes that may be gradually relaxed over time as normative change occurs are being implemented in fisheries management.[22]

7. Frontiers and Commons

Another characterisation of the economic, cultural and institutional aspects of resource use and the sustainability transition is made by Hanna.[23] This establishes two modes of resource exploitation as extremes on a resource management spectrum, the *frontier* and the *commons*. She uses the concepts of resource stocks and flows, and of three types of capital: natural, physical and institutional capital.

> *Frontiers are developed by extracting natural capital's surplus flows to the extent of eroding its stock. Physical capital is expanded, while institutional capital is left undeveloped or developed only at rudimentary levels. Commons use the three types of capital differently; natural capital's flow services are used in ways designed to leave stock values unimpaired. Levels of physical capital are stabilised, and the institutional capital underlying the rules of resource use is developed to a sophisticated level.*[24]

Hanna describes the culture of pioneers in terms of the ideals of discovery, conquest, invention, individualism, competition and change.

> *Frontiers provide undeveloped and unbounded resources, … [p]roperty rights to the resource are attained at the point of capture, [and] ownership is created through possession. … The end of the frontier is marked by the emergence of spillover effects between various resource uses as the lack of new resources keeps pioneers from moving on.*

Although Hanna writes in the context of the challenge to develop new institutions for governance of American fisheries, this characterisation has potential value elsewhere, including in Australian land and

water management, in understanding how attitudes to change are grounded. The construction of equity norms in pioneer societies is linked firmly to these individualistic ideals and property relations. That is, these factors provide the logic of values and fairness. Abundance of resources provides great freedom of action and inventiveness, and rewards in wealth and prestige. The minerals exploration industry, for example, maintains the ethos of the frontier in full swing. However, the continuance of extensive land clearing amidst the salinity crisis speaks of contradictions between the historically developed culture of the frontier and the realities of spillover effects unmediated by the development of adequate institutional capital.

Where pioneers at the frontier expand, innovate and profit amidst abundant resources, the culture of the commons resides at the opposite end of the spectrum. Here, cooperative *shareholders* in common pool resources must coordinate to maintain long-term productivity of the resource complex. They must diversify activities to cope with variation in resource availability, and learn to negotiate and manage risk in their stewardship role.

Table 4. Comparison of traits of resource users

	Pioneer	Shareholder
Expectation of tenure	Variable	Long-term
Risk attitude	Risk taker	Risk averter
Work style	Independent	Cooperative
Behaviour	Innovator	Maintainer
Decision making	Individual	Collective
Role	Developer	Steward
Strategy	Specialist	Generalist
Response to variability	Substitution	Diversification
Skills	Exploration, entrepreneur	Negotiation, manager

Source: Hanna 1997.

Attempts to develop aspects of a commons culture are being made in many areas of natural resource management, through various more participatory and cross-tenure initiatives. There are many positions that may be legitimately occupied on the spectrum between these two ideal types, but where a pioneer culture still predominates in situations where resources are under stress from over-exploitation and spillover effects are apparent, conflict and difficulty in adjustment can be expected. Institutional systems need to be built that not only address the resource issues, but that adequately cope with these cultural issues as well. New institutional arrangements for decision-making need to focus as much on accommodating and shifting attitudes and understandings as in developing new rules and rights, for without change in culture and values, rules tuned to a commons sensibility will make no sense to pioneers. Nor will they appear as fair. A sense of fairness is a judgement about the congruence of actions, events or rules with cultural norms. Incentives established by rules should reward valued attributes, but those attributes of pioneers and shareholders are qualitative opposites. Hence to pioneers, the incentives established by institutions to encourage commons values will seem illogical and unfair, and *vice versa*.

These attitudes about how the world should work can be viewed as part of an individual's ideology, and are changed and shaped by experience, new information and new understanding. This is normative change. As value is attached to ideology, individuals are prepared to forgo benefits to adhere to their belief about what is right. This is the cost of one's convictions.[25] Hence if normative change can be achieved to align the ideology of resource users with more sustainable institutional arrangements, potential conflict is reduced and such change becomes possible. Such alignment will also mean reduced cheating (opportunism) where enforcement is less than perfect, as it must be, and reduce the costs of maintaining the regime.

8. Process and Path Dependence

The need to attempt to pre-align values and expectations of stakeholders when considering policy change indicates the importance of process and of an adequate time frame to develop management policies. In a further paper, Hanna demonstrates, through a series of case studies, the importance of constituency building for NRM policy change, and its dependence on three important factors. These are the initial conditions at the point of program development, the attributes of managers and user groups, and attributes of the process used to develop the management program.[26]

The stage of the exploitation of the resource – whether it is still abundant, has peaked and starting to decline, or has already become scarce – and the associated profitability and costs of information,

monitoring and enforcement determine the initial conditions for developing a new management regime. The second, transitional stage is arguably the most tractable in which to begin negotiating change. Here, resource users are aware of the declining conditions but are generally still able to profit by resource use. They perceive the threat to their livelihoods as external to the resource user group, and the focus becomes protecting the resource from outsiders. If action is delayed until both the resource condition and appropriator economics are in deep decline, the group is likely to become focused on internal wrangling over allocation. [27]

The skills, knowledge and relationships among the management policy community and their history of interaction are important attributes that affect outcomes. Continuity of interaction promotes credible commitment between participants that allows exchange and reciprocity. Without this credible commitment, time is spent monitoring the validity of others statements and positions. The ability to craft mutual interdependencies and expectations creates assurance and minimises conflict. All this relies on a group size small enough to allow information transmission and collective action.[28] Fisheries examples have shown that more *ad hoc* and less representative processes with short time frames are less likely to succeed in developing credible commitment, good information and mutual assurance.

The attributes of the process of program development are important to the legitimacy of the rules among resource users and therefore to their effective implementation. Legitimacy can hinge on the problem definition or framing, and whether this is shared by a consensual majority. Where problems are framed by special interest groups that want to change the rules to benefit themselves, conflict is more likely. To gain consensus the process of change needs to begin with a wide representation of interests that works toward an informed problem definition. This again highlights the need for adequate time frame for the development of the program to allow for social learning to occur among stakeholders. Lastly the organisation of the process affects the costs involved and their distribution, and this is important to maintaining representative involvement and legitimacy.[29]

In Hanna's example of the introduction of PRIs into a North American fishery, the process failed in part due to a failure to recognise differing views of the problem held by large and small-scale users. Both required more flexibility than the existing regime offered, but for different reasons. The short process time frame driven by one problem framing did not allow for learning to occur about the needs of all stakeholders.

The introduction of PRIs as individual transferable quota (ITQ) into fisheries management in New Zealand represents a policy program development task of much greater scope. The declaration of the two hundred mile Exclusive Economic Zone in 1978 set in train a decade long policy process culminating in the introduction of ITQ for the large majority of commercial fisheries. The process of engagement between the fishing industry and government agencies built up through this period, as did the organisation of the industry itself. Most interests were included and extensive consultation processes were carried out, led jointly by industry and government, both in defining the problem before policy direction was set, and in working out how implementation was to proceed.

Allocation processes took more than a year, due to processes that accepted objections at an administrative level before the scheme became operational. Appeals against final allocations went to a quasi-judicial tribunal involving industry members in judgements. This took almost a decade to resolve on a case by case basis, but this did not hold up the operation of the program. The stakeholder group that went unrecognised by the process was Maori, New Zealand's indigenous population. A year after the ITQ policy became operational, the High Court ordered a halt to further implementation of it because Maori claims to a resource share had not been heard. This issue, further development of the scheme, and the many operational issues that have since arisen, have kept the stakeholders in constant dialogue with the regulating agency and government, and this ensures that adjustments to the rules and implementation occur regularly. In fact the demanding nature of regime, in terms of information demand and flow, has created and sustained a vital and innovative policy culture amongst all stakeholders.

9. Adaptability of Cultures of Resource Use

Constraints on available research time here preclude the gathering of evidence from the undoubtedly

extensive literature on correlates of adaptability of societies and cultures to change. However, the following assertion may be defensible from the anthropological literature, and seems reasonable on evidence from analyses of the management of fisheries.[30] It seems that cultures of resource use that are more long-standing are less easily able to adapt to changed property rights regimes. This may be a result of the deep implication of the property rights regime in structuring social identity and relationships, and cultural meaning.

By way of example we use recent attempts to change property rights regimes in fisheries around the world through the application of PRIs in the way of individual transferable quota (ITQ). A recent survey of empirical studies of the social impacts of ITQ implementations covered fisheries from Norway, Denmark, The Netherlands, Iceland, Canada, USA, Australia, and New Zealand.[31] Arranged in this order, these countries cover a range in the time of origin of their contemporary resource exploiting cultures from prehistoric times to about 1800. Table 5 sets down some general observations on the difficulties experienced in regime change.

Table 5: Evidence for trend in cultural fixity with time

Country	Origin Date	Difficulties with Regime Change in Fisheries
Norway	Prehistoric	Major ongoing social and political issue
Iceland	1000 AD	Constitutional crisis
Canada	1500	Great hardship and difficulty – gradual steps and experiments
USA	1600	Stalled – issues around decision process, written constitution and revolutionary origins of the state
Australia	1780	Fractured but progressing
New Zealand	1800	Relatively easy and complete – progressive

A seemingly plausible argument can be made that the longer a culture continues in a particular stable tradition, the more completely the practising culture, including belief system and values, is based on that context. One effect of culture is to scope our expectations of the possible. For example, for recent settler cultures such as New Zealand and Australia, the radical change in location, lifestyle and livelihood undertaken by recent antecedents is an intrinsic part of contemporary culture, and therefore possible again. At the same time, many Anglo-Celtic and other European cultural traditions run through these settler cultures that do not derive from current relationships with place and resource use. This independence of at least part of cultural practice from the current physical context could imply greater adaptability to further change, because cultural portability has also been shown by experience to be possible.

Contrast this with the fate of longstanding indigenous cultures such as the Australian Aborigines following disruption of their relationships with place and natural resource use. The traditions involved are so long standing as to have no beginning except in creation myth tied explicitly to a specific landscape and natural resource context. The New Zealand Maori, although profoundly culturally undermined by dispossession, have proved more resilient. Their traditions embrace a history of the Polynesian radiation and settlement of the new lands, as well as a culture of warfare and conquest[32].

A great many other factors impinge on the process of attempted property rights regime change, and some of them are also related to the tenure of the general culture. For example, there seems to be a tendency for the Old World countries to use more conservative administrative process and be less flexible and adaptive in the way they deal with policy development. Related problems also exist in the US where the checks and balances of governance produce so many veto players that any potentially controversial issue can relatively easily be blocked by vested interests. The US also has a problem with the interpretation of property rights, with the *takings clause* of the constitution, and with aspects of the common law such as the public trust doctrine. This case demonstrates how complex institutional systems tend to stability, a desirable characteristic, but also how experiences and rules made in earlier centuries do not embody the imperatives of sustainability, making the transition long and fraught.

Much of Iceland and Newfoundland in Canada have a great deal in common in comprising isolated coastal communities with egalitarian traditions, almost entirely economically reliant on small boat fishing for Atlantic cod. The Canadians have not brought in ITQs for the small boat fleet, although they have in the offshore trawler fishery. Social resistance to such change is very high, as PRIs are a contradiction of the 500-year-old egalitarian culture. However, due to failure of the overstressed fishery many have been without work for a decade. Icelandic fishing

communities have worked off the same beach catching the same fish from the same boats for a thousand years; fishing being the primary reason for settlement by the Danes. The implementation of ITQs without a widely consultative process that accommodated the concerns of small boat fishers and their communities has led to rising social rejection of the regime, and continuing challenges to its constitutional legitimacy a decade after the change.

By contrast, Australia and New Zealand have had easier run. Implementation in the Australian South East Fishery suffered through some unfortunate process issues including concurrent organisational restructuring, key species in rapid decline, and rushed development of the allocation formula. However, following a process to redress the consequent grievances, the fishery has adjusted reasonably well to the new rights regime.[33] New Zealand has become the international exemplar for ITQs due to the comprehensiveness of the regime and the success achieved in acceptance of change. In eight years, property rights in fisheries were transformed from completely open access to an ITQ regime that covered some 83% of the total commercial finfish catch.[34] The transition occurred during the first and second stages in Hanna's framework (see section on Path Dependence). The offshore fishery was still in the expansionist phase and the inshore had recently peaked but had not gone into serious decline. The policy development process was inclusive and the implementation accommodated concerns for both administrative errors and injustice in the allocation. Resource users embraced the new property rights framework and adjusted their behaviour rapidly to the new incentives. One year after the new regime was implemented, a survey found that 40% of fishers in the Auckland region were changing methods of catching and handling fish to increase the value of their quota limited catch.[35] Behaviour was adapting to the new incentive structures intended in policy design.

10. Conclusion

The implications of this case study of the nature of the impact of property rights regime change are not so much profound as subtly informing. They bear on the place of property rights in the institutional system, and how the application of a seemingly simple policy tool can have profound impacts of economy and society.

Property rights are fundamental components of the institutional system and changes have implications for social and cultural change as well as for ecological and economic factors in the use of resources. Hence the adoption of PRIs should not be taken lightly. Individual circumstances need to be analysed carefully to anticipate the degree of difficulty and anticipated costs and benefits of achieving regime change, including a realistic timeframe and the extent of process issues. Time is required for learning to take place among the stakeholders about the imperatives for change, the nature of policy proposals, and the implications of change for individual and overall group circumstances. Policy makers also need to be open to learning about the circumstances of resource use culture and to be prepared to accommodate transitional or long-term modifications to preferred policy models to enable more gradual change. Trade-offs of potential economic efficiency gains to ease equity concerns of stakeholders may well be more efficient in the long run.

As powerful institutional settings, changes in property rights regimes for the management of natural resources can have transformative impacts on the culture and value of resource use. Regime changes involve shifts in opportunity sets and expectations that can provoke major changes in investment patterns and resource allocation. These are generally intended consequences, but are only likely and positive in the long-term if there is credible commitment to maintaining and supporting the new regime. Property rights change needs to be understood by policy and decision-makers and by the wider stakeholder group before being applied.

If the power inherent in regime change can be brought to bear in a satisfactory manner, PRIs can contribute substantially towards achieving sustainability goals. Resource use behaviour can be changed to positively support these goals through altering property rights regimes to produce incentives compatible with social goals. PRIs can jointly address an ecological bottom line and produce greater benefits from the use of scarce resources. The fact that both distribution and the logic of distribution of resource use will change should not be a surprise. This tends to challenge prior constructions and meanings of social equity, but these constructions can adapt and change, and arguably must change in some

circumstances in order to advance sustainable development.

PRIs could be helpful in moving from pioneer culture toward a more commons oriented culture consistent with ecological constraints. The incentives inherent in individual use rights can change behaviour without requiring group cooperative management. However, PRIs also clearly identify a group of which each individual is a part – authorised users. This in turn can lead to a new dynamic in management and an evolution of attitudes towards viewing involvement in cooperative management, monitoring and enforcement as being in the interest of the individual. This is now occurring in advanced implementations such as in New Zealand fisheries. In part it has been triggered by the application of fiscal policy by government to recover management costs from the identified users with quantified interests. Here, quota owners are forming associations, building legitimacy among their constituents and with the government resource owners and managers, acquiring skills and knowledge, and preparing to take on management responsibilities. These developments are not without dangers, including moral hazard, but these are well recognised, and open policy processes can help to avoid potential pitfalls. Stakeholders readily admit that when the ITQ system was introduced they would not have given any credibility to the suggestion of accepting such responsibilities in cooperative management. However, within a decade this became thinkable, and after 15 years is now beginning to take place.

CLOSING COMMENT

While this discussion has been more conceptual than prescriptive or even suggestive, it raises important considerations of practical significance that can be reiterated. These considerations should be a necessary input into discussions of economic or market-based policy instruments generally, and especially when property rights-based policy options are proposed or analysed.

An overall message is that the broad class of policy instruments known variously as economic, price or market-based, in fact contains a number of distinct options with different intents, design requirements and social and ecological implications. Following from that, as proposed at the start of this discussion, PRIs are not *just another tool in the policy toolbox*, but have deeper implications. The impact of PRIs on the balance between environment, social and economic goals is complex and may be profound. The fact that PRIs are transformative interventions - and to some degree irreversible ones - invites a long term view of implementation and of the maintenance and evolution of the policy regime.

The complexity of concerns associated with PRIs in a practical policy-making context implies difficulties in coming to a fully integrated policy perspective, and conflict is often encountered. Where cultures and economies are most exclusively dependent on resource use relations, there are no easy routes to change. A wide variety of perspectives are required to inform discussions about change, policy design, and implementation: not just economic, but ecological, legal, sociological, administrative, and not least of all the perspectives of affected stakeholders. This is already widely appreciated. However, this paper points to a need to understand the nature of property rights regimes more broadly, and within the context of the wider institutional system, before changes are made to existing rights. This institutionally informing view is often missing from policy debates.

Finally, the lack of empirical analyses of existing PRI systems in some topical resource management sectors (e.g. water, salinity, biodiversity) invites lesson-drawing from arenas where these approaches have been in place for some time and have been analysed more extensively (e.g. fisheries). However, while there are valuable lessons to be learnt across sectors, any policy intervention, and especially transformative policy interventions, must be considered within specific contexts. The conceptual analysis presented here establishes a framework by which lessons drawn from specific experience can be understood in generic terms before being applied to a new context. This process avoids the risk of mimicry, and provides a model for instrumental policy learning.

REFERENCES

Acheson, J.M. 1988. *The Lobster Gangs of Maine*. Hanover and London: University Press of New England.

Aslin, H.J., Connor, R.D., and Fisher, M. 2001. Sharing in the Catch or Cashing in the Share? Social Impacts of Individual Transferable Quotas and the South East Fishery. 110. Canberra: Bureau of Rural Sciences and Centre for Resource and Environmental Studies.

Baland, J.-M., and Platteau, J.-P. 1996. *Halting Degradation of Natural Resources: Is There a Role for Rural Communities?* New York: FAO & Oxford University Press.

Boyd, R., and Dewees, C.M. 1992. Putting Theory into Practice: Individual Transferable Quotas in New Zealand's Fisheries. *Society and Natural Resources*. 5: 179-198.

Coase, R.H. 1960. The Problem of Social Cost. *Journal of Law and Economics*. 3: 1-44.

Connor, R.D. 1997. Sustainability and the Market: Rights Based Fishing in Australasia. Paper presented at *Creating a Green Future: National Conference of the Australia New Zealand Society for Ecological Economics*, 17-20 November, 1997. in Melbourne, Australia.

Connor, R.D. 2001. Changes in Fleet Capacity and Ownership of Harvesting Rights in New Zealand Fisheries. Pages 151-185. In R. Shotton (Ed.), *Case Studies on the Effects of Transferable Fishing Rights on Fleet Capacity and Concentration of Quota Ownership. Fao Fisheries Technical Paper, No. 412*. 238p. Rome: FAO.

Connor, R.D. 2001. Initial Allocation of Individual Transferable Quota in New Zealand Fisheries. Pages 222-250. In R. Shotton (Ed.), *Case Studies on the Allocation of Transferable Quota Rights in Fisheries. Fao Fisheries Technical Paper, No. 411*. 373p. Rome: FAO.

Connor, R.D., and Alden, D. 2001. Indicators of the Effectiveness of Quota Markets: The South East Trawl Fishery of Australia. *Australian Journal of Marine and Freshwater Research*. 52(4): 387-97.

Connor, R.D. and Dovers, S.R. 2002a. *Learning from Institutional Change for Sustainable Development*. Project ANU 24, Summary report to Land & Water Australia. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Connor, R.D. and Dovers, S.R 2002b. *Institutional Change and Learning for Sustainable Development. Working paper 2002/1*. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Connor, R.D. and Dovers, S.R. 2002c. *Environmental Policy in the European Union*. Project ANU 24, case study 1. Report to Land & Water Australia. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Connor, R.D. and Dovers, S.R. 2002d. *Sustainable Management of Natural and Physical Resources: The New Zealand Resource Management Act 1991*. Project ANU 24, case study 2. Report to Land & Water Australia. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Dietz, T., Dolsak, N., Ostrom, E., and Stern, P.C. 2002. The Drama of the Commons. In E. Ostrom, T. Dietz, N. Dolsak, P.C. Stern, S. Stonich, and E.U. Weber (Eds.), *The Drama of the Commons. Division of Behavioural and Social Sciences and Education*. Washington, DC: National Academy Press.

Dovers, S.R. and Connor, R.D. 2002a. *National Councils for Sustainable Development: Experiments in Inclusive National Policy Development and Integration*. Project ANU 24, case study 3. Report to Land & Water Australia. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Dovers, S.R. and Connor, R.D. 2002b. *Strategic Environmental Assessment: Policy Integration as Practice or Possibility?* Project ANU 24, case study 4. Report to Land & Water Australia. Canberra: Centre for Resource and Environmental Studies, Australian National University.

Feeny, D., Berkes, F., McCay, B.J., and Acheson, J.M. 1990. The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology*. 18(1): 1-19.

Gordon, H.S. 1954. The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy*. 62(2): 124-142.

Hanna, S. 1997. The New Frontier of American Fisheries Governance. *Ecological Economics*. 20: 221-233.

Hanna, S. 1997. Social and Economic Path Dependence in the Construction of Market-Based Fishery Programs. In G. Pálsson, and G. Pétursdóttir (Eds.), *Social Implications of Quota Systems in Fisheries*. Copenhagen: TemaNord: Nordic Council of Ministers.

National Research Council. 1999. Sharing the Fish: *Towards a National Policy on Individual Fishing Quotas*. Washington DC: National Academy Press.

North, D.C. 1987. Institutions, Transaction Costs and Economic Growth. *Economic Inquiry*. 25(3): 419-428.

North, D.C., and Wallis, J. 1986. Measuring the Transaction Sector in the American Economy, 1870-1970. In S.L. Engerman, and R.E. Gallman (Eds.), *Long-Term Factors in American Economic Growth, Income and Wealth*. 95-161. Chicago: University of Chicago Press.

Olson, M. 1965. T*he Logic of Collective Action. Public Goods and the Theory of Groups*. Cambridge Mass.: Harvard University Press.

Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, Mass.: Cambridge University Press.

Ostrom, E., and Schlager, E. 1996. The Formation of Property Rights. In S. Hanna, C. Folke, and K.-G. Maler (Eds.), *Rights to Nature*. 127-156. Washington DC: Island Press.

Pearce, D., and Turner, R.K. 1990. *Economics of Natural Resources and the Environment*. London: Harvester Wheatsheaf.

Pigou, A.C. 1946. *The Economics of Welfare*. London: Macmillan.

Runge, C.F. 1984. Institutions and the Free Rider: The Assurance Problem in Collective Action. *Journal of Politics*. 46(1): 154-181.

Schelling, T.C. 1960. *The Strategy of Conflict*. Oxford, UK: Oxford University Press.

Schlager, E., and Ostrom, E. 1992. Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics*. 68(3): 249-62.

Scott, A. 1955. The Fishery: The Objectives of Sole Ownership. *Journal of Political Economy*. 63: 116-124.

Tietenberg, T. 2002. The Tradeable Permits Approach to Protecting the Commons: What Have We Learned? In E. Ostrom, T. Dietz, N. Dolsak, P.C. Stern, S. Stonich, and E.U. Weber (Eds.), *The Drama of the Commons*. Division of Behavioural and Social Sciences and Education. Washington, DC: National Academy Press.

WCED. 1987. *Our Common Future*. Oxford: Oxford University Press.

Williamson, O.E. 1985. *The Economic Institutions of Capitalism*. New York: The Free Press.

Young, M.D., Gunningham, N., Elix, J., Lambert, J., Howard, B., Grabosky, P., and McCrone, E. 1996. *Reimbursing the Future*. Canberra: Department of Environment, Sport and Territories.

NOTES

1 Feeny, et al. 1990; Ostrom 1990; Baland & Platteau 1996.

2 See http://www.napswq.gov.au/about/mbi_download.html

3 For example see Gordon 1954; Scott 1955.

4 See Ostrom 1990, although the term originated with this author in earlier publications.

5 Dietz, et al. 2002.

6 Referred to by the original authors, Burger et al. 2001, as *communal property*.

7 This discussion based on Schlager & Ostrom 1992; Ostrom & Schlager 1996.

8 WCED 1987.

9 Gordon 1954.

10 Coase 1960.

11 *Social* costs and benefits include both the financial costs and benefits to the producer together with all other external costs and benefits to society *(externalities)*, with pollution being an external cost, known as a *negative externality*.

12 Pigou 1946.

13 Pearce & Turner 1990.

14 The assumptions of climax equilibrium ecological theory are used in the model, and it is thereby taken that an undisturbed (by fishing) population will be in equilibrium with its habitat, having expanded to the maximum level supportable by available space, food supply and/or other constraining parameters. *Releasing niche space* here refers to the effects of reducing the population on these constraining parameters. Fishing also changes the age structure of the population, lowering the average age, so that a greater percentage of the biomass comprises younger, faster growing fish.

15 Coase 1960.

16 North & Wallis 1986.

17 Connor & Alden 2001.

18 See, for example, Young, et al. 1996.

19 Acheson 1988.

20 Tietenberg 2002.

21 Connor 1997; Connor 2001a.

22 For examples, see case studies in National Research Council 1999.

23 Hanna 1997a.

24 Ibid p 225.

25 North 1987.

26 Hanna 1997b.

27 Ibid.

28 This paragraph is adapted from a passage in Hanna 1997b p 141 that in turn draws on a range of sources, particulary Williamson 1985, Schelling 1960, Runge 1984, and Olson 1965.

29 Hanna 1997b.

30 Aslin, et al. 2001.

31 Ibid.

32 These examples are not intended to reiterate, contest or establish anthropological theory. They are put forward merely as provocative correlations, to stimulate thinking about the links between changes in property rights regimes and social and cultural impacts, which may bear on the appropriateness of particular policies and process.

33 Connor & Alden 2001.

34 Connor 2001b.

35 Boyd & Dewees 1992.

Recent Australian Market Mechanisms as a Component of an Environmental Policy
That Can Make Choices Between Sustainability and Social Justice

Jennifer McKay[1] and Henning Bjornlund[1]

Corresponding Author
Dr Jennifer McKay
Associate Professor of Business Law
Director Water Policy and Law Group
School of International Business
Division of Business and Enterprise
City West Campus, Way Lee Building
North Terrace
Adelaide SA 5000
AUSTRALIA
Tel: 61 8 8302 0887 Fax: 61 8 8302 0512
email: jennifer.mckay@unisa.edu.au

This paper reports on work funded by Land & Water Australia under its Social and Institutional Research Program (Project USA3) – Evaluation of water markets in NSW, Victoria and SA as an instrument to achieve structural adjustment in irrigation.

Citation: McKay, J. and Bjornlund, H. 2001. Recent Australian market mechanisms as a component of an environmental policy that can make choices between sustainability and social justice. *Social Justice Research*, 14 (4): 387-403.

Abstract

Markets in terms of tradeable water or pollution rights, are increasingly being offered as rational solutions for environmental problems. The rational pursuit of personal gain through trading is assumed to promote increased efficiency in resource use and promote a reduction in the negative aspects of the resource use. The social and distributive effects of the introduction of markets and their rules and operations have received little concerted study and examination. In this paper the role of justice considerations in the development of economically rational environmental decision making will be addressed through some case studies of rural water markets and urban water markets in Australia.

Key words: water policies, marketisation, water reform process, corporate governance, triple bottom line accounting, public interest, water laws.

Introduction

In Australia, corporate excesses of the 1980's led the courts to place more onerous duties on directors in terms of their diligence. This resulted in Parliaments passing new laws to widen the ambit of the laws governing the responsibilities and duties of directors and other officers of companies. Finally, companies and Professional organisations like the Australian Institute of Company Directors responded by producing Codes of Conduct (McKay, 1994a). All of these were designed to make directors more accountable to the shareholders, the community and the company and to provide social justice in an environment where information was not equally shared. At the same time, the regulators were acknowledged to be under funded and efforts were made to strengthen their role and provide greater resources in the late 1980's (Graobosky and Brathwaite, 1986).

Just a few years after this, the principles of competition were introduced into the former Australian public sectors, especially the fisheries and water sectors. This was part of a worldwide phenomenon

begun about 20 years ago in both the developed world, countries in transition and developing countries (Guislain, 1997). The institutional models outside of Australia included components of promotion of rivalry by splitting up the water sector into small parts. Others focused on integration and benchmarking. All required regulation, but the independence and funding of the regulator has been shown to be an issue of conflict within communities. All water sector models need to address the natural monopoly characteristics of the water institutions in the sector.

In Western Europe, the privatisation of water utilities had been shown to generate "fat" profits for shareholders (Walker and Walker, 2000). A cynic might even be led to say that regulation is often a device to transfer income to well organised groups (Rolph, 1983). In the United Kingdom (UK) major initiatives were taken in privatisation and Australian utilities drew on these, but water bodies were corporatised or commercialised, not privatised (see Table I).

Privatisation in the UK has not been seen not to promote sustainable management practices based on using the Bruntland Commission definition of sustainability (Legge, 2000). The Bruntland Commission definition looks to developments that meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Report, 1987).

Recently, in response to social justice issues such as the conflict between shareholders and customers, there is a move to pass ownership of assets from the private sector in the UK to customer owned not-for–profit "mutual companies". The privatisation cycle has thus come full circle in the UK (Water21, 2000). Mutualisation would involve a company entirely financed by debt with its owners making a nominal payment. The Mutual would mortgage the company and finance later investments by loans, which it would service through water charges. Servicing the debt would be cheaper for the Mutual than at present where the companies have to pay shareholders a rate

Table I: Outline of State and Territory Urban Water Authorities Marketisation Models

State	Number of Acts	Date of latest key act	Environment	Customer service	Regulatory Model
NSW	7	2000	EPA	IPART	Corporatisation
VIC	4	2000	EPA	PRICE REGULATOR	Corporatisation
WA	3	2000	Dept of EP	Pricing control held by Government	Vertical integration
SA	6	1997	EPA	Pricing Control held by Government	Contracting out
NT	4		Dept of Lands Planning and Environment	Pricing Control held by Government	
QLD	8 includes large role for local government	1997	EPA	Qld Competition of Authority and Dept Natural resources	Franchise model commercialisation
TAS	3 Local Government a large role	2000	Dept of Environment	Government Price Oversight Commissioner	Commercialisation
ACT	Includes electricity provision	2000		Broad utility regulator out-sourced to NSW IPART	Public private partnership

Sources-AWA Water Directory 2001 and forum of Chief Executives at the Water Odyssey Conference, Canberra, April 2001.

1 School of International Business, Water Policy and Law Group, University of South Australia, Adelaide, Australia

of return they expect so that the share prices are kept high. For Yorkshire Water, five percent of the water tariff is devoted to shareholder dividends (Water21, 2000). This is hardly social justice in the short term, or sustainable in the long term, as such dividends detract from the resources available to spend on long term environmental management of water resources.

This paper will first look at Australian rural and urban water sectors and then draw other lessons for short term and long term social justice in the operation of the marketisation models used in these sectors.

Water Reforms in Australia

In Australia, the reforms of the 1990's are known as the Council of Australian Governments (COAG) reforms and these were driven by 1990 and 1992 Inquiries by the Federal Government Industry Commission (Industry Commission 1990, 1992 and 1997). The first two Inquiries called for change and pricing reform based on poor past performance, and the last one looked at environmentally sustainable development. The competition reforms were set against a background of concern over water resources management in particular, environmental problems noted by the Senate in 1970's (Senate Select Committee on Water Pollution, 1970), and the view that an important part of the solution to environmental problems lay in policy and institutional change (COAG Progress Report, 1999, High Level Steering Committee, 2000). Each State and Territory signed the COAG Agreement in 1994. The Agreement explicitly links economic, social and environmental objectives. It seeks to improve both the efficiency of water use and the environmental management of the Nation's river systems (COAG Progress Report, 1999). As seen above and below, the reforms were driven by the triple bottom line accounting requirements to be economic, socially and environmentally sustainable. This was because the continuation of the present water use trend would have been unsustainable (Water in the Australian Economy, 1999).

Hence, the water reforms are attempting to promoteing sustainable development in the long term by redressing past introspective State policies (e.g. McKay, 1994b) and recognising the important contribution of water to the economic, social and environmental development of the nation. Many past practices were introspective, such as water allocation policies, water trading rules, water developments focussing on structural solutions to problems, and giving scant regard to environmental issues in water development.

Outline and Implementation of the Coag Water Reforms

The reforms were set against the background of concern over water resources management in particular environmental problems and the need to reform water pricing and water rights to encourage future economic development. At a meeting in June 1993, COAG concluded that there were still significant economic and environmental problems to encourage future reform. An independent Committee was set up, and the strategic framework generated provided the background to these three agreements set out below.

The National Competition reform process is set out in three inter-governmental agreements (States and Federal) signed in April 1995. These are:

- the Competition Policy Reform Act;
- the Competition Principles Agreement; and
- the Agreement to implement the National Competition Policy and Related Reforms.

Progress is discussed below.

Legal Instruments to Adopt the Water Reform Process: Competition Policy Reform Act 1995

The reforms of former government owned enterprises were enacted into law by the States. There was constitutional uncertainty as to whether the Federal Trade Practices Act 1974 could be extended to cover State Government businesses as these generally operated in one state only and were very introspective. Hence the legal mechanism used to achieve the extension of the Anti-competitive conduct regime of the Trade Practices Act was for each State to enact a modified version of Part IV. These were template, all copies of each other, a legal mechanism used before to enact the Corporations Law.

The new Part IV of the Trade Practices Act prohibits a range of anti- competitive conduct including;

- anti-competitive agreements,
- misuse of market power,

- exclusive dealing,
- resale price maintenance; and
- mergers that have the effect, or likely effect, of substantially lessening competition.

Competition Principles Agreement

The National Competition Reforms have been stated to be a direct response to the need to halt the degradation of water resources and they seek to address economic viability and ecological sustainability of the nation' s water supply through the following measures.

1. Pricing reform based on the principles of consumption- based pricing, full cost recovery (urban by 1998, rural by 2001) and removal of cross subsidies, with remaining subsidies made transparent, thus encouraging people to use water more wisely by basing their consumption decisions on prices reflecting the actual value of the water they use.
2. Water allocations or entitlements, including allocations for the environment, coupled with trading in water entitlements- allowing water to flow to those activities bringing maximum benefit to the community (see later discussion of water markets).
3. Improved water quality monitoring and catchment management policies and a renewed focus on land care practices to protect rivers with high environmental value.
4. Future investment in dams and other water infrastructure being undertaken only after appraisal indicates that it is economically viable and ecologically sustainable- addressing the need for cost efficient investment with due regard to environmental concerns.
5. Structural separation of the roles of service provision from water resources management, standard setting and regulatory enforcement.

Agreement to Implement the National Competition Policy (NCP) and Related Reforms

This incorporates COAG agendas for electricity, gas, water and road transport industries into the NCP framework. The agreement also sets out conditions for financial assistance (Under section 96 of the Constitution) from the Commonwealth to those States, which implement the NCP reforms and the timetable for implementing reform. The total financial incentives between 2000 and 2006 amount to $16 billion. The timeframe for reform in the water sector was set at 5 to 7 years from 1994 because of the sheer size and complexity of the package (National Competition Council, 1999). The third tranche assessment of the performance of the water industry was due for completion in July 2001. The NCP has recently added a further issue to the agenda and that is reviews of the corporate governance issues in the reformed bodies in each State. The different corporatisation models have different consequences for the consumer.

Review of the Implementation of the COAG Principles up to 2001 and Future Issues

Each jurisdiction has implemented the reform package in a different way and with varying rates of progress (McKay 2001). This reflects differences in starting points, the nature of the water resources and also the underlying difficulties of a reform process that involves extensive, social and institutional change as well as potential alterations to the way some river systems operate (COAG Progress Report, 1999). The momentum has been reported as lost on environmental issues in some jurisdictions (COAG Progress Report, 1999). Some commentators argue that the reforms have generated environmental damage in themselves as "newly privatised bodies seek to expand their market share by reducing prices". The example cited that the consumption of coal to generate electricity has increased as it is cheaper, but not environmentally friendly (Walker and Walker, 2000). The following are issues that have been identified as requiring attention.

A) Pricing

There is a requirement to achieve full cost recovery in the rural and urban sector.

To achieve this, priority needs to be given to identifying and including the costs of resource management and environment degradation into pricing (COAG Pprogress Report, 1999).

B) Water Allocations

There are a number of concerns that need to be dealt with in water allocation.

- Provision for security of rights to water needs to be addressed.

- More work is needed to address the issue of allocating water to the environment with priority to stressed rivers. This will be progressed by improved scientific information and effective processes for community involvement.
- Effective consideration of the social, physical and ecological constraints needs to be incorporated into water trading policies.

C) Communication Packages

Communication packages are needed to ensure community acceptance and more work will be done here (Parliament of the Commonwealth of Australia, 1999). This is a general trend in many areas of water reform (Beckwith and Syme, 1990; McKay and Moeller, 2000)

D) Coordination of the Reform Package

The State jurisdictions were responsible for implementation of reforms and proceeded alone. There was a recognition that some issues were common and so in 1998 Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) established a High Level Steering Committee on Water. This Group has initiated and recently reported on many issues. The High Level group is to work to assist the jurisdictions in the priority areas to help realise the full economic and environmental gains of the reforms.

E) Water Reuse and Recycling

Australia is a world leader in recycling (Anderson and Dillon, 2000) and it has been recognised that recycled water is an essential resource for the new millennium. It is a matter of assessing the community acceptance of the schemes.

Can Australian Water Market Mechanisms make choices between Environment, Sustainability and Social Justice?

Given the above reforms, there was a need to adopt an adaptive policies based on economic, social and environmental characteristics which, in itselfthemselves, is imposing a set of three traditionally conflicting ideals on the decision maker in a system of limited and uncertain information. (McKay 2001a). This has been operationalised in all Acts by requiring decision makers to optimise all three (Jones et. al., 2001). However, the means to achieve this optimisation will be constrained as above, and heavily influenced by past practices which were, in themselves, introspective and muddled in each jurisdiction (Lindblom, 1959).

The past practices are the social construct in which any law operates. The social construct of water in Australian society has involved the main users, irrigated agriculture (72%) urban users, industrial users and the environment. To date there has been little competition between these sectors for water but that is due to change. Water is subject to the differing requirements of these multiple heterogeneous groups and neither the law nor legal or regulatory institutions relating to water are one system even in each State (see Table I). The institutions exist within a state of legal pluralism (Griffiths, 1986) within which groups may support, complement, ignore or frustrate each other. The law that is actually effective is a combination of complex and in practice unpredictable patterns of competition, interaction, negotiation and isolationism.

How then to get such an inherently limited, albeit environmentally constrained, market system to make choices between sustainability as defined by Bruntland (1987) and social justice? It will depend on the view of social justice that is taken. Social justice for the purposes of this paper has the two Brundland dimensions. The first dimension is the short term issue of equity between users of natural resources, especially when the rules on pricing and allocation are being changed. The second more general concept is that of longer term social justice issues of inter-generational equity in water resource use. In many ways, the second set of issues and their binding effect from international treaties is driving the changes in the first.

Many economists argue that, with a set of reforms like those proposed by COAG, the individual pursuit of self interest will re-allocate water to the most efficient and high value uses (Eckersley, 1995). To properly evaluate this belief, empirical data needs to be collected on the attitudes of water consumers to proposed changes, and the operation of the reforms such as use-based pricing, and the ability to permanently and temporarily trade water. This paper will report on some data, where available, on the

social justice outcomes in the COAG policies in relation to rural water markets and urban water.

These data show a variety of social justice outcomes both in the short and long term, some of which are compatible with short and long term social justice and others that have negative social justice results. In general terms, they show that markets are a blunt instrument for achieving short or long term social justice as key issues, such as payment for externalities associated with resource use, are unlikely to be fully costed (Bjornlund and McKay 2000a; Shiel, 2000,; McKay, 2001b) and the markets by themselves do not ensure community acceptance of change.

To be able to assess the social justice impacts of the Australian water reform in both the rural and urban setting, detailed studies will be required to evaluate the impacts of the policies, instruments and regulatory framework. A long term general solution to the issue may lie with increasing the formality and breadth of the regulation model selected, ensuring the independence and importantly improving the funding and the policing powers of the regulators (See Table I) of the marketised bodies. For example, the Australian Consumer and Competition Council has found the ability of the regulators prior to 1997 to watch the activities of water utilities to be patchy (Asher, 1999). In 1998, the Sydney Water Board essentially wrote its own licence and there was no requirement for public consultation or accountability in licence drafting or amending (Sydney Water Inquiry, 1998). There have been changes to the regulatory models since then, in part demanded by the community as a reaction to a recent highly publicised water quality incident. In a democracy, perceived social justice does change over time, and the community changes too. For example, even green environmentalists have been shown to support markets if the regulators are seen to be active and supported (Grabosky, 1995). However, what does not change is the need to adequately fund social research on the issues.

Rural Irrigation Water Markets

Rural water markets have been operating in Australia for almost 20 years but have rapidly expanded since the reforms (Bjornlund and McKay, 2001aa). Each State grafted these provisions on to their previous water allocation policies. For example, the policy in South Australia (SA) was always conservative, Victoria (Vic) less conservative, and New South Wales (NSW) least conservative (Bjornlund and McKay, 2001b0c). Hence, the reaction of growers, in part governed by their expectations built up over many years prior to COAG, were very different. In NSW growers have objected most vehemently to reductions in allocations. The policy makers see water markets as a way to reallocate water to promote economic gains, however they have also acknowledged that trading and reallocation can cause considerable financial hardship social dislocation and structural change within irrigation communities (Bjornlund and McKay, 2000a).

Each State now has legislation to provide for a water market and each State imbeds the market in a system of planning and approvals of the right to use the water on certain land. These plans have become much more stringent, recently requiring the user to install appropriate irrigation technology and drainage methods, and acceptable monitoring processes. Some irrigation authorities such as Goulburn Murray Water (Australia's largest) zone their regions to protect the environment against further rising salinity levels and have set maximum use levels per hectare, depending on the efficiency of the irrigation and drainage infrastructure. Financial penalties exist for the States if water trading increases River Murray salinity.

Social Justice Policies in the Short Term: Structural Adjustment in Rural Communities in NSW

The NSW Government adopted a $33 Million structural adjustment package to assist irrigation farmers to adjust to the new water management arrangements. The package targets farm businesses planning, irrigation skills training, financial assistance for water effective techniques and technologies, and re-establishment assistance where required. Such funding was not provided in other jurisdictions

Social Justice in the Longer Term: COAG Elements in Relation to Entitlements - Separate Water from Land

This policy element was assumed to lead to a much greater incentive for the holders of water to manage it efficiently if their entitlement is clearly defined, secure and transferable. Landholders would hence engage in permanent and temporary trade. The early results

suggested that it is the temporary market that has boomed in Vic, SA and NSW (Bjornlund and McKay, 1995;1996; 2000a; Crase et. al., 2001). Other key results are:

- Economic efficiency has been improved as water does move from irrigators producing low value commodities to higher value commodities. This helps maximise the dollar value of output per unit of water input as well as generating additional on-farm as well as off-farm work.
- Water moves from irrigators with less efficient irrigation technology to those with more efficient. This has both positive environmental and social impacts. More efficient irrigation practices reduce the volume of water leaching into the watertable as well as reduce drainage flow back into the waterways. Both have a positive environmental impact. More efficient irrigation practices increase the volume and thereby the dollar value of output per unit of water input. This again has generated more jobs and income in some of the communities. However the social impacts of this are unclear, and it seems that the distribution of both may not promote long term equity or sustainable communities.
- Sellers are selling sleeper water or dozer water, that is water never used before or only sometimes used. This potentially has negative social and environmental effects, as unused water is activated total extraction increases. Under the Murray Darling Basin Commission's (MDBC) Cap, total state extraction cannot exceed the 1994 level of development. To stay within the Cap, annual allocation levels to all irrigators therefore have to be reduced as previously unused water is being activated. Existing irrigators therefore have to buy more water on the water markets. These irrigators see this as an unfair income redistribution since they now have to buy water from their neighbours who in many instances have never used the water.
- In SA, the predominant upstream direction of water movement has had a negative environmental effect. This upstream movement of water has reduced stream flows in the lower reaches of the river and thereby increased the salinity level in the river. Further, the area upriver where the water now is applied has much higher groundwater salinity levels. If the increased water application causes escalation in drainage outflow, this can potentially have a significant impact on river salinity (Bjornlund and McKay, 1996). The State government has in place a process of Irrigation and Drainage Management Plans that would reduce the impact on salinity if properly implemented. However, it is widely acknowledged that the monitoring and policing of such plans are lacking (Bjornlund and McKay, 1999 2001d). Hence environmental detriments are unevenly spread.
- Water is moving from 'life-style' farmers to commercial farmers. Combined with the operation of the rural land market, this process facilitates structural, and thereby social change. There is evidence to support the conclusion that water markets in this way have helped to maintain the viability of many rural communities by changing the composition of the population rather than causing it to decline. In a sense this process has also helped to uncouple the economy of these communities from the farming industry (Bjornlund and McKay, 1999).
- Water markets have caused a consolidation of irrigated farmland into larger profitable family operations. Many agricultural research agencies believe that larger farms are more likely to be able to survive in the present globally competitive environment. This process has also seemed to polarise the irrigation communities into two groups, one consisting of large family operations depending on a non-family workforce, and a group of smaller properties depending on off-farm work. (Bjornlund and McKay, 1999).
- Water markets also polarises the irrigation community into two different classes of irrigators: a 'water rich' class, which will continue high production during drought; and a 'water poor' class, which will be exposed to reduced production during periods of drought. Research has also shown that many of the sellers, now being 'water poor', sold water on which their existing production depended without having any intention of reducing production and used the proceeds from such sales to cover annual operation costs. These farmers are struggling to avoid the inevitable structural adjustment out of irrigated farming. In this process they are consolidating themselves in the

rural poverty trap (Bjornlund and McKay, 2000a). By selling the water they are eroding the capital value of the farm by more than they receive for the water, and will therefore be in a worse financial position the day that they eventually have to give up farming. The long term social impacts of today's permanent water trading is thus still not known.

- In relation to the smaller permanent markets it has been clearly shown in SA and Victoria that trade does move water to more efficient irrigators, with better farm management and irrigation monitoring techniques, yielding a more efficient allocation between water use and plant requirements (Bjornlund and McKay, 2000b)

Social Justice in the Longer Term: COAG Elements of Allocation of Water to the Environment - Intergenerational Aspects of Social Justice

This policy element was assumed to facilitate community acceptance of reductions in water allocations, especially in areas of river stress. For example, the NSW government identified a number of stressed rivers, and for seven key rivers announced that up to 10 % of the annual diversions would be reserved for the environment. The NSW government classified all rivers of low, medium and high stress and created a Healthy Rivers Commission for coastal rivers to balance the environmental, social and commercial goals for each river. Targets have been set to increase native fish breeding and migration, improve bird breeding in wetland areas, suppress algal blooms and provide greater long term certainty. The package involves the community in water management.

Other jurisdictions have made provisions for the environment through their revised water allocation policies assisted by a Commonwealth report (National Principles for the Provision of Water for Ecosystems, 1996). The jurisdictions all involve community consultation in developing a Water Management Plan (variously described).

In recent interviews of 1,100 irrigators around the Murray River in NSW and Vic, about 60% show support for environmental allocations. Irrigators who have never participated in water trading as well as water sellers were supportive at that level, whilst only 54% of water buyers showed support. This finding is supported by Syme, Nancarrow and McCreddin, (1999) that a large proportion of growers believe in the rights of the environment and its preservation for a range of uses for future generations. However, when asked whether the growers were willing to provide part of that water from their allocations, the level of agreement dropped to 30% for non-traders and sellers, and down to17% for water buyers (Bjornlund and McKay, 2001c).

The attitudes of growers to environmental allocation can be summarised by the following split.

- Those against environmental allocations - larger efficient farmers.
- Those for environmental allocations - smaller life-style driven farmers.

Analyses of water markets clearly indicate that trade concentrates water into larger efficient farms, thereby generating environmental and economic benefits and more profitable and sustainable rural communities. Analysis also shows that water markets increase the number of non-commercial 'life-style' farmers more positive toward providing water for the environment. Water markets thus concentrate a larger proportion of the water resource within fewer larger operators least positive toward environmental allocations, while at the same time increasing the number of 'life style' farmers more positive toward the environment. These processes are positive from a rural adjustment perspective, but polarise rural communities on the issue of environmental allocations, and potentially form the basis for community conflicts on environmental grounds. (Bjornlund and McKay, 2001c).

With regard to water trading in Victoria,, 30% of water buyers don't want water trad inge since they perceive that it activates unused water and hence reduces annual water allocations. Many of these are dairy farmers who have developed their properties based on historically very high annual sales-water allocations. This allocation level has been considerably lower during the last many years. These farmers therefore have to buy water simply to maintain existing production levels and they think that this reduction is at least in part caused by the operation of water markets.

Urban Water

Growth of water use in the cities has been slower than within rural irrigation especially in the 1990's when water use declined in a number of the State Capitals. There have also been significant urban per capita reductions in water use especially in Sydney and Melbourne. This has led to the deferment of capital expenditure on new source development (Water in the Australian Economy, 1999; Water Audit, 2001). All this is positive from the short term perspective, and also from the long term perspective.

The scope and pace of water reform has differed in each State (National Competition Council, 1999) but the early key aspects have been institutional and legislative reforms via commercialisation and corporatisation rather than privatisation. Commercialisation involves few changes in ownership but the adoption of management practices of private sector businesses. Corporatisation is a major transformation of the structure and organisation of Government Business Enterprises to resemble a company.

A key common component of the reforms in each State has, however, been benchmarking. This has evolved to the extent that eighteen (National Competition Council, 1999) of the major urban providers in all jurisdictions actively participate in performance monitoring through reporting to their industry lobby group the Water Services Association of Australia (WSAA). WSAA was formed in 1995 to provide a forum for debate on issues of importance to the urban water industry and to be a focal point for presenting and communicating the industry's views (WSAA, 1999). In 1999 WSAA had twenty-one members drawn from businesses that provide water to 50,000 people or more either directly as retailers or indirectly as wholesalers. These use benchmarking to compare performance on a wide variety of dimensions. In addition, sixty-four non-major urban water utilities are compared against seventy-four performance indicators on water and sewage services and irrigation benchmarking. These are all voluntary, and it is stated that this competition by comparison approach will lead all water service providers progressively to adopt best practice.

Social Justice in the Short Term: COAG Price Reforms Aim for Full Cost Recovery by 1998 for Urban Water

The water pricing provisions were generally on target in all jurisdictions (COAG Progress Report 1999). There is anecdotal evidence that there have been reductions in consumption because of pricing reforms. , demand management and education (Bjornlund et al, 2001). There wereas some reductions in unit price as well but with Government as price setters such reductions could signal less management waste or more environmental destruction. It is not possible to take price changes at face value, as almost anything can account for them (Shiel, 2000).

The Brotherhood of St Laurence did some empirical work on price changes in Victoria and hence on the need to support lower income earners in relation to water supply (Siemon, 20001998). The study found that price changes were regressive, with losers being tenants and larger low-income families. It was also found that the consumers perceived a risk to themselves from price deregulation, specifically a risk of higher prices, and that there was very great support for public provision of water. Water was seen as a universal right. The issue of the proposed abolition of rates concessions also raised concerns.

Social Justice in the Long Term: COAG Elements of Cost Recovery which Includes Environmental Costs and the Costs of Asset Consumption

The main issue here is that progress on this reform has been patchy (National Competition Council, 1999). It is difficult to know how to assess the environmental costs and how to compare very different authorities. There is no such thing as world class terrain. It will always be more expensive to provide water in Sydney because of the sandstone and hilly terrain as compared to Adelaide (Walker and Walker, 2000). Hence at the stage of the second Tranche assessment, it is not possible to make any statements concerning the roles of the marketisation models in achieving long term choices that are socially just.

Conclusions

There are few simple choices between water sector management structures. Nevertheless, the one common lesson from the corporate sector in Australia and overseas is that the powers and funding of the Regulator are crucial elements in ensuring that the laws against social abuses such as monopolistic practices are enforced. Australia has had a very gentle system of regulatory enforcement and at present more funding is required. Even with an extremely strong regulator in the UK, the privatisation model has been recognised as not promoting sustainable choices as it puts traditional conflicts of interest between consumers and shareholders to the fore.

In Australia, the COAG Reforms have resulted in commercialisation and corporatisation as the chosen model in the water sector. In the rural water sector, the connection of land to water has been severed creating the ability for each jurisdiction to create permanent and temporary water markets. Each State has imposed environmental regulations on to the water market system and only recently have these been tightened (Jones et. al. , 2001).. These vary, and once again regulatory enforcement is an issue, especially in relation to stockpiling of water and other monopolistic practices.

Assuming that the environmental regulation selected is sound and enforced, how does the market assist in making choices between sustainability and social justice? The results suggest that the market creates many gaps, which need to be filled by education policies to help farmers adjust to the new water management regimes. One extensive package exists in NSW. This is well funded at $33 million, but only helps farmers in that one jurisdiction. Also with regard to stressed rivers in NSW, the community is being asked to give 10% of annual water allocations diversions to improve river health. To achieve this, extensive community consultation and education have been implemented. The community in NSW has significant sectors that do not want to accept this reduction.

Marketisation is a relatively recent phenomenon in Australia but one hailed as yielding sustainable and socially just short term and long term solutions to irrigation water and urban water management issues. But the markets make very blunt choices between social justice and sustainability. For each positive social outcome there is a negative and the same for environmental outcomes. The markets in three States have generally moved water to growers with higher value commodities with improved economic outcomes and environmental benefits as these farmers have better irrigation technology. However, to counteract this positive environmental outcome, is the negative that now water has a dollar value, unused water is being sold. This water was allocated to irrigators pre COAG and growers feel it is their right to sell it. Water is also moving to larger commercial farms. In relation to growers giving up allocations of water to provide for the environment, Bjornlund and McKay (2001b) suggest thatour results suggest that presently in Victoria, only a third of sellers and non-traders and 17% of buyers will agree to this at present. Before an withoutwithout an extensive education package. Larger farmers are, in general, against environmental allocations.

Hence in the rural sector, the market by itself does not make uni-directional choices that promote social justice or sustainability. At all times, education and community involvement and partnershipspackages are needed, and also a well funded "water police" system to ensure that the application of the laws is fair.

In the Urban sector, price rises have achieved significant consumption reductions but at the expense of some sectors of society – poor, large households. Consumption reductions mean that environmental issues associated with new infrastructure can be delayed. The benchmarking process aims to achieve best practice, but as the utilities differ so greatly in past practices and present legislation, one wonders if comparisons are being made between apples and oranges. This conclusion also applies to environmental management practices and ecological indicators.

In summary, the market mechanisms in Australia need to be further evaluated from the sustainability and social justice perspective over a long period of time. Early results suggest community education needs to be incorporated into the market package and that the community must feel that the regulator will enforce the laws to promote fairness.

Acknowledgements

Land & Water Australia, Canberra funded the work on rural irrigation water markets and that part of the work was jointly authored. Thanks are due to Janet Matheson ,and Paul Martin and Bart Van der wWel, Mike Smith, Rodney Ralph.

References

Anderson, J. and Dillon, P. (2000). *Preface to Water Recycling Australia*, Australian Water Association First Symposium of Water Recycling Forum, Adelaide, October.

Asher, A (1999). Privatisation of public enterprises and utilities and establishment of regulatory framework. *Australian Consumer and Competition Council, International Conference on Competition Policy and Economic Adjustment,* Bangkok.

(AWA) Australian Water Association (2001). *The Australian Water Directory,* Published by the Australian Water Association and others, Melbourne.

Beckwith, J.A. and Syme, G.J. (1990). Muddling through to an Australian Water Quality Strategy. *Impact Assessment*. 10(3): 349- 365.

Bjornlund, H. (2001). Water policies and rural land values. Proceedings from the 7th Annual Pacific-Rim Real Estate Society Conference, Adelaide, January.

Bjornlund, H., and McKay, J.M. (1995). Can water trading achieve environmental goals?. *Water*. 22(5): 31-34.

Bjornlund, H., and McKay, J.M. (1996). Transferable water entitlements: Early lessons from South Australia. *Water*, 23(5):39-43.

Bjornlund, H., and McKay, J.M. (1999). Do permanent water markets facilitate farm adjustment and structural change within irrigation communities? *Rural Society*, 9(3):555-572.

Bjornlund, H., and McKay, J.M. (2000a). Do water markets promote a socially equitable reallocation of water?; A case study of a rural water market in Victoria, Australia. *Rivers*, 7(2):141-154

Bjornlund, H., and McKay, J.M. (2000b). Water Markets and instrument in achieving a more sustainable water use. Paper presented at the 10th World water Congress Melbourne, March.

Bjornlund, H., and McKay, J.M. (2001a). Current issues and future directions for Australian water market policies. *Water*, 28(2): 74-78.

Bjornlund, H., and McKay, J.M. (2001b). Operational aspects of Australian water markets. *3rd Australasian Natural Resources Law and Policy Conference, Focus on Water,* pp.50 –70.

Bjornlund, H., and McKay, J.M. (2001c). Environmental flows and sustainable rural communities profitability and sustainability - conflict or coexistence. *Australian Water Association Conference,* Canberra, on CD Rom.

Bjornlund, H., and McKay, J.M. (2001d). Operational mechanisms for the effective working of water markets - some Australian experiences. *Proceedings from the Joint Conference of the International Water and Resource Economics Consortium and the Seminar on Environmental and Resource Economics*. Girona, Spain, June.

Bjornlund, H., McKay, J.M. and Pisaniello, J. (2001). *Water: Waste Not - Want Not*. Report to the Water Conservation Partnership Project, Adelaide.

Brundtland Report (1987). *Our Common Future,* Oxford University Press, Oxford.

(World Commission on Environment and Development).

Crase, L.B., Dollery, B., and Lockwood, M. (2001) To trade or not to trade? The limitations of water markets as an allocation mechanism in NSW. *Australian Water Association Conference* Canberra. On Cd Rom

(COAG) Council of Australian Governments Progress Report (1999). *Progress in Implementation of the Water Reform Framework,* Canberra.

Eckersley, R. (1995). Markets the State and the environment: An Overview. In Eckersley, R. (ed.), *Markets, the State and the Environment: Towards Integration,* Macmillan Education Australia, South Melbourne, pp.7-45.

Grabosky P and Brathwaite, J. (1986). *Of Manners Gentle - Enforcement Strategies of Australian Business Regulatory Agencies,* Oxford University Press, Melbourne.

Grabosky, P. (1995). Governing at a distance: Self Regulating green markets. In Eckersley, R. (ed.), *Markets, the State and the Environment: Towards Integration,* Macmillan Education Australia, South Melbourne, pp.197-228.

Griffiths, J. (1986). What is legal pluralism? *Journal of Legal Education*. 24:1-55.

Guislain, P. (1997). *The privatisation challenge: A Strategic, Legal and Institutional Analysis of International Experience,* World Bank.

High Level Steering Committee (1999). Progress in implementation of COAG Water Reform Framework, High Level Steering Committee , Canberra

Kaufman, B. Geen, G. and Sen, S. (1999). *Fisheries Futures: Individual Transferable Quotas in Fisheries.* Fisheries Research and Development Corporation, Canberra.

Jones G, Whittington J, McKay J Arthington A ,Lawrence ,Cartwright S and Cullen P 2001 *Independent Assessment of the Jurisdictional Reports on the Achievements of the COAG Water reforms*, Technical Report of CRC for Freshwater Ecology, Commissioned by Environment Australia, Natural Hertitage Trust and Nation Competition Council

Industry Commission (1990). *Measuring the Performance of Selected Government Enterprises*, Canberra.

Industry Commission (1992). *Water Resources and Waste Disposal,* Canberra.

Industry Commission (1997). *A Full Repairing Lease: Inquiry into Ecologically Sustainable Land Management,* Canberra.

Jones, G., Whittington, J., McKay, J., Arthington, A., Lawrence, I., Cartwright, S., and Cullen, P. (2001). *Independent Assessment of the Jurisdictional Reports on the Achievements of the COAG Water Reforms.* Technical Report of CRC for Freshwater Ecology, Commissioned by Environment Australia, Natural Heritage Trust and Nation Competition Council.

Legge, D (2000). The sustainability of the water industry in a regulated environment. *Journal of Environmental Law.* 12(1):1-19.

Lindblom, C. (1959). *The science of muddling through.* American Society for Public Administration. 19: 79-88.

McKay, J.M. (1994a). Classification of Australian corporate and industry based codes of conduct. *International Business Lawyer.* 22(11):507-514.

McKay, J.M. (1994b). Water planning in SA. *The Australasian Journal of Natural Resources Law and Policy.* 1(2):181-192.

McKay, J.M. (2001a). Marketisation models in urban and rural water and fisheries progress and issues up to 2000. In Dover, S. and Wild River (eds.), *Processes and Institutions for Resources and Environmental Management: Australian Experiences,* Report to Land and Water Australia, Centre for Resources and Environmental Studies, Australian National University, Canberra.

McKay, J.M. (2001b0). Legal instruments and regulatory models in privatisation of water utilities in Australia. Proceedings of the conference *Legal Aspects of Sustainable Water Resources Management,* Regional Conference of the International Association for Water Law, Bosnia.

McKay, J.M. and Moeller, A.(2000). Is it time for a new model of water quality laws incorporating community consultation. *Environment and Planning Law Journal.* 17(3):165-175.

McKay, J.M. (2001). Marketisation models in urban and rural water and fisheries progress and issues up to 2000. In Dover, S. and Wild River (eds.), *Processes and Institutions for Resources and Environmental Management: Australian Experiences,* Report to Land and Water Australia, Centre for Resources and Environmental Studies, Australian National University, Canberra.

National Competition Council (1999). *National Competition Policy – Some Impacts on Society and the Economy,* Canberra.

National Principles for the Provision of Water for Ecosystems, (1996). ARMCANZ and ANZECC, Sustainable Land and Water Resources Management Committee, Subcommittee on Water Resources,. Occasional Paper SWR No 3,. Agricultural and Resources Management Council of Australia and New Zealand and Australia and New Zealand Environment and Conservation Council.

Parliament of the Commonwealth of Australia (1999). *Competition Policy: Friend or Foe- Economic Surplus, Social Deficit?* An interim Report of the Senate Select Committee on the Socio- economic consequences of the National Competition Policy, Canberra.

Rolph, E. (1983). Government allocation of property rights: who gets what. *Journal of Policy Analysis and Management.* 3:45-61.

Senate Select Committee on Water Pollution (1970). *Water Pollution in Australia,* Commonwealth Government printer, Canberra.

Siemon, D. (2000). In McKay, J. (Convenor), *Overheads from 10 World Water Congress session: Legal and Social Issues in the Corporatisation and Privatisation of Water Utilities,* International Water Resources Association, Melbourne.

Sheil, C. (2000). Running the Risks: The rationalisation of Australia's water. *Australian Journal of Public Administration.* 59(3):11-21.

Sydney Water Inquiry (1998). *Final Report,* chapter 10, p66.

Syme, G.J., Nancarrow, B.E. and McCreddin, J.A. (1999). Defining the components of fairness in the allocation of water to envirnmental and human uses. *Journal of Environmental Management.* 57:51-70.

Walker, R. and Walker, B.C. (2000). *Privatisation Sell Off or Sell Out - the Australian Experience,* ABC books.

Water21 (2000). *Returning to Public Ownership, newsletter of the European water network.*

Water Audit (2001). *Australian Water Resources Assessment 2000,* National Land and Water Audit, National Heritage Trust, Canberra.

Water in the Australian Economy (1999). Joint study of the Australian Academy of Technological Sciences and Engineering and the Institution of Engineers Australia.

(WSAA) Water Services Association of Australia (1999). *Annual Report 1999,* Foreword, Melbourne.


FUTURE