

## **Competition and Water: A Curmudgeon's View**

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### **Introduction**

Water infrastructure, whether for urban water or irrigation, has natural monopoly characteristics. But water policy in Australia is burdened with something far less manageable than the complications of natural monopoly. Sadly, water policy suffers from widespread romantic, irrational views that have brought forth inadequate policy responses. This used to be more obvious for irrigation. Arguably, urban water policy is in the process of catching up. From the pervasive pro-irrigation bias of the past to today's emphasis on environmental damage caused by irrigation, a common thread in water policy has been to attribute more importance to water than is justified on wider examination of economic and other issues.

A sceptical and discursive paper on water is hard to organise. There are many variations in institutional arrangements between the states and in different parts of the water industry. No doubt counter-examples could be found to support more conformist views.

The paper consists of several loosely linked parts. The next section discusses the contest between romanticism and empiricism. The theme is expanded with a section describing the debate over 'water use efficiency'. Then follows discussion of special interests in the water industry, emphasising the influence of concerns with environmental effects of water use. Confusion has arisen with a poorly articulated philosophy of the environmental movement and ambiguous responses by governments leading to conflict over cost sharing and property rights. Natural monopoly and infrastructure issues are outlined in the following section, with comments on water pricing. Differences between pricing policy and practice for water for irrigation and urban water are noted. The following section discusses the emergence of water trading in the last fifteen years: its advantages, constraints on water trading and their effects, and water trading and the environment. The penultimate section of the paper discusses access issues in the context of the application by Lakes R Us to participate in the management of the airspace of dams in the Snowy Scheme. A brief conclusion follows.

### **Romanticism or empiricism in the water industry?**

When it comes to water, what should be empirical questions were, and are, often treated as articles of faith. This failing is more widely recognised about water used for irrigation, following numerous powerful critiques of the chequered history of the development of irrigation. Perhaps the best known of these are two books by Bruce Davidson (1965, 1969) that still should be part of everyone's education. On a charitable interpretation, earlier romanticism about water and exaggerated hopes for irrigation in the evolution of European farming in Australia were products of ignorance and misunderstanding of the underlying facts of local economic geography, production costs and market opportunities.

The surprise of early encounters with drought was a major stimulus to the interest in irrigation. Changing water availability through water storage and river regulation is a natural reaction to water shortages in arid regions. This response missed the point that land was abundant in Australia but labour and capital were also scarce. Higher yields per unit of land are obviously achieved with irrigation but the pursuit of economic efficiency should consider all resources. It turned out that concentrating available water on small areas of agricultural land was not propitious, economically or environmentally. Rainfall variability in Australia meant that a large capital investment was required in water storages and other irrigation infrastructure compared with other countries where irrigation is practised.

Critics of Australian irrigation development like Davidson accepted that irrigation had a role in Australia. But even a limited role would have been compromised by the simultaneous predilection of governments to closer settlement that accompanied the bias in favour of irrigation. With minor variations, both the irrigation and closer settlement biases were bipartisan, reflecting community attitudes of the time. In particular, the emphasis on closer settlement meant that irrigation was not used to reduce production risks in livestock industries. Even today, drought assistance reduces opportunities for irrigation farmers to make profits during droughts. The high proportion of small farms in irrigation settlements lessened the economic contribution of irrigation and created economic and social problems that resonate to the present day.

In the past, many products of irrigation had to be assisted through a variety of restrictions on production, trade and marketing. Horticultural products in particular suffered from high labour and transport costs. Almost all product-related assistance given to irrigation farmers has been eliminated, although some relics of statutory marketing persist in the rice industry. An interesting and researchable question is the extent to which the bundling (aggregation) of farm-gate returns for rice with off-farm receipts from rice processing and marketing has affected resource allocation in irrigated areas of southern New South Wales. Ironically, the Government of New South Wales that now pesters irrigators in so many ways is steadfast in its support of the single desk for rice. A case of the green right hand not knowing what the regulatory left hand is up to. State-owned rural water authorities formerly granted various concessions to farmers. These organisations were characterised by cost padding and overmanning similar to other government instrumentalities that became candidates for reform. Government departments responsible for irrigation usually saw themselves as custodians of irrigators' rather than community interests. The careless way Australian irrigation was developed exacerbated environmental damage from salinity, both on-farm and downstream.

All these features combined to make irrigation, especially water pricing, a natural target in the agenda of microeconomic reform that has developed over the last couple of decades. One of the themes of this paper is to explore reasons why water has been treated so differently in the debate and implementation of microeconomic reforms measures, compared with other former publicly owned utilities. A central idea of microeconomic reform was that Australia's economic performance would be enhanced with lower prices for inputs such as electricity, gas, telecommunications and rail transport traditionally provided by government enterprises. This generalisation was applied to business inputs and domestic consumers. An exception is

invariably made for water because it is taken for granted that water was priced too low previously, rather than too high. No such general conclusion should have been made about urban water. Dwyer (2005) has surmised that past rural water policy failures in irrigation are being used to justify the punishment of urban water users. The green hair shirt mentality of parts of the environmental movement provides part explanation of political support for higher urban water prices. By and large, urban water authorities have remained in public ownership. Treasury officials have never been shy of providing rationalisations for revenue-raising measures, however questionable. While previous investment in irrigation may have occurred with undue haste and without proper assessment, that is no excuse for superficial economic analysis at the present time.

Changing technology on-farm and off-farm has had dramatic effects on the productivity of modern irrigation farms, reducing the initial handicap of low labour productivity. But is not easy to transform the existing capital structure of irrigation, on-farm and off-farm. As pointed out by Godden (2005), retrofitting existing capital can be very expensive. Further adoption of modern irrigation technology would have major consequences for the number of farms in irrigated districts. For much of the last few years, price movements have been benign for major irrigated commodities like dairying and until recent sharp falls, wine grapes. As witness the difficulties being experienced by Australia's vegetable industries in competition with imports, the harsh logic of comparative advantage still applies to agricultural production. The idea that the future of Australian irrigation (and agriculture generally) is in further processing and the production of high value products for export markets is as far off and far-fetched as it ever was. In any case, the objective should be institutional arrangements that enable farmers and others to make their own decisions about what they produce from the available water without any call for ill-informed barracking from the sidelines, however well intentioned (Pratt 2005).

Whereas most of the deficiencies of water policy used to be concentrated in irrigation, the boot is now on the urban water foot. There have been several successes in the reform agenda for irrigation, especially following the introduction of water trading. The Cap introduced by the Murray-Darling Basin Commission in the mid-1990s recognised that water extractions from regulated rivers could not be increased indefinitely. Many changes occurring in the urban water sector in recent years do not stand up to close examination. In an echo of the past, drought and water shortages in urban areas have unfortunately become an excuse for poor public policy. In fact, the approach to water pricing in most states is now more disciplined and logical for bulk irrigation water than it is for urban water, which in several respects is being treated as another opportunity for disguised taxation. Public authority dividends and other imposts are levied, ostensibly in the cause of environmental protection.

Controls on water use in urban areas are arbitrary and amount to little more than a de facto restriction of the innocent pastime of gardening. There is an unpleasant whiff of the latter-day green wowser in many contemporary attitudes of state governments to urban water. Exhortation and expensive advertising campaigns about water saving are the order of the day. Block water pricing arrangements being introduced in some Australian cities are regressive and inequitable. Water recycling is promoted without objective analysis of its costs and benefits. Urban water was always a different case to irrigation in the agenda of microeconomic reform. The previous differences are now reversed, and magnified.

## **Water use efficiency – an unwelcome diversion and dead end in water policy**

Unfortunately, romanticism, a narrow view of economic efficiency and a leavening of anti-empiricism are still prevalent and damaging in water policy, despite all the rhetoric about water use efficiency and environmental flows. The preoccupation with water use efficiency has been especially unproductive. There are at least a couple of reasons for this. Invention is the mother of necessity. There is always a queue of enthusiasts with grandiose technical solutions wanting to solve economic and political problems. This suits politicians and special interests in the water industry as it avoids facing up to decisions that are politically unpopular. Running away from buyback of irrigation licences is an obvious example. The marketing hype and superficial advertising of urban water saving campaigns avoid facing up to financing issues for new dams, and those parts of the environmental movement who have foolishly set their face against new dams in all circumstances.

Economic efficiency is not the same as technical efficiency. The efficiency of water use is often expressed in terms of 'production per unit of water', a criterion as partial and unsatisfactory as 'production per unit of land' that fuelled early interest in irrigation. Marginal valuations are important not calculation of average efficiency. A lot of resources have been invested in dubious measurement of water use efficiency that has neglected other determinants of the pattern of agricultural production (Bryan and Marvanek 2005). At best, these are data gathering and data massaging exercises, rejigging information already in the public domain to satisfy the information needs of unqualified and under resourced catchment management authorities, searching for ideas and a role in environmental management. At worst, benchmarking and calculations of water use efficiency are sheer quackery.

Misuse of the concept of water use efficiency has been damaging in policy development. The worst result has been undue concentration on the commodities produced with irrigation water, rather than the volume of water used and off-farm effects of irrigation. The latter are legitimate concerns for public policy. Fundamentally, water use on farms that does not have off-farm effects is the operator's own business. That is, unless we have returned to another era of central planning in irrigation. Rabbiting on about how water is used on farms has unnecessarily alienated irrigation farmers and set back the course of reform. Rice and cotton are the favourite targets of would be irrigation planners.

Confusion amongst scientists over simple ideas from economics is bad enough but the contagion has now spread to the principal Commonwealth Government Department responsible for agriculture. In its 'Stocktake' of the Australian Agriculture and Food Sector, the Department of Agriculture, Fisheries and Forestry (2005) said at page 6 under the meretricious heading 'Natural resources are critical to agriculture':

The value of output per unit of water used in agriculture varies considerably across the different agricultural commodities. For example, in 1996-97 (the latest year for which data are available) it was estimated that there was \$200 000 (gross value) of rice produced per gigalitre of water used, while at the other end of the scale there were around there was around \$1.6 million of vegetables produced per gigalitre of water used...

This statement completely ignores the demand side. On-farm production decisions also depend on the other resources available to the farmer. Concentration on rice growing in southern New South Wales is largely a product of past settlement and irrigation policy.

A variant of the confusion over water use efficiency is neglecting the international dimension of Australian agriculture. In many quarters, there is gross misunderstanding of price formation for irrigated commodities sold on world markets (Foran, Lenzen and Dey 2005; Wentworth Group 2002, 2003). Thus, it is claimed that Australian water prices should include the costs of environmental damage ('externalities') and that these costs could be passed through to consumers. The market does not work this way for commodities whose prices are determined on export markets. Additional charges would fall on farmers.

The Wentworth Group (2003, p.15) goes even further and wants 'a labelling system to let consumers choose in favour of environmentally friendly products that don't guzzle excessive amounts of water.' How the labelling scheme would deal with products grown under natural rainfall and irrigation is not elaborated. No doubt a well-crafted marketing campaign would recruit a few gullible and affluent Australian consumers but the idea of water-based product labelling is completely irrelevant to international purchasers of Australian products that lose their identity in foreign trade.

The consequences of higher water prices for farmers should be acknowledged and not dressed up as a benefit to the environment. In any case, market prices for water as revealed by water trading are now far more relevant to farmers in on-farm decision-making. Including the costs of externalities in prices charged by water authorities would make little difference to production decisions, even if it could be done successfully. Setting bulk water prices should concentrate on the performance of rural water authorities and not be sidetracked by irrelevancies (to pricing) like the environmental effects of irrigation.

Not all of the concern with water use efficiency has been created by environmental interest in water saving or misunderstanding by scientists of how decisions are made on Australian farms. The idea that water is frequently 'wasted' is now part of popular belief. The involvement of the businessman and philanthropist Richard Pratt in the controversy over water use efficiency and water saving came from a slightly different direction. Mr Pratt started from the (defensible) position of wanting to increase Australia's population (Pratt 2005). On his own admission, environmentalists persuaded Pratt that water supplies were insufficient to achieve this objective. But the conclusions of his informants about water and the limits to Australia's population are incorrect.

The standard reference work on Australian water resources is explicit that water is not a binding limit to Australia's population (Smith 1998). Pratt and many others have missed the point. Australian water resources would be sufficient to support a larger human population, if there were sufficient investment in urban water supplies. Effective supplies of urban water would also increase with a changed distribution of the population, and, most obviously, if the amount of irrigation were reduced. Instead of throwing in his lot with those encouraging transfers of water from irrigation to boost urban supplies, Pratt has put his faith in engineering solutions to improve water use efficiency in existing irrigation areas.

Relying on engineering solutions to save water implies that irrigation water is not only being used to produce the ‘wrong’ commodities, irrigators use the ‘wrong’ technology to do so. Farmers are free to choose the irrigation technology they use on their farms. The value of output will be a major determinant of their choice of irrigation technique. The market for water creates plenty of incentives for water saving by farmers and water authorities. Within limits, water can already move to its best use.

There is no doubt that Australian irrigation is based on a low level of technology compared to other rich countries. International comparisons are fatuous because the products and markets of Australian irrigation are different to elsewhere. A high proportion of irrigation water is supplied in large gravity irrigation systems supplied through open channels. Losses do occur. Whether these losses are all worth saving is another question? Some of the losses through seepage return via groundwater. Surface run off from farms (return flows) is part of the supply for irrigators downstream. In a subtle and largely unnoticed<sup>1</sup> paper exposing the gross exaggeration of the potential for water saving, Gyles (2003) demonstrated the extent of double counting of losses from the irrigation system. It is one of the oldest mistakes in the economic book to confuse stocks and flows.

A simple rule of thumb can be applied in thinking about the market potential for water saving by investing in new irrigation technology. Direct pumping from regulated rivers occurs for many major horticultural developments for a variety of products. These greenfields operations use the best irrigation techniques on-farm with modern layouts, but do not pump much beyond 15 kilometres from the river. On this reasoning, there is not much future in piping water to produce lower value products on existing farms, set up for flood irrigation. Why pipe water to be used in flood irrigation?

There is no reason to believe that financial institutions are unwilling to lend for private investment in irrigation, including water saving projects. The growth of irrigated horticulture, viticulture and dairying over the last fifteen years is evidence of that. Special financial vehicles for investing in water saving as advocated by Pratt Water (2004) are not required.

### **Special interests and other conflicts over water**

Past enthusiasm for irrigation created an amalgam of interests that were dependent on irrigation and a formidable pro-irrigation lobby. A notable achievement of the irrigation lobby has been to maintain virtual separation of urban and irrigation water supplies. This has occurred even though the era of public investment in irrigation development is at an end, and there are water shortages in many Australian cities and provincial towns. Canberra is an extreme case of the adverse effects of the separation because urban water is drawn from the Murrumbidgee irrigation catchment. Water could be provided to Canberra at low cost. Other cities would require substantial investment to access water now used for irrigation, but the underlying principle is the same. Recent suggestions that irrigation and urban markets for water be interconnected have been treated as newsworthy. The obligation to justify continued rigid separation of irrigation and urban supplies should be the other way around.

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<sup>1</sup> But not by those involved in a crude attempt to suppress this excellent work.

The Victorian Government White Paper (2004) on water had a few timid lines at page 119 recognising the advantages of interconnection of water supply systems but did not mention accessing irrigation water as an option for Melbourne. Some Victorian provincial towns adjacent to irrigation water supplies are even more disadvantaged. With around 70 per cent of water extracted from regulated rivers and streams used for irrigation and around ten per cent for urban use, modest transfers of water to cities or towns could not seriously jeopardise irrigation. Instead, profitable opportunities for trade would arise that would benefit irrigators, individually and collectively. To think otherwise is to misunderstand (or obfuscate) the simple economics and arithmetic of water use in Australia.

Opposition to water trade between irrigation and urban use is concentrated in sections of the irrigation industry that are, or regard themselves as, the beneficiaries of present arrangements. An 'every last drop' counts mentality is advanced when it is inevitable that some irrigation water is being used in low value uses, at the margin. Spurious arguments about 'multipliers' and dire economic consequences for country centres if any less water were available for irrigation are bandied about. The every last drop mentality of irrigation organisations – but not all irrigators – unfortunately finds a ready hearing in political circles. Much the same rhetoric is being used to beat urban consumers over the head with crass advertising campaigns about water saving. The political influence of negative environmentalism has been influential in the debate over urban water. So much so, governments are reluctant to invest in new dams for urban water. By definition, this is a foolish position to take. It was always absurd to have a non-empirical and unquestioning view of irrigation in its expansion phase. The same applies now to blind opposition to dam construction or other extensions to the urban water supply system, or profitable investment in irrigation for that matter.

Environmental organisations are major players in the contemporary debate over water. That some environmental damage is caused by irrigation is uncontroversial and should have been appreciated from the outset. Yet, the historical record is clear that past advocates of irrigation development ignored warnings based on then knowledge of potential adverse effects of irrigation (Barr and Cary 1993). Damage has occurred from irrigation through salinisation of irrigation areas, river salinity, decline of native fish populations, degradation of wetlands and riparian and floodplain vegetation. Many aspects of the environment have improved because of river regulation. Flood control is an example. Certainly, amenity has been vastly improved for active and passive recreation on water storages, and weir pools in many towns on regulated rivers.

River health is an archetypal environmental problem where multiple attributes and uses of the environment have to be reconciled. Lack of information is ubiquitous in environmental disputes. A vigorous debate has occurred on the extent to which irrigation development should be wound back. Although the issue has been around since at least the mid-1990s following the Murray-Darling Basin Commission Cap on water extractions, the debate was intensified by the 'Living Murray' exercise of the MDBC in 2002-03 culminating in the National Water Initiative of 2004. The Living Murray had a bad start with a glossy and unconvincing discussion paper published by the Murray-Darling Basin Ministerial Council, slap bang in the middle of a drought. Catchphrases like 'one Basin, one river system and one environment' did not inspire reductionist observers or hard-bitten farmers alike.

Arguments about environmental flows are usually cast in terms of an annual (average?) amount of water to be returned to the 'environment' to restore river health in all its dimensions. The MDBMC document proposed reference points of 350 GL, 750 GL and 1500 GL for the 'community' and agencies to consider. Even higher proposals had been suggested earlier, generating fears among irrigators that the reference points were the thin end of a green wedge. Fine sounding words about 'community engagement' are small comfort when changes are being proposed that will reduce irrigators' incomes without any indication of their scale or method of implementation.

The judgements first proposed in the Living Murray documents were based on purely technical criteria. But what should be more important is having a logical process for water to be returned to the environment combining technical and economic information. Thankfully, the outline of a better process for reconciling conflicting interests is coming together.

Technical criteria on their own are inadequate in determining environmental flows. The 'environment' of rivers and streams, like other parts of nature, exists only in the contemplation of its users. Three important ingredients were missing in the recent debate over environmental flows. First, costs need to be evaluated, especially costs to irrigators of less production. Many steps can be taken to improve riverine environments with vastly different implications for cost. Some steps are related to flow per se and can be achieved by buyback of licences or water savings. Other measures require expensive engineering works.

Second, a valuation process is required to measure the environmental benefits of increased flows. Otherwise, we are at the mercy of political, bureaucratic or scientific whim. Unfortunately, there was reactionary opposition in the Living Murray process from parts of the bureaucracy frustrating plans to conduct comprehensive valuation studies. Gillespie and Bennett (2004) describe methods that could be used to value biodiversity gains and losses. These methods cannot be applied without cooperation of scientists and economists. Formal valuation techniques are based on sampling but do not preclude other methods of community consultation where the interests of those directly involved are considered explicitly.

Third, the timing of the return of water to rivers is important. Some strategies for environmental improvement – sustaining red gum forests, for example – only need water supplies intermittently. Sensibly, this water would be supplied in wetter years. Opportunities exist for profitable deals via temporary trading between irrigators and environmental agencies in making these exchanges.

The political difficulties of the Living Murray exercise arose in part because the objectives of those proposing change were not clear. The scientific basis of the case for environmental flows was ambiguous, or at least extremely difficult to communicate. Furthermore, governments were reluctant to declare the extent of changes envisaged and how they would be financed and implemented. Community consultation became a charade.

What should be the point of reference for investment in environmental changes? Nature in its original state or improvement of measurable aspects of the environment from an existing base. The latter approach that might be called 'environmental rationalism' is gradually



becoming embodied in official policies. And is the only valid way to proceed in the long-term. None the less, the former unrealistic and essentially non-empirical conception of the environment, referred to as 'environmental fundamentalism' by Marohasy (2004), is lurking behind some campaigns and claims put forward by the political environmental movement.

The line of least resistance to populist environmentalism is in the city, where most of its adherents live. Farmers are well organised and well represented politically. The dispersed interests of urban dwellers in rational outcomes on environmental flows have had to take their chance between the vigorous lobbying efforts of the green end of town, and the entrenched position of the irrigation lobby. Part of the problem is that the professional base of state environmental agencies has been eroded in the last twenty years. Independent assessments by academics and other researchers have also been diminished by excessive reliance on grants-based funding.

Environmental battles have brought about defensiveness on the part of irrigators, sometimes to the point of denying any scientific data that confirms loss of biodiversity or damage to the riverine environment on regulated rivers. For example, surveys of river red gums and black box along the River Murray demonstrate a significant change in tree health over a short period (MDBC 2005). Defensiveness is partly understandable because genuine progress has been made in reduction of salinity levels and other environmental indicators (Marohasy 2003).<sup>2</sup> It would be surprising if otherwise, given the scientific effort that has taken place to improve the environmental condition of the Murray-Darling system involving substantial public and private expenditure by farmers. Farmers have actively collaborated in the development of Land and Water Development Plans with state agencies.

### **Cost sharing, property rights and environmental levies**

An ambiguous notion 'cost sharing' has had a life of its own in discussion of Australian environmental policy. But on closer examination cost sharing is another expression of standard concepts from public finance, whenever division of responsibility for revenue raising and expenditure has to be determined for the public and private sectors. There was no need to develop a separate body of literature pertaining to the environment. Debate over taxation and public expenditure has been going on for centuries. Theories of taxation in a mixed market-based economy concentrate on three issues – efficiency, equity and costs of administration, including costs of tax collection and private compliance. These are the paramount issues that should be analysed in determining expenditure on the environment and how it is financed.

Like many questions in the theory and practice of taxation, there is no unambiguous answer on cost sharing or as put by Pannell (2004) "who should pay for the environment?"

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<sup>2</sup> Marohasy (2003, p.22) unfortunately appears to have fallen into the trap of confusing stocks and flows by claiming that the actual percentage of water used by irrigators relative to the Murray-Darling system's total potential capacity has only increased marginally from 1950 to 2002. The idea of a 'mature water economy' with the sustainable yield for irrigation close to its limit has been around in Australia for almost twenty-five years (Randall 1981). Increased storage capacity does not affect sustainable yield.

In the usual treatment of cost sharing a distinction is drawn between ‘beneficiary pays’ and ‘polluter pays’. Sometimes these terms are called ‘victim pays’ and ‘impacter pays’ respectively. Polluter pays requires that costs should fall on those who cause environmental damage. Beneficiary pays requires that the beneficiary of a good or service should pay for its provision. Polluter pays is favoured as a funding principle because polluter pays creates an incentive to change behaviour. This would be a straightforward except that it is not always possible to identify the proximate cause of damage. Unlike manufacturing industry, non-point pollution and long lags characterise environmental damage to land and water resources. Sometimes it is not possible to recover the costs of remedial action from the polluters. Beneficiary pays then becomes the preferred funding principle by default. If the direct beneficiaries cannot be identified and/or costs of environmental damage readily recovered through charges then the obligation falls on government. The role of government is further convoluted in Australia because of the federal system and the multiplicity of Commonwealth, state and regional agencies.

In short, cost sharing and funding for the environment is a mess where special pleading and the self-interest of recipients and funders is a matter of course.<sup>3</sup> Pannell concluded that “the intrusion of politics is inescapable.” What can be done to limit ad hoc decision-making so that politics, parochialism and the power of lobbying do not have complete sway? Economics does have something useful to say about the distinction between existing environmental problems and the potential problems of new developments. According to Pannell, “precedence [should be given] to the status quo. Polluter pays would be applied to prevent a change to a more polluting activity, while beneficiary pays (or an approximation to it in the form of government funding) would be used to encourage a change to a more environmentally friendly outcome.” Economics is also relevant to efficiency aspects of environmental expenditure. Unfortunately, arguments over cost sharing have often taken precedence over benefit-cost analysis. There is no point arguing over cost sharing for inefficient projects (Read Sturgess and Associates 2000, pp.37-9). This is especially so when the best strategy is to do nothing because environmental damage is unrepairable, or not worth repairing.

Not only is it difficult to decide who is the polluter from a technical perspective, the political economy of environmental policy is confounded by the previous role of all levels of government. Governments were intimately involved in land development and irrigation through policies promoting closer settlement. The development ethos was reinforced until recently by taxation incentives for land clearing and water-related expenditure, with little regard for environmental consequences.

Cost sharing is a question of who has the ‘rights’ to determine what happens to the environment. Arguments over property rights in water have come to the fore in the current debate over environmental flows. Two distinct points of view can be recognised. Conscious of the possibility of arbitrary reduction in their existing rights by governments under pressure

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<sup>3</sup> Australian environmental policy is badly in need of a refined critique along the lines of that provided so elegantly by Ted Sieper (1982) for agricultural marketing. That is, to explain apparently odd government interventions and assistance from a distributional perspective.

from parts of the environmental movement, irrigator interests favour more secure property rights. Their argument is generally couched in terms of the benefits to investment of greater certainty. Macintosh and Denniss (2004) put a contrary view in an interesting paper published by the Australia Institute. The basis of their argument is that property rights in water are not absolute but derived from licences granted by state and territory governments. "Governments actually own Australia's water resources, not the farmers" (Macintosh and Denniss, p.v). Why should farmers have rights that are not available to others? These authors argue environmental repair should be considered another cost of doing business and the responsibility of the landowner. This is effectively the situation that applies in the manufacturing sector.

Arguments concerning the property rights of irrigation farmers are seriously compromised by the recent firm commitment of all Australian governments to water trading. Transactions have been entered into with existing circumstances in mind. A pragmatic response is necessary for good results in environmental management. Macintosh and Denniss (2004, p. vi) concede that their strictly legalistic approach would have high "political costs" and that there may be grounds for discretionary assistance on equity grounds if property rights are restricted "having regard to the nature of the restrictions, the treatment of other property rights, and the circumstances of the affected farmers and communities" (p.54). This is to enter the realm of politics, in the manner of Pannell's observations on the inherent subjectivity of cost sharing.

Some environmental commentators have introduced further complications by supporting environmental levies. Hypothecated levies have been fashionable in recent years. The Wentworth Group (2002, p.16) toyed with an environmental levy of one per cent added to income tax. The "primary purpose" would not be to raise revenue but raise awareness and change behaviour. This allows the Wentworth Group the luxury (and cheek) of claiming they are "not advocating another new tax."<sup>4</sup> The head of the peak environmental organisation in Victoria, Environment Victoria (Paul Sinclair) also supported a levy to be collected by supermarkets (ABC Online, 2004). The implication is that supermarket proprietors would actually pay, not noticing that the tax would fall squarely on consumers.

Crean (2003) analysed in some detail the case for environmental levies pointing out *inter alia* that levies challenge the taxation principle of keeping separate decisions about revenue and expenditure. Crean concluded that was "little basis for the environment to be made a special case and excluded from the normal budget process where all funding decisions are routinely assessed against changing community demands."

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<sup>4</sup> The Wentworth Group has been given an easy time, especially by metropolitan newspapers. An exception is a stimulating paper by Lane, McDonald and Morrison (2004) that highlighted the tension in the Wentworth 'Blueprints' between commitments to regional 'participation' and creation of "a business-like national Natural Resource Management Commission" (Wentworth Group 2002, p.3), sidelining the states who have constitutional responsibility for land and water management and more technical capacity to implement policies than Commonwealth agencies. The Blueprints are another example of the modern penchant for sophisticated exercises in public relations, safe in the knowledge that only a handful of people will ever read the documents cover to cover.

## Natural monopoly, water infrastructure and pricing

Water supply networks could only be duplicated at substantial cost. The water industry is a classic case of natural monopoly with all that entails. The water industry exhibits increasing returns (decreasing costs). Like all infrastructure, water infrastructure generates external benefits that cannot be easily captured through simple user charges (Lim and Dwyer 1999). Because the marginal cost of network usage is much lower than the average cost, private investors would be reluctant to invest in infrastructure if only able to charge marginal cost. At the other extreme, there is the possibility of exploitation of monopoly profits by private owners – hence, the alternative traditions of public ownership or regulated private ownership. The standard Australian response to natural monopoly in infrastructure was public ownership. For irrigation, the public sector rapidly became involved because of failure of early private investments in irrigation, such as the Chaffneys at Mildura (Barr and Cary 1992). Municipal or metropolitan authorities managed urban water. There were state government rural water authorities servicing irrigated settlements and private pumpers on regulated rivers.

Urban water and irrigation water have always been different cases. The political economy of urban water was different from natural monopolies for telecommunications, gas and electricity where prices were linked closely to consumption. Water pricing was based on fees linked to property values with only a limited volumetric component. Pricing favoured residential users at the expense of commercial and industrial users. The average business paid around fifteen times as much for water as the average household (Industry Commission 1992). After the era of expansion of basic services had passed, government enterprise in urban water was beset by the usual problems of cost padding and overmanning, with these costs falling on consumers. State governments were able to raise dividends from urban water authorities and charges for the amenity provided by waterways. Public authority dividends have grown rapidly in recent years (Lim and Dwyer 1999). The Victorian Government White Paper (2005) extended disguised taxation of urban water users further by advocating a five per cent ‘environmental levy’ on urban water. There have been some institutional changes for urban water in the era of microeconomic reform often involving the separation of water storage and catchment management from retail distribution. With variations between states, urban water remains in public ownership administered by government-owned corporations.

Social objectives in the development of irrigation precluded monopoly pricing. Instead, economic difficulties experienced by irrigation farmers meant that subsidisation of water prices was necessary. The water reform agenda has led to changes in institutional arrangements for delivery of irrigation water. These arrangements are now different in Victoria and New South Wales. There is private ownership of retail distribution systems in New South Wales supplying bulk water to irrigators. The Victorian system has been regionalised but is still firmly in public hands. With different institutional arrangements on either side of the Murray, this provides an interesting case study in microeconomic reform.<sup>5</sup>

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<sup>5</sup> Issues of interest include labour productivity of corporatised and privatised authorities, and performance in developing and implementing cooperative arrangements with farmers to manage environmental problems. Their independence and ability to stand up to government flirtation with dodgy regional development proposals is also worthy of close examination

The debate over the pricing of irrigation water was muddled by the loose position advanced by the Council of Australian Governments (CoAG) (1994) on 'cost recovery', also described as 'full cost recovery' (Watson 1995, Lim and Dwyer 1999). General aspects of the CoAG water reform agenda such as separation of service provision from resource management, encouragement of trading and recognition of the environmental consequences of irrigation were positive and uncontroversial. Cost recovery has a ring of economic and fiscal rectitude but there is more to cost recovery than meets the eye. A private firm in a competitive industry has to recover costs to stay in business but there are no guarantees that any rate of return will be earned on investment. Whether past investments are successful depends on operating costs and demand when the investments come to fruition. Cost recovery has more to do with accounting and revenue collection than it does with the economics of resource allocation.

Infrastructure pricing is beset by two difficulties: charging for capital and making good the deficit that would occur if prices at marginal cost. CoAG failed to draw distinctions between costs incurred before and after the event of investment. A rate of return was advocated when most of the capital tied up in water infrastructure is sunk and has no alternative use. In practice, a rate of return is collected on urban water but not bulk water for irrigation.<sup>6</sup> CoAG did not appreciate the difference between capital and recurrent costs. Pricing should be forward-looking. What irrigation schemes cost to establish is only of historical interest. In a mature water economy, the task is maintenance. Increased prices of irrigation water cannot bring forth additional supplies. As mentioned above, water trading has superseded any demand management role for prices. Water is not allocated by bulk water prices.

The most well developed approach to pricing of bulk water is that of the Independent Pricing and Regulatory Tribunal of New South Wales. In essence, the position adopted by IPART is that the price of water should be set to sustain the long-term businesses of water supply authorities. This requires that direct operating costs are covered by charges and financial provision is made to keep the capital stock intact, while maintaining a satisfactory level of service. IPART (1996) resisted the temptation to change a rate of return on existing assets.

The outstanding debate in bulk water pricing is between charging for capital by a renewals annuity or a building block/regulatory asset base (RAB) approach. Renewals annuities have been favoured so far. Renewals annuities provide for medium to long-term cash requirements for renewal, refurbishment or replacement of existing infrastructure (Frontier Economics 2005). A capital charge for expected expenditure is raised up-front. With a RAB, the business finances investment and then recovers the cost from users. The RAB requires assessment of proposals when they occur and places more discipline on price determination. There is a danger that money collected for renewals will be spent irrespective of the merits of the investment. Far greater demands are placed on regulatory authorities by renewals annuities. A danger to the public of the RAB approach is that faced with a major capital expenditure, government will succumb to pressure from irrigators and fund unwise investment.

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<sup>6</sup> Dwyer (2005) points out that metropolitan water systems were financed by loans. These loans have been paid. Dwyer refers to Professor Bob Walker's conclusion that there are not many businesses where you can get your assets given to you by taxpayers and consumers and then turn round and demand a return on money you never had to outlay.

## **Water trading and its advantages**

Water ‘ownership’ belongs with the Crown. The traditional system of water allocation tied the entitlement to use irrigation water to land. Allowing transferability of the entitlement to use water since the early 1990s has encouraged the use of water in ‘higher value’ uses. Water trading has led to greater economic efficiency in water use. Higher value use has often been thought of carelessly as production of higher value commodities. This is a narrow view of the economics of farm production in similar fashion to the superficial approach to water use efficiency, discussed earlier. Product price is just one determinant of the value of water. The marginal value of water on a farm also depends on fixed inputs in the short-run – capital, land and labour, technology and prices of substitute inputs. Farmers choose production techniques and plan their output taking all factors of production into account. A higher value use from the viewpoint of the farmer is not necessarily producing higher priced products. This is confirmed by actual experience of water trading. Water has not always moved from low value to high value commodities.

A legacy of closer settlement policies in the older irrigation districts is many small farms of low productivity. But there is a lot more to structural adjustment than mere consolidation of blocks and increasing size per se. Flexibility in the use of all resources is required, especially labour. Saving labour is often more important than saving water for investment in new techniques of production. Timing of exit is of the essence for individual farmers planning to leave agriculture at some time. Water trading is a valuable tool in structural adjustment because it gives farmers more choices and control over the use of their assets. Some farmers, for example, have gained from selling water on the permanent market and continuing farming by buying on the temporary (annual) market.

Despite populist claims about the emergence of water barons with water trading, water trading is far more equitable and supportive of the aspirations of small irrigators than the previous rigid system (Musgrave 1996).<sup>7</sup> Trade in water also allows irrigators to manage the risks of wet and dry years. Low flexibility users with perennial plantings will be buyers in dry years and sellers in wet years. Higher flexibility users with annual crops will be sellers in dry years and buyers in wet years.

Attitudes to water trading are subject to bias, from different directions. There is still knee jerk opposition to trade from a few who do not like the adjustment pressures arising from market processes. Frequently, there is self-interested opposition to trade from those who want to restrict trade in order to lower prices. This is because the growth objectives of buyers rather than sellers are favoured by low prices for water, at least in the short-term. Almost by definition, buyers and large users of water are influential in irrigators’ organisations. This

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<sup>7</sup> Talk of ‘water barons’ emerging in irrigation industries was common following one-sided and ignorant television programs in 2002-3. Monopoly power in irrigation water (as distinct from water infrastructure) is out of the question because of the risks involved. Most water is used in industries where Australia is a price taker on world markets. Monopolists would also need to be weather prophets to manage the substantial financial risks of investing in water. A putative water baron could easily become money barren.

makes excessive reliance on the contemporary fashion for ‘consultation’ and ‘community engagement’ in sorting through the maze of remaining restrictions on trade – interstate, intertemporal, interregional, permanent versus temporary– extremely problematic from the standpoint of the public, and many irrigators.

Extensive research by Bjornlund (2003) using price and quantity data on water trade has established that trade in water has behaved in accord with the predictions of economic theory for inputs to production like water. Bjornlund analysed prices on temporary and permanent markets and found that the prices were subject to the same underlying causes – expected product prices, and substitutes for irrigation water like natural rainfall, or grain in the case of the dairy industry. Temporary prices were more variable because of weather influences.

The upshot of Bjornlund’s findings is that many of the remaining restrictions on trade are futile. In practice, farmers are finding ways around restrictions. The economic efficiency consequences of restrictions in these cases are then small. For example, it makes as much sense to think of permanent trade as a substitute for temporary trade as vice versa. Restrictions on permanent trade with unrestricted trade in temporary water have minor effects. Leasing of water is now common, formally or informally. Transactions in land can be substituted for transactions in water. The issues for public policy are the transaction costs of trade and any environmental effects of trade. Existing restrictions add substantially to the transaction costs of trade. Fixed transactions costs fall heavily on small water trades. Large buyers and sellers have brokers acting on their behalf to handle the paper work. Getting rid of some restrictions on trade is a question of equity as well as economic efficiency.

After years of a rigid control, hesitancy was inevitable in the evolution of water trade. Some constraints placed on water trading have bad effects. Intertemporal trade (carryover) is allowed in southern New South Wales but not in northern Victoria. Autumn irrigation of annual pastures has stopped in New South Wales but continues in Victoria because there is no opportunity to use water in the following spring or summer. Only limited progress has been made on separating the right to own water from the right to use water. Water ownership should be allowed for third parties increasing the liquidity of the water market. There is no more reason to tie water ownership to owners of irrigable land than there was to tie water use to particular parcels of land. Third party ownership of water would also have the advantage of allowing environmental groups to own and use (or not use) water.

Permanent interstate trade has been allowed on a trial basis between Victoria, New South Wales and South Australia in pumped districts from Nyah to the Murray Mouth. The trial has demonstrated that all three states can manage environmental clearances for large horticultural developments. Continuing restrictions on permanent interstate trade between Victoria and New South Wales outside the Mallee are an artefact of institutional arrangements. Companies hold the water licence on behalf of the individual farmer shareholders of the privatised irrigation companies in New South Wales. Existing articles of association of the companies preclude disposal of permanent water. Freeing up this market would require legislative changes. Taking a long view, directors of these companies will want to sell permanent water at some time.

Differences between states in the way various aspects of irrigation are administered such as pricing should not be allowed to impede interstate trade. Interstate trade is free, as it is supposed to be, in a multitude of goods and services that are administered differently in different states, in the public and private sectors. This is akin to poor arguments supporting stringent anti-dumping provisions in world trade.

Further opposition to trade comes from water authorities and local interests because of fears of 'stranded assets'. Stranded assets may be off-farm infrastructure (for example, channels) or on-farm delivery systems. More notice has been taken of this issue than justified. Generation of some stranded assets is just what advocates of water trading were looking for. Irrigation was often located in the wrong places because of initial carelessness in testing for soil types and so on, causing environmental damage through water logging and salinization. Shifting water to safer locations is a plus not a minus. Stranded assets are more like a success indicator than a valid reason for slowing down the transfer of water through voluntary exchanges. Proposals for 'exit fees' to be paid when water is shifted from one area to another have no counterpart in other areas of commerce. Plenty of other assets are left 'stranded' by social and economic changes. Stranded assets in irrigation reflect the fact that water is being used more profitably elsewhere.

The transition from plan to market is not easy. Gradualism is indicated. Liberalisation of the water industry in Victoria left corporatised rural water authorities with an obligation to supply those already connected to the network. Some parts of the irrigation system now need to be closed down because water has traded away and remaining infrastructure needs to be maintained, or even replaced. An absolute duty of supply threatens the financial stability of water authorities, and remaining irrigators. This is a challenge to price regulators because some irrigators may prefer to avoid closures by paying more and keeping facilities operating. Once infrastructure is sunk, the appropriate rule is to charge for variable costs including agreed standards of maintenance. Negotiation between water authorities and irrigators is the best way of solving problems of stranded assets.

A raft of studies has indicated that off-farm engineering and on-farm investments in water use efficiency are a costly way of finding water savings (ACIL Tasman 2003; Goesch and Heaney 2003; Gyles 2003). Buying water for environmental purposes is an attractive proposition in many circumstances, that is, if the proposed environmental uses of water have been properly analysed, technically and economically. If the environment is to have defined rights to a share of water, the next interesting question is how environmental entitlements and environmental trade should be managed? An independent environmental manager would seek to trade temporary water between seasons taking into account wet and dry years and timing requirements of different environmental strategies. It is not clear whether present provisions of the National Water Initiative would allow temporary trade, because the agreement is written in terms of permanent water entitlements.

Politicians and environmentalists resist buyback of licences and development of trade in environmental water. Politicians responsible for the environment do not want to account to their colleagues for environmental programs. Environmentalists know that public support would diminish if it were known environmental flows came at substantial cost. Ambit claims for the environment are easier with budgetary and other costs hidden from view.



## **Access to water – the case of Lakes R Us**

Liberalisation of the irrigation industry and the introduction of water trading have had predictable consequences. Greater private rights to water imply that irrigators will seek greater influence on the actions of others that they regard as having deleterious effects on their operations, or potential operations. Musgrave (1996) anticipated that the initial success of water trading would lead to development of markets in other scarce resources such as storage airspace.

The National Competition Council is now considering an application by Lakes R Us Pty Ltd for access to storage airspace in the Snowy Scheme, confirming Musgrave's prediction. The application is opposed by Snowy Hydro Limited, the corporatised operator of the scheme owned by the States of New South Wales and Victoria and the Commonwealth Government. The New South Wales Government is the majority owner of Snowy Hydro and the principal participant in the dispute. Victorian irrigators, as mentioned, cannot carryover water. How it might be stored does not enter their thoughts.

As a matter of engineering, the Snowy Scheme is a separate Snowy-Murray development and a Snowy-Murrumbidgee development. New South Wales' irrigators draw water from both. The political compromises necessary to get the scheme established required legal sleights of hand using the defence powers of the Commonwealth, in peacetime (Watson 2005). This case is one for legal aficionados rather than tyros of agricultural economics. Its legal significance is far greater than its economic significance.

The following comments are based on the NCC Issues Paper, submissions by Lakes R Us and Snowy Hydro obtained from the website of the NCC, plus a perceptive opinion piece by Alan Moran published in the Melbourne Age on July 4, 2005. There is no attempt to assess the legal arguments and precedents that have to be considered by the NCC. Nor is there any attempt to judge whether Lakes R Us would have a successful business in the event its application were successful.

Moran's article goes well beyond the access issue pointing out quirks in the electricity market post-deregulation, especially following the introduction of renewable energy certificates, as part of the Commonwealth response to greenhouse/climate change. It turns out it can sometimes pay Snowy Hydro to pump water uphill (with a pointed stick?), using coal-fired off-peak electricity to earn extra renewable energy certificates from the high-priced peak electricity that is generated when water later flows downhill. Snowy Hydro can use almost two times as much coal-derived energy as it produces in subsequent generation of hydroelectricity. This is not what the renewable energy policy intended and, as Moran suggests, is anomalous and wasteful deserving separate investigation irrespective of any aspirations of Lakes R Us. On the numbers given by Moran and other information in the NCC Issues Paper, the profits obtained by Snowy Hydro from machinations involving renewable energy certificates would swamp revenue at stake in the application of Lakes R Us.

It is hardly surprising that Snowy Hydro seek to preserve maximum flexibility in generating electricity while meeting minimum obligations to supply water to irrigators. Prima facie, Snowy Hydro has no incentive to actively develop a storage function. Who owns the water in the scheme is an overriding question? Do the rights of irrigators to use water apply on both sides of the dam wall?

The Issues Paper sets out the tests and precedents that need to be considered by the NCC. these consist of a mixture of complex legal arguments that also require economic judgement. Hydroelectricity generation is usually described as a ‘non-consumptive’ use of water. How that fits in with Snowy Hydro’s claim “that the Council’s power to make a recommendation to the Minister in respect of declaration of the water storage and transport service is prohibited because it is part of a production process” (NCC 2005, p.11) is a challenging question? A physicist might give different (correct) answer to a lawyer.

Some of the arguments being put by the parties to the dispute stretch common sense and lay intuition. Thus, Snowy Hydro argues that obscure swamps near Griffith, or untested CSIRO technology to store water in aquifers, are potentially alternative storage possibilities that could substitute for the much larger Snowy Scheme.<sup>8</sup> It is hard to believe that “it would be economic to develop alternative water storage and transportation facilities” (Snowy Hydro 2005, p.2)

The ‘promotion of competition’ test raises issues that are more within the purview of economists. Snowy Hydro already lends water to irrigation companies in New South Wales, effectively providing a storage function. Snowy Hydro definitely is in the box seat in price negotiations over these transactions. Presumably, this was a driving force behind the creation Lakes R Us.

Formal or informal leasing of water provides intertemporal flexibility to irrigators. As stated in the preceding section, irrigators have a range of water trading, production, financial and marketing strategies available for risk management. Would one more make much economic difference?<sup>9</sup> But is that the point? If Lakes R Us loses money doing something judged legal, does it matter how the risk management/storage function is performed?

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<sup>8</sup> Lakes R Us throw in ‘climate change’ as if it were a trump card at a couple of points in their submissions, reminiscent of the Victorian Government White Paper on water. Even if perfect forecasts were possible for the Australian climate, it would be a small part of the story. Effects of climate change on agriculture in other countries are just as important to irrigators. A flexible irrigation policy is needed for all contingencies, irrespective of the outcome of climate change. Snowy Hydro plays an environmental card of sorts saying, “to allow the release of water to be subject to the arbitrary decisions of private individuals would be contrary to the public interest of protecting the environment”. (Snowy Hydro 2005, p.4) Even the NCC indulges itself with a rhetorical flourish by saying “the Snowy Scheme is recognised as one of the seven civil engineering wonders of the modern world” (NCC 2005, p.25). Like the ancient wonders, good to look at and serving symbolic and spiritual purposes.

<sup>9</sup> The argument evokes the idea of a ‘law of constant risk’ from the literature on agricultural finance. Farmers have a range of risk management instruments. If one is subject to change, then it is possible to adjust other instruments to restore the desired level of risk.

## **Concluding comments**

Water has frequently been flavour of the month in Australia, and a brackish flavour at that. Most of the irrigation infrastructure now in place would not have been constructed without the fervour for national development based on irrigation. A reckless approach to investment in irrigation was followed in the past, resulting in a situation where Paterson (1987) judged that only twelve per cent of the land in irrigated production in 1987 would have been developed on economic criteria.

An objective of this paper has been to point out that all is not what it seems in contemporary water policy. Some progress has been made in the reform of irrigation but there are outstanding issues in irrigation and urban water. Raising revenue rather than resource allocation has distorted the agenda of microeconomic reform in urban water pricing. An erroneous concept of water use efficiency has pervaded water policy discussion and distorted the water research agenda. Prospects for water saving through investment in irrigation infrastructure have been grossly exaggerated.

More progress has been made in irrigation water pricing. Bulk water for irrigation is now priced rationally in the major irrigation states of Victoria and New South Wales. The approach to water pricing and regulation of groundwater and water taken from unregulated streams is still deficient. Richard Pratt was correct in recognising that the priority given to measurement and monitoring of water use in Australia is insufficient. The standard of groundwater administration is poor. Groundwater and surface water are continuous. Managing one and not the other is a travesty of water administration. For water pumped from unregulated streams and groundwater, metering is the exception rather than the rule.

A turning point in the retreat from the pro-irrigation bias of the expansion phase of irrigation scheme was the controversy over Commonwealth support of the Ord River Scheme in the early 1960s. It was demonstrated that the scheme was not economically justified although the support given to the Ord did achieve its political objectives. Perhaps some progress has been made in public understanding of the water industry. The political success of the supporters of the Ord River Scheme was not repeated in the bizarre far canal episode of early 2005, when the Western Australian Opposition tried unsuccessfully to persuade the electorate to support an extravagant proposal to transport water over large distances to supply urban water to Perth.

A negative influence on improvement of water policies has been excessive reliance on consultants' reports instead of strengthening the policy development capacity of public institutions. Grants-based funding will not deliver on the expectations of the community for improvement environmental and water management. The Commonwealth and state governments are getting in each other's way offering grants for water saving. The guidelines for the Water Smart Australia Programme that are part of the National Water Initiative (National Water Commission 2005) inspire no confidence. The same goes for the Victorian Water Trust, whose approach to investment was described as 'holistic' in the 2003 Green Paper on water that proceeded the Victorian Government White Paper.

Market-based policies hold out the best hope for improvement in policy development. Command and control mechanisms are seldom applicable for irrigation because most environmental problems are non-point. Modern theories of the economics of information are pertinent. Policy-makers do not know enough about the economic and technical dimensions of protecting and repairing the environment to make well-informed decisions. Information is unequally held between the parties to environmental disputes. Decision-making can be improved with an experimental approach designed to bring together these separate pieces of information.

A younger generation of professionals is moving in the right direction. It is a pity that politicians and other agents of influence cannot keep up. Even in the modern era, politicians find it difficult to restrain themselves when under pressure from irrigation interests. A gold-plated replacement of Torrumbarry Weir on the Murray River downstream of Echuca was built in the mid-1990s, when lower-cost options based on pumping were feasible for parts of the system supplied from Torrumbarry. In the event, much of the water that was previously used for irrigated pasture has traded from the Torrumbarry district to horticultural and viticultural developments in Victoria and South Australia, based on direct pumping. The Victorian Government also supports the (well-named) Deakin Project in Sunraysia; a project intended to be mainly based on irrigated grape production. Consultants' budgets of potential on-farm development were based on (irrigated) wine grape prices of \$700 per tonne (SMEC and Psi-delta 2001). Current prices are lucky to be half that. More to the point, private investors are capable of making investments in large horticultural projects. The role of government should be restricted to environmental approvals. There is no economic case for direct involvement.

Further afield, the Government of Queensland is proceeding with construction of the Paradise Dam on the Burnett River against the advice of officials. Again, there was shoddy analysis by consultants that either ignored or completely misinterpreted demand considerations. The dam was supposed to be justified by production of high-priced fruit and vegetable products for the Australian domestic market. These markets are already adequately supplied from nearby parts of Queensland. Additional output of fruit and vegetables would depress prices. In South Australia, the record is also mixed. It has taken aeons to act on polluting and unprofitable government-controlled irrigation on dairy farms on the Murray Swamps, in recreational areas close to Adelaide.

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