

Murray-Darling Basin Royal Commission

Submission

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1. This submission consists of brief comments prompted by reading the Terms of Reference and the Issues Paper available from the Royal Commission website, together with seven attachments, consisting of five papers written over more than a decade, and two scanned newspaper articles from 2007 that help make a point about the questionable origins of the Murray-Darling Basin Plan and the nature of water policy in Australia.
2. If there is a distinguishing feature of this material, it is my long-held belief that the MDBP is first and foremost a mistake and creates a set of problems additional to those it seeks to correct. In summary, this is because planning is an inferior way of dealing with uncertainty compared with an incremental or experimental forward-looking approach. The argument is elaborated in the attachment *MDBP 2018* and was anticipated in attachment *Water plan 2007 Connections*, written following the release of the Howard-Turnbull National Plan for Water Security of January 2007.
3. Not just uncertainty, the Water Act 2007 (Cwlth) is so vague that the existing MDBP developed as a requirement of the Act is only one of many that might have been put forward under different interpretations and empirical judgements about matters set out under C on the first page of the Terms of Reference for the Royal Commission.
4. Section f of C is notably problematic. The notion of social, economic and environmental outcomes would be difficult enough if the three concepts were contemplated separately. The idea that all three can be 'optimised' without assigning arbitrary (politically determined) weights is unachievable.
5. Further, on reading the Issues Paper of the Royal Commission it turns out that the sustainable diversion limits underpinning the MDBP, which might have been thought the product of (albeit again difficult) statistical procedures, include adjustments for socio-economic factors.
6. It is thus unsurprising that the final version of the MDBP has 'adjustment mechanisms', which some would consider more like escape clauses, fudge factors and loopholes. This ensures a costly bureaucratic nightmare, and, if the worst faults of the MDBP are not corrected, could persist for many years to come. Indeed, so called supply measures and efficiency measures, which are not easily understood, allow water recovery targets to be pushed in different directions.
7. In particular, as pointed out in attachment *PC Issues Paper 2018*, the idea of supply measures makes some sense for non-flow related environmental actions for (upstream) wetlands and riparian areas but is more or less irrelevant for the flow-related issues of the Lower Lakes, the Coorong and the Murray Mouth.
8. The MDBP might be thought of as a backdoor way of reducing the existing Cap on diversions from the MDB, meaning more water reaches South Australia. But the MDBP is an expensive and indirect way of going about an objective that should

be dealt with on other criteria. As outlined in *MDBP 2018*, past arrangements were working satisfactorily and only required rejigging and more resources. By exacerbating interstate tensions, the MDBP puts those achievements at risk.

9. The most damaging economic and fiscal aspect of the MDBP is the dominant position of public expenditure on off-farm and on-farm irrigation infrastructure. This statement is elaborated in attachment *MDBP 2018*. Surprisingly, the Issues Paper for the concurrent inquiry into the MDBP by the Productivity Commission is deficient by not highlighting the differences between public infrastructure investment and buyback as instruments for water recovery. From the usual perspective of the PC, the vexed question of whether infrastructure expenditure is actually water saving for hydrological reasons is second order.
10. A failing of the Issues Paper for the Royal Commission is to mention the importance of the MDBP to the two million residents of the MDB without acknowledging that the taxpayer component of more than twenty million other Australians are paying around \$13 billion for the privilege of developing the MDBP, and will continue to do so in its tortuous and tortured implementation.
11. Hardly likely at this stage of its deliberations, but the Royal Commission will have to confront at some time the widespread parochialism, romanticism and fundamentalism, as distinct from a national perspective and hard-nosed empiricism, that has long characterised irrigation and water policy in Australia. As indicated in attachment *ACCC Paper*, written when the Millennium Drought was in full swing before the MDBP was conceived, these facets of the water policy debate have long been displayed in attitudes towards irrigation but similar sloppy attitudes have now found expression in the slogans and unreasonable expectations of the political environmental movement. The sorts of questions that need to be considered in environmental policy for the MDB are introduced in attachment *MDBP 2018*. A more nuanced approach to environmental policy is suggested in *WATERING VICTORIA 2008*.
12. The political problem of the MDBP is the well-known dilemma whereby the limited interest of a large number of people a long way from the action, in this case those interested in environmental improvements to the MDB, has to be balanced against the substantial interest of a small number of people close to the action whose major interest is commercial irrigation. This puts a lot of strain on institutional arrangements.
13. Understandably, the interests of the few generally prevail. Skeletons abound in water policy cupboards. No Basin State is blameless. The Commonwealth Government does not have the technical expertise of the states whatever its financial power. The situation is not helped by the long-term marginalisation of the central agencies of government from the water policy debate, the partisanship of a few Basin State officials in water-related departments, and the malign influence of lobby groups (stakeholders?) supporting the narrow interests of irrigators and unsophisticated environmentalists. The *scanned items* forming part of this submission are a chilling reminder of this state of affairs.
14. The Royal Commission will perform an important and useful service by sticking to the aspirations expressed at point 23 of its Issues Paper.
15. Finally, all those associated with the Royal Commission would benefit from reading the 2014 novel by Anson Cameron, *The Last Pulse*.

Man, Plan and the Murray-Darling Basin

Alistair Watson*

Introduction

The Murray-Darling Basin Plan (MDBP, or ‘the Plan’) of 2012 is intended to tackle environmental damage caused by too much irrigation in the Murray-Darling Basin (MDB). Recently, the MDBP has run into political difficulties. Many of the difficulties of the MDBP could have been predicted, and avoided. The MDBP was always problematic given its origins in the National Plan for Water Security of 2007 (Watson 2008) and the Water Act 2007 (Cwlth). Following a change of government, the programme was renamed the Water for the Future plan.

Initially, the plans differed according to the emphasis given to the instrument of recovering water for environmental repair, infrastructure investment or buyback. The principal focus of the 2007 version was public investment in irrigation infrastructure whereas the Water for the Future plan favoured buyback. Both versions, however, supported a planning approach whereby a water recovery target for the environment was set in advance as part of a comprehensive plan rather than following an incremental or experimental path to environmental improvement. Moreover, both Governments agreed that the Commonwealth should exercise more influence on the content and direction of water policy for the MDB.

In the event, the Water for the Future approach soon reverted to the National Plan for Water Security stance. This followed release of a Guide to the Plan in October 2010, which argued that large reductions in irrigation were needed to meet environmental obligations implied by the Water Act. The Guide was confronted with a hostile reaction, most obviously demonstrated when copies of the Guide were burnt in the major New South Wales irrigation centre of Griffith. In effect, the reaction of irrigators bolstered the political appeal of public investment in irrigation infrastructure, instead of a simpler approach, gradual buyback of irrigation licences.

These events revealed another confusing aspect of the National Plan for Water Security, its successor programme and the Water Act; that is, an over-simplified approach to the notion of environment, as if a multi-faceted concept could be described in a single word.

The final version of the Plan is thus the outcome of an ambiguous combination of objectives and instruments. Inevitably, it is a political compromise with what amount to escape clauses. The water recovery target, the cornerstone of the Plan, can be adjusted up or down under certain circumstances (Productivity Commission 2018, p.11).

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Arguably, the genesis and development of the Plan has made the politics and administrative arrangements of the MDB even more tortuous. Other issues that have arisen since implementation of the Plan began were less predictable. These are not so much a consequence of the Plan *per se* as the result of independent and opportunistic actions, or inaction, by individual states or territories within the MDB. One example is the New South Wales experience in the Northern Valleys of the MDB where water theft by some irrigators was not detected and punished. While this is not the fault of the MDBP, it has reduced public confidence in water policy (Matthews 2017).

In addition, the MDBP is often a scapegoat. Irrigators blame the MDBP for unrelated events in commodity and water markets, especially in the modern irrigation era with water trading. Irrigated commodities have a life of their own on agricultural markets. Technical change does not occur at constant rates across commodities. Water is traded in and out of irrigation districts according to on-farm performance and prospects of commodities on world markets, irrespective of the MDBP.

Plan or administrative process in water policy – dealing with uncertainty?

Because the MDB is characterised by so much risk and uncertainty, it is argued in this paper that a prescriptive plan should not have been attempted in the first place. It was ambitious to try and set out an environmental strategy in advance. Disciplined public administration was overtaken by the temptations of finding solutions to what in truth are intractable issues. Further, these issues were already being tackled with varying success within individual jurisdictions of the MDB and the (then) Murray-Darling Basin Commission (MDBC).

Climatic uncertainty (the extreme variability of rainfall and runoff in the MDB and its catchments) and marketing uncertainty affecting agricultural commodities were well understood from mainstream critiques and empirical research on the economics of Australian irrigation (Davidson 1969, Cummins and Watson 2012). The research concluded that one mistake of irrigation enthusiasts was to concentrate on water as an input to production without thinking much about other inputs – labour, land and capital.

Paterson (1987) estimated that only twelve per cent of the land in irrigated production in 1987 would have been developed on strict economic criteria. This does not mean that existing irrigation infrastructure should not be used. For similar reasons, it is necessary to account for the sunk costs of irreversible environmental changes brought about by irrigation (Cummins and Watson, 2012, p.11).

Managing irrigation in southern Australia was made more difficult by closer settlement policies. While the older irrigation areas still have some sub-economic farms, successful irrigation is practised widely throughout the three principal states of the MDB (New South Wales, South Australia, Victoria). There are also many attractive towns in irrigated areas, and associated tourism. Investment in irrigation has provided numerous recreational opportunities for locals and visitors alike.

The mistake of thinking mainly about water as an input to irrigated production seems to have carried over into the development of the MDBP. Further, the Plan was put together in the aftermath of the Millennium Drought of the early twenty-first century, not dissimilar to the circumstances that encouraged early interest in irrigation.

It is not well understood that substantial conceptual and empirical uncertainty surrounds environmental policy. There is little doubt that with increasing incomes and knowledge there is greater interest in environmental issues within the general community. Nor should there be much argument that by the 1980s and 90s that irrigation in the MDB was approaching its hydrological, environmental and economic limits. By then, irrigation had reached what Watson and Rose (1980) and Randall (1981) described as 'the mature water economy' because the best sites for dams were developed and water extractions for irrigation were approaching sustainable limits compromising downstream users, including other irrigators. In fact, policies were emerging on a project-by-project basis to deal with environmental issues under existing administrative arrangements. Salinity interception schemes were initiated as far back as 1985. A cap was applied to extractions from the MDB in 1995. The MDBC had a Floodplain Wetland Management Strategy by 1998. A Living Murray Programme to recover 500 GL from the MDB negotiated in 2002 was based on five 'icon sites', wetlands and riparian areas judged worthy of special protection.

Nevertheless, there are many unanswered, and some unanswerable questions about environmental policy for the MDB. This is despite a lot of effort by policy-makers and disciplinary specialists to address these questions. What priority should be given to the MDB *vis-à-vis* environmental concerns in other parts of Australia, agricultural and non-agricultural? What are the objectives of environmental policy for the MDB? What should be the balance of flow-related and non-flow objectives? What instruments are best suited to achieve those objectives? How should objectives be weighted in the design of projects? What are the consequences of spatial aspects of the MDB – with respect to upstream/downstream issues and proximity of different parts of the MDB to population centres? What of temporal issues, since management of water storages following irrigation has changed river flows from a winter-spring peak to a summer-autumn peak (Crane and Gawne, 2010). Is there a clear distinction between the aesthetic, recreational and biological aspects of the MDB and its environment? Can information about consumer preferences for different attributes of the MDB environment (fish, avian fauna, in-stream and riparian phenomena, wetlands etc.) be effectively combined in project selection and design with scientific information on these attributes? What are the policy consequences of irreversible changes in the MDB following so much irrigation development? Or put slightly differently, what should be the starting point for analysis? Can a desired end-point be determined, or reached? What are the boundaries of public and private responsibilities for the environment? When public responsibilities are recognised, what is the appropriate division of functions and funding between the Commonwealth, state and local governments, and catchment authorities?

Even more difficult conceptually is the empirics of environmental policy for the MDB. Is the relationship between environmental flows and environmental benefit linear, or

approximately so? What are the implications for benefits and costs of the sequencing of decisions intended to improve various aspects of the MDB?

These questions, probably incomplete, challenge the wisdom of the planning approach adopted in the development of the MDBP. Instead, the complexity and multi-attribute features of environmental policy-making for the MDB strengthen the case for a forward-looking approach building on existing knowledge to discover and generate more information.

Responsibility for working out the details of the environmental component of the MDBP rests with the Basin States, in accordance with their Constitutional responsibilities for water management. Water Resource Plans (WRPs) are being developed for 36 areas across the MDB. The process is proving difficult with only one WRP accredited after five years (Productivity Commission 2018, p.19). This is hardly surprising since the MDBP sets out 54 requirements for the accreditation of WRPs.

Uncertainty also applies to the politics of the MDB. The MDB is beholden to deep-seated interstate rivalries that exceed even those applying to normal conflicts within the Australian Federation. Often, these disputes are conflated with the local politics of particular irrigation areas and mercantilist sentiment concerning the respective irrigated products of the states.

It follows that there is a link between the emphasis given to flow-related environmental objectives and the practical politics of the MDB. South Australia is at the end of the system and more concerned with final flows – urban water for Adelaide and industrial use of water in South Australia are important. The Plan has some direct implications for Melbourne but none for Sydney or Brisbane, apart from the concerns of their citizens. The Plan also affect the states differently because of the different composition of output and the way changes in technology affect the profitability of farming systems.

Two recurrent themes muddy popular discussion of water and environmental policy for the MDB. First, there is pre-occupation with the commodities produced on irrigated farms. Rice and cotton grown in New South Wales and Queensland are favoured targets for criticism from the southern states. What is grown on farms is a decision best left to farmers and should not be an issue for public policy. What is important is the amount of water available for irrigation. Irrigation has to fit into farming systems not the other way round. In fact, rice and cotton as annual crops are suited to variable water supplies. Cropping has the advantage of significant economies of size and elastic demands for exports unlike the dairy and horticultural industries. Economies of size are limited for dairying, the principal irrigated industry in Victoria. Second, ahistorical claims about the estuarine status of the Lower Lakes and Murray Mouth with the confident and unproductive suggestion that the barrages be removed and the Lower Lakes flooded. The barrages were installed because of substantial extraction of water for irrigation upstream. Removal of the barrages would make the water too saline for irrigation, urban and industrial uses in South Australia.

The development of the MDBP could be interpreted as rewriting the existing water sharing agreement between the states in favour of South Australia. The existing cap on water extractions from the MDB has been revised upwards by calculating new sustainable diversion limits (SDL). Increasing the cap to allow more water for the Lower Lakes and at the Murray Mouth might be justified on other criteria. The lengthy and costly procedures of the MDBP were an expensive way of approaching the issue.

Public investment in on-farm and off-farm infrastructure versus buyback

The dilemmas now facing water policymakers are a textbook example of how difficult it is to recover from poor decisions. Irrigation development in Australia was not based on rational calculation. Eventually, there was too much irrigation in Australia for economic and environmental reasons. It is proving as difficult to exercise rational decision-making now that irrigation in the MDB has entered an overdue contraction phase. It is a matter of record that from the early days of irrigation poor decisions about water policy were often taken deliberately, ignoring evidence and advice (Gordon and Black 1982, Davidson 1969). More recently, former Treasury Secretary Dr Ken Henry was in bother for questioning the cost and direction of water policy following release of the National Plan for Water Security. The ('decimal' or 'metric') National Plan for Water Security, presented in 2007 as a ten-point plan to spend \$10 billion over ten years, was developed without any input from Treasury or the Department of Finance (Quiggin 2012, p.52). Subsequently, the cost has increased to \$13 billion.

The most contentious aspect of the MDBP is its emphasis on public investment in off-farm and on-farm irrigation infrastructure to deliver water savings to increase flows and for environmental benefit within the MDB – upstream, downstream, and at the Murray Mouth. Infrastructure investment, however, is a dubious policy for reasons of public finance and, less obviously, doubts whether investment in irrigation infrastructure results in water saving as claimed, and believed in most instances.

With respect to public finance, most claimed savings from infrastructure investment cost more than the prices of water revealed in markets for water in the MDB. Buyback is a cheaper option for water recovery. Water savings in the Connections Project in the Goulburn Valley of Victoria will cost \$10,000 per megalitre on completion – around five times the going price for water entitlements - if it achieves its costs and savings targets! This is a high price for the public to pay for the improved service and labour savings enjoyed by irrigators connected to this modernised irrigation network. The project has also had negative effects on communities outside the network.

Then there are information-related and equity considerations for subsidised on-farm infrastructure. Irrigators are best placed to choose irrigation techniques for their own farms. Both labour saving and water saving will be accounted for in these choices. Energy costs are important for pumped irrigation. Subsidised investment discriminates against irrigation industries (and regions) that have already adopted modern methods of irrigation compared with industries where new techniques are being developed.

Further, what is the justification for irrigated farmers having their capital requirements subsidised when other farmers, and small businesses generally, pay their own way? The same goes for off-farm irrigation infrastructure. Other farmers meet the costs of industry specific infrastructure essential to the conduct of their businesses – grain handling and meat processing facilities spring to mind.

There is also the issue of the costs of irrigation infrastructure, on-farm and particularly off-farm. In the long run, farmers will struggle to pay maintenance and refurbishment costs of inflexible irrigation equipment that would not have been installed in the absence of the MDBP. It is possible that the burden will be such in the future that irrigators will have to be excused maintenance costs on inflexible irrigation infrastructure, especially when water has traded away to other districts.

A further equity issue associated with publicly funded investment in infrastructure is that irrigation industries and regions experience different time paths of commodity prices, water availability and technical changes in irrigation practices. Government intervention at a point in time will favour industries and regions best placed to take advantage of government support. Greenfields operations are favoured *vis-à-vis* established districts where retrofitting is difficult and expensive.

It seems obvious that buyback is preferable to publicly funded investment in infrastructure. Water trading is highly developed in Australia and the property rights of irrigators are well defined. Pointedly, water purchases for the environment improve the financial position of all irrigators. Buyback of irrigation entitlements does not mean sellers are out of business. Irrigators may choose to manage risks by buying annual water allocations. A more difficult issue is the rate at which water is acquired via buyback and the way that water is managed. Buyback has also proved difficult to administer in the Northern Valleys of the MDB. Highly variable overland flows are difficult to measure and convert to an equivalent long-term average yield basis so that government purchases can be satisfactorily valued and executed.

The idea that water is actually saved per medium of infrastructure investment is a stark example of the fallacy of composition. Individual farmers may save water via their choice of irrigation technique although, as mentioned, the choice is influenced by the cost of other inputs, especially labour and energy. These savings cannot be aggregated for the MDB as a whole. For with the exception of evaporation and water that drains to saline aquifers, irrigation water that is supposed to be wasted by seepage and leakage eventually returns to the river system from which it is taken, or is available in groundwater. One irrigator's tail water (return flows) is another irrigator's irrigation entitlement or contributes to environmental flows (Cruse and O'Keefe, 2009; Perry 2009). Infrastructure investment, in effect, shifts water in the landscape rather than saves water for environmental purposes. Despite these observations, or maybe because of them given the traditions of Australian water policy, buyback has been suspended and plans are afoot to find new infrastructure projects aimed at delivering environmental water more efficiently in the southern end of the MDB. If this were actually possible, it is astonishing that the projects had not been identified and implemented already.

Recent developments

Commonwealth administration of water policy is divided between three agencies: the Murray-Darling Basin Authority (MDBA) set up in 2007 under the Water Act 2007 (Cwlth), the Department of Agriculture and Water Resources (DAWR) and the Department of Environment and Energy which includes a Commonwealth Environmental Water Office, where the Commonwealth Environmental Water Holder (CEWH) is located. In summary, the MDBA is responsible for development and implementation of the MDBP; DAWR manages several programmes for off-farm and on-farm infrastructure investment, and the CEWH manages buyback.

After a lengthy process and change of strategy following release of the Guide, the 2012 Plan proposed recovery of 2,750 GL of water from irrigation in the MDB over the seven years to 2019. This was based on the Baseline Diversion Level of 2009. At the end of January 2018, it is claimed that 2106 GL had been recovered– 1227 GL purchased from irrigators by tender, 703 GL from infrastructure projects, 162 GL from state infrastructure projects and 5 GL from other sources.¹

The MDBP allows the recovery target to be adjusted up and down (Productivity Commission 2018, p.11). Under the adjustment mechanism, the surface water SDL in the southern Basin can be increased up to 650 GL per year, reducing the recovery target under the Plan, if it can be shown that engineering works and measures can achieve equivalent outcomes with a lower volume of environmental water. Given the complexity of environmental policy-making discussed above, this is a recipe for conflict between the MDB states. This is because the idea of supply measures is more relevant to water saving that occurs when water is delivered more effectively to wetlands, riparian areas, fish ways and the like. It is less relevant in the context of dilution flows for the Lower Lakes, and flows at the Murray Mouth

Conversely, the SDL can be reduced, increasing the recovery target, if additional volumes of water can be recovered via measures that improve the efficiency of on-farm and off-farm irrigation. The questionable prospects and rationale for infrastructure investment were discussed in the previous section. In fact, South Australia signed on to the Plan in 2012 in the expectation that an extra 450 GL could be found. The extra 450 GL was supposed to be achieved under the Basin Plan with 'neutral or improved socioeconomic benefit'. Hardly surprisingly, the states have different views on what neutral or improved socioeconomic benefit actually means, if anything.

The adjustment mechanism has been invoked in agendas to revise the recovery target downwards. The MDBA conducted studies in the Northern Basin in 2016 that purported to show negative effects on employment in remote towns in Queensland and New South Wales and recommended a reduction in the amount of water to be acquired from the Northern Basin. This was later voted down in the Senate, partly because the Australian

¹ These data are from the CEWH website. Very similar data are reported in the Issues Paper of the Productivity Commission (2018, p.16).

bicameral system of government and federal organisation of political parties mean that small states like South Australia have substantial leverage.²

A new socioeconomic study is proposed for the Southern Basin to test whether ‘neutral or improved socioeconomic benefit’ applies and whether the discretionary 450 GL should be delivered. All economic changes, whether policy-driven or market-driven, generate winners and losers. Australia already has a social security system to buffer adverse effects on the losers from more significant economic events than the MDBP. There is no sense in which separate social security, health and education policies are justified for the MDB. Even if the effects of the MDBP were severe for some regions, investment in social infrastructure would be better than the proposed increase in investment in irrigation infrastructure with all its problematic effects, including on irrigators (Quiggin 2012, p.58).

Finally, regional studies that concentrate on jobs have little merit. Benefit-cost analyses and rate of return calculations are appropriate criteria for investment decisions, not local employment – think crime and road accidents, which generate too many jobs.

Concluding comments

There was always confusion about the objectives of the MDBP. While for some the principal objective was taking defensive action in anticipation of the effects of climate change, the major implied objective was rectifying environmental damage associated with over-allocated irrigation systems in the MDB. This is hard to quibble with as a general objective. The difficult question is deciding whether flow-related aspects should take precedence over non-flow related environmental objectives. Flow-related objectives effectively translate to more water for the Lower Lakes and the Murray Mouth in South Australia.

The other difficult question is whether a water recovery target should be planned or emerges as a by-product within administrative processes that allow environmental policies and projects to evolve as more information becomes available? The latter approach is preferred in this paper. This is because there is so much uncertainty about conceptual and empirical aspects of environmental policy for the MDB. A gradual approach was favoured by Cummins and Watson (2012, p.32) who stated that ‘messy gradualism’ would be superior to the prescriptive legalistic approach embodied in the MDBP.

² Exposure of poor administration in the Northern Valleys mentioned earlier also influenced the decision to oppose the MDBA recommendation. Sometimes, the rank absurdity of politics, and MDB interstate rivalries in particular, is easier expressed in literature than mundane commentary. Anson Cameron’s 2014 novel *The Last Pulse* does just that and belies an observation of Bruce Davidson (1969, p.47) that it ‘is difficult to find an Australian novel or poem praising the life of an irrigation farmer, while those concerned with our wide open spaces are too numerous to mention.’

Another reason for a gradual approach is administrative cost. Allowing the water recovery target to be adjusted up or down guarantees that the MDBP will be constantly under review.

The other principal conclusion of this paper is that buyback is a far preferable option for water recovery than public investment in on-farm and off-farm irrigation infrastructure. Not only is that policy costly and flawed for several reasons, it is potentially damaging to irrigators. There is a strong case for public investment in irrigation infrastructure to cease forthwith (Grafton and Wheeler 2018).

References

Cameron, A. (2014), *The Last Pulse*, Vintage Books, North Sydney

Cruse, L. and Gawne, B. (2010), 'Coarse-coloured Glasses and Rights bundling: Why the Initial Specification of Water Rights in Volumetric Terms Matters'. *Economic Papers*, 30 (2), 135-46.

Cruse, L. and O'Keefe, S. (2009), 'The Paradox of National Water Savings', *Agenda*, 16 (1), 45-60.

Cummins, T. and Watson, A. (2012), 'A Hundred-Year Policy Experiment: the Murray-Darling Basin in Australia', in Quiggin, J., Mallawaarachchi, T. and Chambers, S. (eds.), *Water Policy Reform: Lessons in Sustainability from the Murray-Darling Basin*.

Davidson, B.R. (1969), *Australia Wet or Dry: The Physical and Economic Limits to the Expansion of Irrigation*, Melbourne University Press, Melbourne.

Gordon, G. and Black, A. (1882), *Supply of Water to the Northern Plains: Irrigation, First Report*, Presented to Both Houses of the Victorian Parliament by His Excellency's Command.

Grafton, R. Quentin and Wheeler, Sarah Ann (2018), 'Economics of Water Recovery in the Murray-Darling Basin, Australia', *Annual Review of Resource Economics*. 10 (3.1-3.24).

Matthews, K. (2017), *Independent Investigation into NSW Water Management and Compliance: Advice on Implementation*, New South Wales.

Paterson, J. (1987), 'The Privatisation Issue: Water Utilities', in Abelson, P. (ed.), *Privatisation: An Australian Experience*, pp. 181-204, Mosman, Sydney: Australian Professional Publications.

Perry, C. (2009), 'Pricing savings, valuing losses and measuring costs: do we really know how to talk about improved water management?' In Albiac, J. and Dinar, A. (eds), *The Management of Water Quality and Irrigation Technologies*, Earthscan, London, pp.179-196.

Productivity Commission (2018), *Murray-Darling Basin Plan: Five-year Assessment, Issues Paper*, March.

Quiggin, J. (2012), 'Why the Guide to the Murray-Darling Basin failed, and what can be done to fix it', in Quiggin, J., Mallawaarachchi, T. and Chambers, S. (eds.), *Water Policy Reform: Lessons in Sustainability from the Murray-Darling Basin*.

Randall, A. (1981), 'Property Entitlements and Pricing Policy for a Maturing Water Economy', *Australian Journal of Agricultural Economics*, 25 (3) 195-220.

Watson, A. (2008), 'The Howard-Turnbull National Plan for Water Security of January 2007: Rescue or Rejection', *Economic Papers*, 27(2), 146-159.

Watson, W. and Rose, R. (1980), 'Irrigation Issues for the Eighties: Focusing on Efficiency and Equity in the Management of Agricultural Water Supplies', Paper Presented at the Annual Conference of the Australian Agricultural Economics Society, Adelaide

Murray-Darling Basin Plan: Five-year assessment

Not so much a plan as an idea, and not a very good idea at that.

(Notes on Productivity Commission Issues Paper)

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1. Rather than the traditional concerns with economic efficiency and resource allocation of the Productivity Commission and its predecessor agencies, the tone of the Issues Paper reflects the special nature of this Inquiry, which has its origins in the previous responsibilities of the now defunct National Water Commission.
2. The scope of the Inquiry is restrictive given the importance of the Murray-Darling Basin Plan. At page 2 it is stated that 'the scope of the Inquiry does not extend to considering changes to the water recovery and other targets set by governments as part of the Basin Plan.' A root and branch investigation of the MDBP is justified. \$13 billion is a massive commitment to deal with environmental problems that were already being tackled with some success under earlier arrangements.
3. The Issues Paper is notably deficient in its limited discussion of the importance of infrastructure investment in the MDBP, and its pros and cons vis-à-vis buyback. The predominant off-farm and on-farm infrastructure component of the MDBP is indefensible on standard criteria of public finance, as usually applied by the PC. In summary, most claimed savings from infrastructure investment cost much more than the prices of water revealed in well-established water markets; subsidised infrastructure distorts choice of irrigation technique, which also depends on labour and energy costs; and, subsidised investment discriminates against individual irrigators, industries and regions that have already adopted modern irrigation methods.
4. This PC Inquiry should also consider the possibility (probability?) that a comprehensive Basin Plan was inappropriate in the first instance. There was nothing wrong in principle with the concept of 'a healthy working river' or the forward-looking project-by-project approach implied by the 'icon sites' of the Living Murray programme. The Basin States and the Commonwealth managed to cooperate under previous institutional arrangements. Far better results might have been achieved with changing emphasis and an increase in the resources devoted to existing programmes.
5. The PC is in an unenviable position. The MDBP exists because of environmental damage brought about by too much irrigation in the MDB. Over investment in irrigation was caused by past government (and public) enthusiasm for irrigation. Nevertheless, there is a lot of successful irrigation in the MDB whatever its chequered history. The regulated river system provides abundant recreation and tourism opportunities for locals and visitors alike.

6. The MDBP is problematic because detailed planning is a costly and inadequate way of dealing with risk and uncertainty. The most obvious sources of uncertainty are climatic and economic (commodity markets and farm technology). Less obviously, conceptual and empirical uncertainty surrounds environmental policy for the MDB. There are multiple economic and environmental possibilities for the MDB. Path dependency is of the essence. The PC, in effect, is put in the position of accepting the false precision of the MDBP.
7. The PC has the resources to investigate some technical issues concerning the MDBP.
8. First of these concerns the meaning, calculation and application of sustainable diversion limits. There are gross differences in the variability of rainfall and runoff across the MDB. Should the same statistical methods be applied in calculating SDLs in vastly different regions? Once calculated, can these estimates be sensibly added up across the MDB? Does it matter that some parts of the MDB have a vastly modified environment as a result of irrigation development?
9. A first check might be to determine the relationship between calculated SDLs and existing diversions. If these were to prove to be more or less uniform across the MDB, it would suggest that rules of thumb have been used and also that linearity between reduced extractions and environmental benefit has been assumed in situations where thresholds and discontinuities might apply.
10. Another technical issue worth exploring is the empirics of return flows. Is water actually being saved in aggregate per medium of infrastructure investment or merely being shifted in the landscape? Not just empirics, second and third round effects need to be considered. Risk management, water trading, entitlement systems, irrigation technology and farm management are intertwined. Arguably, the high tech irrigation industry envisaged by the MDBP is inconsistent with low reliability water shares and other nebulous entitlements.
11. Relatedly, a weakness of the MDBP is the lack of clarity in distinguishing between flow-related environmental objectives, end of system flows at the Lower Lakes and Murray Mouth, and non-flow related environmental objectives that are sought upstream for riparian zones and wetlands. Engineering works and measures can achieve equivalent environmental outcomes with a lower volume of environmental water for the latter, and have done so already in many commendable instances, but are not relevant to the former. Supply measures will not resolve end-of-system issues. It follows that the adjustment mechanisms permitted in the MDBP are a recipe for further conflict between the states, adding even more to the already burdensome administrative costs of the MDBP.
12. The Issues Paper refers to slow progress in the implementation of the MDBP. Removing 'constraints' to the programme of water recovery and tardy accreditation of water resource plans are mentioned. The PC needs to consider whether slow progress is the result of administrative and institutional failures or because what is being sought in the MDBP is actually unrealistic. Put another way, cognoscenti of economic ideas like opportunity cost, sunk costs and path dependency might regard such problems as policy-induced, and not worth treating seriously – the hydraulic equivalent of an iatrogenic disease.



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Ministers shrug off Treasury criticism

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FEDERAL ministers have shrugged off criticism by Australia's most senior economic bureaucrat of the Government's climate and water policies.

Treasury secretary Ken Henry told an internal forum last month that his department had little influence on the development of the Government's \$10 million water reform package announced in January.

Dr Henry expressed regret that the department's advice on water and climate change had been ignored and warned his staff to be vigilant against the development of "bad" policy proposals.

Treasurer Peter Costello rejected Dr Henry's suggestion that policy outcomes had been compromised.

"I think the speech stands for itself. He talks about some of the achievements of the Treasury, he talks about some areas where the treasury can add value," Mr Costello said.

Asked if the Government's \$10 million Murray-Darling water package could have been better with more Treasury input, Mr Costello was dismissive.

"Treasury's no water expert, Treasury's good at treasury. Treasury has not been engaged in water," he said.

Environment Minister Malcolm Turnbull also dismissed Dr Henry's criticism, saying "Treasury certainly wasn't involved in driving the process, but they don't know anything about water."

Mr Turnbull said he had to consult people with "dirt under their fingernails" to gather the information required to reform water arrangements.

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PM and ministers round on Treasury head

Michelle Grattan
April 5, 2007



PRIME Minister John Howard has slapped down

Treasury head Ken Henry over his criticisms of the Government's water and climate change policies, saying last night "I don't agree with him".

Dr Henry has severely embarrassed the Government in a leaked speech to his staff in which he also warned public servants to watch out for "bad" election-year policies.

Dr Henry, Treasury secretary since 2001 and one-time adviser to Labor treasurer Paul Keating, said that "all of us (in Treasury) would wish that we had been listened to more attentively over the past several years" on water and climate change.

"There is no doubt that policy outcomes would have been far superior had our views been more influential. That is not just my view; I know that it is increasingly widely shared around this town.

"At this time, there is a greater than usual risk of the development of policy proposals that are, frankly, bad."

Mr Howard told the ABC he was surprised and puzzled at Dr Henry's view. The Treasury had been appropriately consulted about the water package, he said.

The Prime Minister implied that Treasury might be concerned because it had lost the argument. "It's often the case that a department that loses an argument inside the bureaucracy then says it would be better policy if its advice had been taken," he said.

Earlier, Environment Minister Malcolm Turnbull lashed out at Treasury, saying it knew nothing about water.

Treasurer Peter Costello, Dr Henry's boss, agreed and rejected the suggestion that policy proposals were likely to deteriorate ahead of the election.

The water comments are especially damaging because the Government has failed to get the Victorian Government to agree to its \$10 billion plan for the Commonwealth to have sole power over the Murray-Darling Basin. They also reinforce critics' arguments that the Government has been tardy and inadequate on climate change.

Dr Henry said Treasury was not giving up on water. "Water has got away from us a bit in recent times, but it will come back for some quality Treasury input at some stage — it will have to — and we are, at last, right at the centre of policy development in the climate-change area."

Mr Turnbull said Treasury had had an input on the \$10 billion water plan. "But Treasury doesn't know how much it costs to pipe a channel. How much it costs to replace a dethridge wheel with a computerised flume gate. How much it costs to line 10 kilometres of leaky channel along the Murrumbidgee River."

Mr Howard pointed out that, while he had a lot of respect for Treasury, "in the end you have to understand that governments make decisions on these things".

But Opposition Leader Kevin Rudd said this was "an extraordinary state of affairs".

He questioned what confidence people could have in the Government's climate-change and water policies when its senior economic adviser did not have confidence in its handling of these issues.

Dr Henry said in a statement yesterday that his speech had not criticised Government policy or processes. "My point was that to be effective, Treasury needs not only to provide deep analytical rigour and economy-wide thinking but also to be persuasive in communicating its views."

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A National Plan for Water Security: Pluses and Minuses¹

Alistair Watson, Freelance Economist, Melbourne, ;

Introduction

This was a hard paper to prepare. The debate over water in Australia is overwhelmed by arcane technical and political arguments, convoluted and shifting allegiances, and mammoth journalistic commentary. That does not make life easy for observers and commentators. A couple of drafts of this paper have already been discarded after being overtaken by events.

One thing can be said for the authors of *A National Plan for Water Security* released on 25 January 2007. They are not claiming spurious accuracy for their major proposals. As subsequently emerged, the ten-point *Plan* to spend \$10 billion over ten years was prepared in haste, well away from the troublesome gaze of Treasury and Finance officials and the experienced eye of the Murray-Darling Basin Commission.

Nevertheless, by accepting the case for limited buyback of irrigation licences following decades of political infatuation with irrigation, the *Plan* advanced by the Commonwealth represents a decisive and overdue shift in the overall direction of irrigation policy. This should be conceded even by those instinctively suspicious of grand gestures and central control of water policy by the Commonwealth Government with inevitable disruption to the established arrangements involving the states, however inadequate existing administration may be.

Sadly but predictably, some irrigators and their political representatives immediately resisted this welcome part of the *Plan* by raising unreasonable fears about compulsory buyback. Compulsory buyback is a necessary residual power for any buyback scheme to protect against unreasonable holdouts. Without some residual power for compulsory acquisition, buyback would result in stranded irrigation infrastructure and a patchwork quilt of diversions. In any case, the Commonwealth Government would be legally obliged to pay reasonable compensation even if it were inclined to use buyback powers recklessly, which is hardly likely because of political opposition from irrigators and irrigation communities.

Opposition to buyback has become a shibboleth in irrigators' organizations and irrigation communities. The economic effects of even small reductions in irrigation are often exaggerated. Unfortunately, some leaders of farm organisations still choose to ignore the damage caused by treating common property resources as open access, including to irrigators themselves. Their influence is reflected in the way the case for buyback is clouded in the *Plan* by linking buyback to adjustment programs rather than admit that buyback is the cheapest way of dealing with over allocation.

¹ This is a revised version of a paper originally prepared for a talk given at the lunchtime seminar series of the Victorian Branch of the Australian Agricultural and Resource Economics Society on 07 March 2007. Much appreciated comments were received on that version of the paper from several colleagues. Many of the most useful comments came from officials involved in the administration of water policy and should remain anonymous.

How buyback is handled in the face of influential opposition is the major challenge confronting the *Plan*? Buyback could be fudged. Over allocation is frequently discussed without much thinking about its precise meaning. The problem is in several parts. Governments issued too many entitlements to use water for irrigation, especially in the northern part of the Murray-Darling basin. Furthermore, the processes for converting entitlements to annual allocations are imperfect.

Whether too much water is used for irrigation depends on the value of alternative uses of the water. There are multiple environmental objectives for rivers, with spatial and temporal dimensions that are only crudely reflected in usual estimates of desirable environmental flows. Because environmental objectives such as wetlands, riparian vegetation, avian fauna, native fish and flow-related aspects per se have to be weighted, an already difficult technical problem becomes an even more difficult economic problem.

The next major challenge confronting the *Plan* will be to implement the much larger program of investment in irrigation infrastructure. Government intervention on the scale envisaged threatens to generate substantial economic and administrative costs. Investment in infrastructure will be more cheaply administered for off-farm investment than on-farm investment. Payments by government to irrigators for investments inside the farm-gate send a confusing signal to the irrigation community. Like all input subsidies, this part of the *Plan* will distort on-farm decision-making and is inequitable to irrigators who have acted already in response to market incentives to save water. Bad luck if you have invested in laser levelling, reuse systems or drip irrigation already. The program also ignores the existing market-based network of equipment suppliers and other specialists in irrigation areas who assist farmers design and install irrigation systems.

A new round of subsidies for infrastructure flies in the face of the intention, if not the reality, of post-COAG arrangements that asserted that Australian irrigation should stand on its own feet. How regulators set the prices that rural water authorities charge irrigators would be even more problematic if taxpayers funded major investments in delivery systems. Policy-making has not been helped by the optimism of Professor Peter Cullen of the Wentworth Group who has claimed that profits from irrigation could be doubled and water use halved inside five years. This grossly underestimates the costs of retrofitting off-farm and on-farm irrigation infrastructure, and overestimates prospective returns from high-valued irrigated products. Markets are limited for 'high value' irrigated commodities. Elastic demand prevails for exports of despised bulk commodities like dairy, rice and cotton.

The *Plan* reflects similar wishful thinking about costs and returns from investment in water saving and implies that farmers cannot run their own businesses. According to David Uren (2007) of *The Australian*, Minister Turnbull has supported these comments by Cullen. In Uren's words: "This takes farmers for fools." Gordon and Grattan (2007) report that Minister Turnbull believes that the *Plan* means 'Australia can play a greater role in world food production as water shortages cut farming in China and India.' Both countries are now in a better position to pay for food imports than in the Australian agriculture of my youth, when the Chinese were meant to save the wool industry by each purchasing a wool sock. In the event, the wool industry needed saving from itself.

Journalists are more interested in personalities and power than the minutiae of economic analysis and policy.² Not surprisingly, tensions over administrative arrangements between the states and the Commonwealth dominate media coverage of the *Plan*. Attitudes to this part of the *Plan* are divided between those who think the present situation is so bad that immediate drastic action is required and those who prefer to believe that inevitable mistakes by government should be dispersed among smaller jurisdictions, hopefully allowing an array of experiments and experience to produce a superior outcome.

Veterans of agricultural policy discussion in Australia fall in the latter camp because they are aware of the record of the Commonwealth in administering agricultural policy, especially agricultural pricing, marketing and assistance. For them, talk of independent experts calling the shots in policy has a familiar and disturbing ring. A lot of effort was dissipated in the 1970s and 80s fiddling about with the organisation of statutory marketing authorities, searching for marketing skills and commercial expertise for board members of SMAs, in what proved to be unsuccessful attempts to reform wool and wheat marketing.³ The problem was not in finding the right people but flawed economic policy in both conception and application. In fact, the commercial experts chosen proved to be more of a problem than the farmers they replaced. Reform worked better for other agricultural industries when a more rigorous approach was taken to determining the role of government in commercial decision-making.

The lack of logic about the role of government in irrigation policy is the major weakness in the *Plan*. Moreover, considerable administrative confusion would be caused by a Commonwealth takeover of water used for irrigation. Other state-based agencies are involved in water and land management as well as the rural water authorities that manage irrigation, such as Environmental Protection Authorities responsible for water quality and local government responsibilities for stormwater.

Brian Fisher, cited by Uren (2007), summarised the conventional stance of economists on separation of public and private responsibilities in irrigation as follows:

...there is little case for government spending taxpayers' money on irrigation infrastructure. [And] ...it is reasonable for the Government to decide that there is a public benefit from wetlands and red gum forests and that without some government intervention, there would be less of them than there should be.

² Politics and journalism in Australia work on principles set out by Dostoyevsky (2003, p.568) almost 150 years ago. "There is nothing in the world more difficult than plain speaking, and nothing easier than flattery. If when a man is trying to speak plainly one-hundredth part of a false note creeps into what he is saying, the result is an instant dissonance, and following it – a scandal. In the case of flattery, however, even if everything in it, right down to the very last note, is false, it sounds agreeable and is received not without pleasure; even though it's a crude sort of pleasure, it's pleasure nevertheless."

³ 'From SMAs to CMAs' (catchment management authorities) would be a good title for a study of agricultural administration in Australia.

Unless the ambitions of the Commonwealth Government to reconfigure the irrigation industry through engineering solutions are curbed and the focus of the *Plan* shifts to providing public goods, prospects for this latest in a series of water policy initiatives are bleak. Minuses will be greater than pluses.

The analogy with the Reserve Bank drawn by some supporters of Commonwealth control is flawed.⁴ The administrative task for the RBA is far more important than water policy but the task is less complex, politically and conceptually. The RBA is a research-based professional organisation with a broad spectrum of interests represented on the Board who would cancel one another out if they attempted to engage in a contest of interests. Not that the RBA has been spared the odd shonk on the Board over the years, and occasional political interference. An Australian Water Board (AWB?) or Australian Water Commission (AWC?) would not keep competing interests at bay and would eventually be embroiled in a contest between groups of irrigators and organised environmental groups to the disadvantage of a broader community interest. And to face facts, the talent pool of suitable staff and Board members for the RBA is deeper. Who are the experts on water policy? All aspects of the debate over water for irrigation and the environment should be informed by technical advice but many require a political solution (Prasser 2007). Whether that solution is determined more effectively centrally or locally is the crux of the argument.

The policy debate and its ongoing deficiencies

Rarely has Australia been in such need of drought-ending downpours. Concern about drought bordering on panic now dominates short-term responses to water policy. A long-term *Plan* is proposed to solve an acute short-term problem. A decent flood would do wonders, hydrologically, economically and politically.

A flurry of quack remedies and howlers have been inflicted on the public by political luminaries and journalists alike. The most persistent mistake in media commentary, which is inevitably reflected in public attitudes, is confusion between water use efficiency and economic efficiency. Ambiguous statistics on water use by various agricultural commodities are thrown about as if they are relevant to either on-farm or off-farm decision-making. Farmers take other factors of production into account when choosing techniques of production and their output mix. This simple insight does not stop a raft of editorial writers and newcomers to the debate like Shorten (2007) fulminating about the rice and cotton industries. Ratbag advice from the suburbs that the rice and cotton industries should be closed down makes rice and cotton farmers beleaguered and over-defensive. Necessary compromises are more difficult to achieve. It is indulgent posturing with adverse consequences because rice and cotton farmers are not politically naïve or powerless. In fact, the opposite is the case because these industries are concentrated in isolated areas and irrigators are influential in some electorates.

⁴ Agricultural economists should take a healthy interest in the RBA. The Australian profession was greatly supported in its infancy by the former Rural Credits Development Fund of the Bank. The RCDF was based on profits made by the Bank lending to marketing boards and agricultural cooperatives. Those origins did not influence the views of early agricultural economists on agricultural prices and marketing.

What public policy and enlightened environmental advocacy should be about is how much water is available for irrigation, the adverse external effects of irrigation and how those effects are mitigated and rectified? Design, funding and sequencing of environmental programs are the important issues.

A recent variant of the erroneous idea of water use efficiency is mindless calculation of what has come to be known as 'virtual water', purporting to calculate the amount of water embodied in products destined for domestic consumption or export. Thank goodness the campaign for a clever country came to nought; otherwise we would be worried about exporting our brains. An obvious fallacy in the discussion of virtual water is that it does not distinguish water falling from the skies or water obtained by irrigation from regulated rivers. Virtual water is yet another blind alley in the discourse on irrigation policy of absolutely no public policy significance, generating meaningless figures by the ill informed for the ill informed.⁵

Perhaps the Davidson award for absurdity in the controversy over water in the last month or so should go to Queensland Premier Beattie for his resurrection of the Bradfield scheme of the 1930s. Unless Beattie has some obscure tactical trick up his sleeve, he has managed to make a clown of himself on both irrigation and northern development. Rejected Western Australian politician Colin Barnett has a right to be miffed that people ridiculed his proposal for a far canal from the Kimberleys to supply urban water to Perth. Beattie has apparently survived with his reputation more or less intact promoting connection of the northern rivers of coastal Queensland to the southern irrigation system.

Bradfield's ideas were silly then, and have not improved since. Keynes knew something when he wrote about 'madmen in authority'. Unelected politicians and former government advisors like Alan Jones, now posing as a journalist, are unfailingly impressed by spectacular ideas like turning coastal rivers inland and making the deserts bloom in Australia's dry interior. Richard Pratt was another Bradfield enthusiast although his enthusiasm was dampened once he put his ideas to the test with empirical investigations of the practical possibilities of covering the countryside with pipes and lined channels.

Most ordinary citizens are cured of the romanticism and extravagance of Bradfield and similar proposals by remembering the shock of the last bill from the local plumber. The idea of opportunity cost and the dangers of throwing good money after bad do not count for Australia's rich and powerful. In a newspaper article between Christmas and New Year 2006, Jones cited claims by solar enthusiasts that 'solar stations near Bourke and Moree could provide energy for two billion people.' One suspects that proofreaders of *The Australian* were then taking a Christmas break.

⁵ Like all bad ideas, the concept of virtual water attracts cranks and habitual letter writers to newspapers. It cannot be long before the idea will be advocated by editorial writers. A recent twist of advocates of virtual water is to promote what amounts to an obscure case for vegetarianism whereby it is claimed that eating less red meat can save water. This can hardly even be empirically true for Australia where most meat is produced under dryland farming systems.

But that is no excuse for the shameless implication by Jones that unexpected surpluses from the resources boom and the GST justify oddball engineering projects such as the Bradfield scheme. Aficionados of the sad history of water policy in Australia and the role therein of hucksters like Jones would note in his article that he is still smarting from rejection by the Hawke Government of an attempt by Malcolm Fraser to put Bradfield back on the agenda in the hopeless and hapless *Bicentennial Water Resources Program*. Peter Walsh (1995, p.85) described that program as 'one of the Fraser Government's desperate last throws'. A program that the community was spared and a reminder like the Ord episode of the 1960s that the Commonwealth is not the fount of wisdom in irrigation or land management policy.

The language of past centralist ambitions and Commonwealth mistakes is being recycled in the current debate on water. Senator George Brandis referred on television to the desirability of a 'national unified system' of water management, almost the same words that were used by the unlamented John Dawkins to describe ill-fated changes to tertiary education; later labelled by Professor Max Corden as *Moscow on the Molonglo*. Senator Brandis must also have a copy of the Paul Keating phrase book. He described Premier Bracks as a 'recalcitrant.'

The last twenty years have seen greater professional appreciation of rational analysis of irrigation in Australia by scholars like Davidson (1965, 1969) and Randall (1981) although their work has had insufficient influence on opinion makers. Manifest improvements in policy followed with introduction of water trading around fifteen years ago and a Cap on extractions from the Murray-Darling system in the mid-1990s. The beneficial and lasting influence of administrative efforts in Victoria by the late John Paterson ought not be underestimated in this regard. Though the usual gap exists between promise and performance, what has happened in irrigation policy in a succession of initiatives since the COAG agreement of 1994 is mainly in the right direction, far more so than for urban water. Does the new *Plan* improve on or detract from the achievements of recent years?

An inconvenient truth

The pervasive political and economic dilemma for water policy in Australia is a legacy of an inconvenient truth. There is too much irrigation in Australia because of previous political excesses that continued in Victoria at least into the 1970s, and later elsewhere. Understandably, recognition of this point is implicit rather than explicit in the recent *Plan*. The current generation of politicians is willing to canvass the follies of their contemporaries but find it hard to face up to widespread bipartisan deficiencies of their predecessors in water management, in case their own fallibility is revealed.

Early encounters with droughts had a powerful impact on British settlers in Australia. The stripper's defence explains the attraction to irrigation: it seemed like a good idea at the time. When blind enthusiasm for irrigation was in its heyday, flawed public irrigation schemes were established without careful appraisal of economic prospects taking into account availability and cost of other factors of production, market opportunities and rainfall variability. That is a matter of historical record (Davidson 1969). Paterson (1987) estimated that only twelve per cent of the land in irrigated production in 1987 would have been developed on strict economic criteria.

This is not to say that only twelve per cent of current irrigation is economically defensible or that there are not plenty of opportunities for market-based investments in irrigation according to current economic circumstances. The amount would have been larger if public irrigation schemes had been organised differently. Most importantly, the costs incurred in previous irrigation developments are now sunk, however ill advised might have been the initial public investment. Just as in the private sector, the mistakes of the past are of no account in deciding how the capital stock created from past investment should be used now, or in the future.⁶ The economic difficulties now facing irrigation farmers and districts as well as the environmental consequences of irrigation should be tackled patiently to solve problems that have had a long gestation period.

Australia was not special with regard to its irrational attraction to irrigation. Techniques like benefit-cost analysis (that by the way seem to have gone by the board in the Australian public sector) were developed in the United States in reaction to the unholy alliance of government engineers, irrigators and parochial interests that pushed irrigation in the US well beyond its economic limits. And created economic problems that are not being handled anywhere near as effectively as in Australia, judging from several papers presented at the meetings of the International Association of Agricultural Economists held at the Gold Coast, Queensland in August 2006. Far worse horrors in irrigation development were visited on centrally planned economies in the twentieth century than those that occurred in the US and Australia.

As an initial response to a dry and variable climate, a pro-irrigation bias was understandable in the first days of European farming in Australia. Ignorance of local farming conditions and recklessness of politicians was exacerbated by the simultaneous attraction to closer settlement, in pursuit of poorly thought out distributional goals. This led to irrigation blocks that were too small and unable to pay their way from the outset. Small farm problems persist to the present day in many irrigation areas. Cutting corners on investment in drainage infrastructure guaranteed environmental damage despite centuries of knowledge of the potential adverse effects of irrigation.

The result was subsidised irrigation development and widespread damage from waterlogging and salinity. The weak economic condition of irrigated settlements meant that substantial product-related assistance for irrigated horticulture and dairying became necessary later to support farm incomes. Except for irrigated districts with mixed farming (crops and livestock), for many years it was a case of producing subsidised outputs with subsidised inputs for a large part of Australian irrigation. Product-related assistance has been largely eliminated in Australia and assistance to irrigation is much less than it was formerly. Changes in pumping technology and falling costs of engineering works have enhanced the comparative advantage of irrigation vis-à-vis broadacre agricultural industries.

⁶ As imprudently put by one of our colleagues in the title of an ANZAAS paper during the reckless expansion of irrigation in New South Wales in the 1970s, much to the chagrin of his superiors in the NSW public service, irrigation policy in Australia has been for a long time a case of 'Turning white elephants into a dirty shade of grey'.

The history is different in northern parts of the Murray-Darling system where irrigation came much later. This was private development in the main rather than government sponsored development of irrigation districts and farms. Government built dams on some rivers, supplied the water at concessional rates and issued licences to use water. Further irrigation development followed on other rivers and watercourses in northern areas with the development of techniques to capture and use episodic overland flows in dams on private land. As in many countries around the world, the advent of low cost pumps and pumping has had pervasive effects on the technical possibilities of irrigation and has also generated associated environmental consequences in need of public attention and regulation.

The harvesting and use of overland flows is contentious because flows are poorly measured and monitored and deprive downstream users of water supplies. The intent of the Murray-Darling Cap has been frustrated. Official policy seeks to redress this problem but has made little progress to date. It is usual to blame management neglect by state governments and/or the political power of local landowners and the irrigation establishment, but the problem is also inherently intractable and may only be amenable to a regulated and political solution. Implicit in the *Plan* is the belief that the Commonwealth Government will have more success in enforcing such a solution.

The range of rainfall and runoff in the Upper Darling area within and between years is extraordinary and far greater than for other major river systems throughout the world.⁷ It is doubtful whether concepts of sustainable yield can be given precise enough meaning to manage irrigation effectively on the basis of strict rules and planning of allocations as is the policy espoused by the National Water Commission created in the National Water Initiative that immediately preceded the latest *Plan*. The *Plan* refers a couple of times to current studies within CSIRO that are knocking up at short notice the '2007 Murray-Darling Basin Sustainable Yields Assessment' following the request of the Prime Minister and MDB State Premiers at a meeting on Melbourne Cup Day 2006. If it were that easy, the work would have been done already and would have been incorporated into Australian river management many years ago. Whether this is the result of technical problems for hydrologists in dealing with the consequences of high variability of rainfall and runoff or failures of policymakers in New South Wales and Queensland to even consider hydrological constraints to water allocations in the northern basin is a moot point.

Quiggin (2007, p.12), writing before the *Plan* was announced, argued that gross differences in catchment hydrology make the pursuit of uniform policy between the states misguided. In his view, 'rather than a one-size-fits-all solution it would be better to adopt policies based on local circumstances, and the democratic choices of local electorates.' A fortiori, once we consider attitudinal differences between private irrigators in northern New South Wales and Queensland and irrigators in the former closely controlled government irrigation districts of the southern-connected Murray-Darling system. Even in the south, there are tensions (especially over the rules for water trading) between private diverters for horticulture who use their own pumps and delivery systems and the more numerous irrigators from the former irrigation settlements who rely on shared irrigation infrastructure.

⁷ The Murray-Darling system is large on a world scale in terms of the area of the catchment but inconsequential in terms of the volume of flow.

The economic and political effects of the different history of irrigation settlement and private irrigation development were scarcely recognised with the onset of microeconomic reform in the last twenty years. Given a history of subsidisation of irrigation, attention first turned to water pricing. Despite loose talk in the original COAG documents about cost recovery and full cost recovery, regulators have accepted that there is no justification for reflecting previous capital costs in the current pricing structure, usually developing pricing approaches that recover annual operating costs for supplying irrigation water plus a capital charge to meet the expected cost of keeping delivery capacity intact. Nevertheless, irrigators in parts of the irrigation system are unable to pay prices based on reasonable pricing rules for irrigation infrastructure that has to be replaced in the near future. How can 'full' costs be recovered for something that should not have been there in the first place?

The usual conclusion drawn by unsophisticated observers of Australian irrigation is that prices of irrigation water need to be increased and/or the technical efficiency of irrigation enhanced. Shorten (2007), for example, has given unqualified support to the well promoted, expensive and (economically) barely researched technique of total channel control. Total channel control is in need of urgent independent research to determine whether claimed water savings are genuine and whether, and where, the technology might be applicable in Australia's irrigation systems. Total channel control might be an appropriate technique for countries like Israel or in California where high-valued horticultural products with exacting irrigation requirements are produced for affluent consumers in Europe or North America. That is not the case for Australian horticultural industries. Most popular discussion of water prices charged to irrigators misses the point that following the introduction of water trading, traded prices influence farm decision-making more than the prices charged by rural water authorities set by regulators. Ostensibly low technology gravity irrigation systems are appropriate for low unit value commodities and for intermittent water supplies that cannot support substantial capital investment in irrigation infrastructure, off-farm or on-farm.

It follows that if water use in the irrigation system is to contract as envisaged in the *Plan* and (unofficial) policy for several years, arrangements are needed to tackle local issues in water supply. Whether, how, and which, government is involved in these negotiations is fraught. While much has been made of 'stranded assets' in irrigation following the introduction of water trading, the issue is not as difficult as often presented. Assets are being stranded all the time by social and economic changes. Private firms are reorganising logistics and distribution systems with suppliers and customers continuously. Commercial arrangements worked out between supply authorities and irrigators are the best way of tackling local issues in water supply. Flexible arrangements would allow local groups to negotiate terms and conditions for continued supply provided they meet variable costs of operation. In many instances, it will make sense for ownership and maintenance of local channels to pass to irrigators.

The *Plan* is vague about administrative arrangements for implementing the key objective of modernising Australia's irrigation infrastructure (*Plan*, pp.7-9). The 'irrigation water providers' for improving delivery system efficiency are obviously bulk and retail rural water authorities, both private and publicly owned. As stated, how this will affect the principles applied and determinations of price regulators remains to be seen. 'Our delivery partners' for on-farm infrastructure could turn out to be catchment management authorities. These are

inexperienced organisations with differing structures across Australia, and varying competence. CMAs have demonstrated an appetite for chasing public funds, whatever the funding channel, and intended purpose. CMAs are not worried by niceties like logical criteria for spending any public money they get their hands on. It might be different if CMAs were required to raise a substantial proportion of their revenue through taxes and levies on farmers and citizens of the areas in which they operate.

An underlying assumption of the section of the *Plan* on modernisation of infrastructure is that benchmarks can be derived for investment in irrigation infrastructure. It is not explained why water providers do not have the incentives and ability to make decisions about off-farm infrastructure without central direction. Examples are given of savings that can be made by converting flood irrigation of crops and pastures to centre pivots and laser levelling in the rice industry. Again, it is not explained why irrigators cannot do this of their own volition without advice (and subsidies) from Canberra. Possible reasons include farm layout, remnant vegetation and labour supplies. Long-lived investments on farms are often made to match the life cycle and aspirations of the farmer. On-farm benchmarking and comparative analysis is even more flawed for irrigation than in other industries because of variations in soil type and drainage. Technical efficiency in water use is often not a major consideration in the financial and operational management of irrigated farms. For irrigated dairy farms in Victoria, for example, far more important success factors are pasture production and grazing management (Bill Malcolm, Peter Doyle, personal communication).

The *Plan* is an expression of Commonwealth interference in the normal business of farm decision-making that has not been seen since the halcyon days of soldier settlement following World War 2 or in the Queensland Brigalow schemes of the 1960s.

Page 9 of the *Plan* states:

To participate in the Commonwealth Government's on-farm water savings programme, irrigators will be required to develop water efficiency plans accredited by agreed deliver partners. Expenditure receipts will be required for payment.

Will Centrepivotlink administer this rediscovered dirigisme!

Another inconvenient truth

Some states introduced water trading well in advance of COAG in 1994. Water trading has been endorsed in subsequent programs like the National Water Initiative and recent *Plan*. The theoretical advantages of moving water to higher value uses and preferable locations from an environmental standpoint are clearcut. There have been problems of implementing water trading however that are recognised in the *Plan*. Water trading activated previously unused rights as well as rights to the savings generated by water trading itself. Investment in water saving was a mixed blessing because of reduced return flows. The policy of Cap and trade also failed to account for the water cycle as a whole, by ignoring supplies available to irrigators from groundwater, capture of water in plantations, extractions from unregulated rivers and water collected in farm dams.

Groundwater has been poorly managed in Australia despite a fine scientific tradition in hydrogeology. The concern for improved management of groundwater in the *Plan* by including groundwater in the Cap is welcome and overdue. An absurd situation exists on some sites with irrigators pumping unmetered groundwater, after having sold their entitlements to irrigation water that was in fact extracted from rivers or streams where groundwater and surface water are connected. Whether the Commonwealth is any better than the states in administering groundwater will be a defining test of the success of a Commonwealth takeover.

In effect, the introduction of water trading was accompanied by increases in the rights of irrigators and reduced supplies of water for environmental flows. Logically, removal of constraints on rights once trading was permitted should have been accompanied by reduction in volumetric entitlements or variation in the formulae by which expected annual supplies in the storage system are translated from entitlements to allocations (Quiggin 2007, pp.8-9). Economists are aware of the advantages of secure property rights if water trading is to serve a useful social purpose. However, present arrangements for property rights are loaded in favour of irrigators to the detriment of environmental flows.

While it is reassuring that the *Plan* emphasises the need for improved monitoring of groundwater and attention to other parts of the water cycle, it would be even more reassuring if there were instructions in the *Plan* that rural water authorities employ more water bailiffs to enforce existing regulations. More effective regulation would also protect the property rights of the majority of irrigators who comply with existing regulations. Non-compliance varies between states but is an issue for groundwater, private pumpers and domestic and stock supplies. Rivers and streams that are not part of the irrigation system are managed more poorly than is the irrigated system in all states. Instead of putting first things first in water management, the *Plan* reflects the age-old faith in engineering solutions as witness the enthusiasm for lining and piping irrigation channels, and space age variants like total channel control. This approach is redolent of Professor Parkinson's parable of the committee that spends hours deciding which colour to paint the bicycle shed, and five minutes on a decision to build a nuclear generator.

Minor aspects of the *Plan*

Measuring and monitoring water resources receives further recognition in the *Plan* with a proposal to transfer responsibilities for data collection and reporting standards to the Bureau of Meteorology. That suggestion appears reasonable in that the profession of meteorology is skilled in working in a framework of uncertainty in all its dimensions: theories of climatic phenomena, and time and space. Not that data are always the problem, recent collections by the Australian Bureau of Statistics in association with the Productivity Commission have been excellent, even if the ABS got off to a shaky start a few years back by wrongly emphasising data on the output of various irrigated commodities per ML of water applied. The financial provision for the Bureau of Meteorology to takeover responsibility for data is generous and duplicates existing services. Even though the States have wiped out a lot of corporate knowledge in scientific disciplines relevant to water, the States still have a lot of data and knowledge of the processes they have been managing to date.

A taskforce is proposed to study the water resources of Northern Australia under the chairmanship of Senator the Hon Bill Heffernan. Northern Australia is now experiencing exceptional economic prosperity based on minerals, energy, tourism and a live cattle trade that has managed to evolve and succeed of its own initiative in response to market forces, aided by publicly funded research on the cattle industry. The situation of Indigenous people in Northern Australia remains appalling despite all these economic developments. It is hoped that Senator Heffernan is immediately briefed on the fundamental insights of Bruce Davidson (1965), the thinker from Tambo Crossing, on prospects for northern agricultural development. Otherwise, Alan Lloyd's advice to Australian politicians to "do their vicarious pioneering in front of a television screen" will remain apposite.

Davidson emphasised the transport difficulties of northern agriculture, lack of markets for output and lack of processing and other infrastructure (Watson 2007). Rainfall is also variable and growing seasons are short. Public effort was justified in agricultural research and development but there was no case for farmers in the north to be treated any differently than their southern counterparts. Competition for labour from mining makes those conclusions even stronger today. Nothing stops individual farmers or large agribusiness firms chancing their arm in the cattle industry or other agricultural industries in Northern Australia. Past agricultural research in Northern Australia created a cadre of specialists whose skills have been extremely valuable in international efforts in agricultural development but whose knowledge was never going to be applicable in Australia because principles of production economics and comparative advantage were ignored in the design of research programs. Of what use (to Australia) is knowledge of tropical pasture species suitable for land-saving techniques like pasture improvement with land so abundant in Northern Australia.

The *Plan* also proposes continuation of Commonwealth efforts to repair past damage to the Great Artesian Basin, a shared water resource of three states and the Northern Territory. Commonwealth involvement in management of the GAB is uncontroversial and funding arrangements appropriate.

The squabble with Victoria

Proposals for reforming management of the Murray-Darling Basin in the *Plan* start with a litany of problems in present arrangements that can hardly be disputed. There is a history of slow progress and inter-jurisdictional bickering. Failings with respect to the Cap on diversions and the absence of effective sanctions on miscreant states are highlighted. A radical solution is proposed with referral of powers by the states to allow the Commonwealth to achieve its objectives of water saving, improved monitoring and metering, tackling over allocation through buyback and adjustment, and reform of decision making processes.

There will be a revised Cap taking into account groundwater and losses from afforestation, farm dams and diminished return flows following investment in water use efficiency. How revised is 'revised' is a matter for conjecture. It is something that the major interest groups have not contemplated seriously, except for Victorian farmers. Referral of powers could result in a future Commonwealth Government taking major decisions that could affront farmers or environmentalists. Most of the individuals now involved will not be around to observe the consequences.

A weakness of the existing Murray-Darling Basin Commission is that it has operated by consensus. Hard decisions were avoided. In essence, this is what jurisdictions wanted in the past but there is no reason why unanimity should be required in any future arrangements. A Commonwealth takeover will not remove underlying conflicts between the states that have caused these difficulties of administration. Nor will disagreements between irrigators and environmentalists be removed. Instead, they will be sorted out in the party room of whatever Government is in power in Canberra. There is no reason to believe that this will result in a better result than existing arrangements.

The MDBC is detached from the mainstream of the public sector, nationally and in its component states and territory. In the fashion of the 1980s, the MDBC has a substantial consultative apparatus. The Community Advisory Committee of the MDBC was an obstacle to taking hard decisions. Diverse regional irrigation interests and token representatives of the wider community interest operated in the same consensus-seeking mould. At the intellectual level, the MDBC was influenced to a large extent by a nebulous discipline of Social Impact Assessment, trying to achieve the best of all possible worlds for all concerned. It was as if entrenched interests were non-existent and Australian irrigation had no history. Similarly, the Healthy Rivers Flagship program of CSIRO flirts with Social Impact Assessment rather than a hard-nosed appreciation of the economics and politics of irrigation.⁸ The strength of the MDBC is its expertise in technical aspects of river management, hydrology, ecology and other disciplines. MDBC staff have effective professional links to their counterparts in the constituent jurisdictions.

In the event, Victoria was the only jurisdiction to resist referral of powers to the Commonwealth. The final decision by Victoria was greatly influenced by vehement opposition from the Victorian Farmers Federation to the *Plan* (Topsfield, Grattan and Ker 2007). These attitudes were subsequently confirmed by the president of the VFF (Ramsay 2007). South Australia and Queensland were more concerned with their (successful) play for a group of experts to be imposed on the new Commonwealth decision-making process. New South Wales was compliant with Commonwealth ambitions for a takeover of water management. Ramsay claims that irrigators in other states are not happy with the decisions of their respective governments who 'took the opportunity to hand over the problems caused by mismanagement and inaction to someone else'... whereas... 'the Victorian system is the most responsibly managed in Australia.' No doubt the money offered by the Commonwealth is also difficult to resist.

The VFF are not ingrates. Farmers have had an excellent financial deal from the Victorian Government before and after the White Paper of 2004. The way sales water was converted to tradable entitlements was favourable to irrigators and of limited benefit to environmental flows. A five per cent environmental levy (oops, contribution) was imposed on urban water consumers to fund projects in northern irrigation areas. Concessions have also been given

⁸ Perhaps the experience of Bruce Davidson working for CSIRO in the 1960s has not been forgotten. Independence of advice is still an issue in water research and policy with a few individuals maintaining a stranglehold on grants-based funding. Land and Water Australia eschews research on water policy.

from time to time on water prices and strengthening the dam wall at Eildon Weir. The Victorian Water Trust funds an array of projects of substantial benefit to irrigators, many of which would not stand up to detailed scrutiny. The impenetrable and untouchable VWT provides a template for the difficulties soon to be confronted by the Commonwealth Government, when the Commonwealth foolishly enters the business of picking winners in off-farm and on-farm investment in irrigation infrastructure.

At a general level, the VFF knows what it like to be run over by the single-minded aggression of farmers' organisations in other states. Known Victorian devils are a better bet for the VFF than unknown Commonwealth devils, with their unknown unknowns. Victorian taxpayers and urban dwellers have more reason for a few gripes with local water policy. The overriding political imperative has been keeping the peace with Victorian irrigators while long-term objectives are patiently worked through. And this is a reasonable assessment of the realpolitik of irrigation in Victoria.

Irrigators have little to complain of except that hype about Victorian export targets has wound up irrigation development in Victoria excessively, with negative consequences for longstanding irrigators. Claims about exports and the favourable value added by irrigation in Victoria compared with other states are economic nonsense. The main reason that the ratio of the value of output to the amount of irrigation water is higher in Victoria than New South Wales is that Victoria has a vulnerable irrigated dairy industry that uses substantial inputs of grain to maintain production. The much-maligned rice and cotton industries of NSW can be shut down in periods of water shortage. If present rainfall and runoff conditions continue, Victoria will be in dire straits in irrigation season 2007-08.

Victoria has not been a backslider on the Cap and has been at one with the Commonwealth on policies for water trade and exit fees. Significantly, the first of Premier Bracks' 44 concerns⁹ with the *Plan* was its geographical scope. The Goulburn (and Murrumbidgee) in the southern-connected M-D Basin are in the Commonwealth's sights but not the Queensland/NSW tributaries in the northern basin where some of the worst abuses occur. The Commonwealth was only able to provide a hair splitting justification for this selectiveness. The Commonwealth Government cannot have it both ways by picking and choosing which rivers it wants to manage. Furthermore, the Commonwealth appears only interested in rivers in the Murray-Darling Basin on the other side of the Great Dividing Range from Australia's major cities. Does this mean that Victoria, for example, would have a Water Act covering south of the Divide with the Commonwealth having a separate Water Act for north of the Divide? Would the Commonwealth take responsibility for managing water for plantations and urban dwellers in its area of interest?

It is not possible to go through the 44 concerns of Premier Bracks in detail. Ministers Turnbull and Thwaites have plenty to negotiate. Their successors will be on the case for years to come, as referral of powers does not involve changes in ownership. Who will be footing the bills when the major, and uneconomic, state-owned infrastructure now being touted comes to the end of its useful life?

⁹ Catch[ment] 22 times two!

Concluding comments

Minister Turnbull has described on his website the Prime Minister's statement of 25 January 2007 as the 'the most important statement on water security in our nation's history.' Time will tell, for good or ill. Similar sentiments were expressed when Prime Minister Hawke and Environment Minister Graham Richardson made 'the world's greatest environment statement' at Wentworth in 1989 at the junction of the Murray and Darling Rivers (Hawke 1989). Hubris lives.

The *Plan* has a lot more going for it though than the 1989 target to plant one billion trees (another example of political fascination with round numbers).

We should be thankful that de facto trade between irrigation and the environment is quietly accepted in this *Plan*. When the dust settles on arguments between the states and the Commonwealth over management of the Murray-Darling system, the debate can return to more important issues – the detail of policy to deal with over allocation of water in regulated rivers, its funding and timing. Compensation issues will need to be tackled. Over time, the relative emphasis on buyback and costly attempts to recover water through investment in infrastructure can be changed. More care will be given to the design and implementation of environmental projects to use water purchased, or saved.

The *Plan* is silent about connection of urban and rural water. Present indications are that some irrigators in Victoria are at last recognising the advantages (to them) of urban-rural water trade (Kleinman 2007). The gearing of rural and urban water is favourable to trade. A one per cent reduction in use of diverted water by irrigation results in a three per cent increase in water for other purposes. Support for trade is stronger among horticulturists for whom water security looms large and who require higher standards of infrastructure for timely delivery of water for quality control. Other irrigators are less enthusiastic. Whether the proposal under discussion in Victoria is a good deal for taxpayers and urban consumers is debatable. In a well-functioning water market, urban consumers should pay the going rate for water purchased on the market. There is no case for their expenditure to be hypothecated to any particular infrastructure project in irrigation areas, water saving or otherwise.

Since the era of microeconomic reform was initiated in the 1980s, it has been a case of two steps forward and one step back with COAG, the Living Murray Initiative, the National Water Initiative and now the recent *Plan*. A program is hardly in place and a new one is announced before previous policies are worked through. A myriad of programs with different sources of funding and overlapping budgetary intervals now exists. No one can be really sure what is going on. Rather than embark on a new program for water via a Commonwealth takeover and the ambiguity, risks and costs that entails, it would be more convincing if the Commonwealth and states were to agree to carry existing programs for the Snowy and the Living Murray Initiative to fruition and clean up once and for all the administration of the MDBC by removing the effective veto given to each jurisdiction by consensus decision-making. Penalties should apply for non-compliance with the Cap.

The harsh reality is that the logic of trading was not fully accepted by powerful forces in the environmental movement and irrigation community. Once property rights are established and water was made tradeable, it was unreasonable to prescribe to whom water was sold and for what purpose water was used, including no use if water were purchased by environmental agencies. No government has made a serious attempt to break down rigid separation of rural and urban water markets. Within Coalition ranks there is greater division over water policy than between the Commonwealth and the states. For Australian Labor Party governments in the states, the political issue is applying pragmatic principles to water policy while keeping quiet its inner city supporters from the non-empirical tail of the environmental movement.

Why is it difficult to make progress in the water industry? This paper has emphasised the difficulties of policy implementation because of the history of irrigation, drought and the powerful interests at play. Nevertheless, ideas and information are important as well. Obvious problems caused by carelessness about the meaning of water use efficiency and wishful thinking about expensive engineering solutions like the Bradfield scheme have been highlighted throughout the paper. Failure to distinguish on-farm and off-farm effects of irrigation is another failing resulting in unproductive rivalries between states and industries with silly prescriptions about which industries should be encouraged or discouraged.

More subtly, the base line or point of reference for analysis of environmental problems is often confused. Scientists and economists are often at loggerheads on this issue with the former less likely to realise that the starting point should be the present not some idealised pre-existing state of nature or fixed point to which policy should be directed. Further there have been arguments over funding with frequent erroneous support for environmental levies in the mistaken belief that these levies and/or increased water prices will be passed on to consumers rather than fall squarely on farmers (Foran, Lenzen and Day 2005; Wentworth Group 2003). The idea that export prices determine Australian farm prices is completely foreign to most scientific commentators on Australia's irrigated industries. But the most important sticking point between scientists and economists has been disagreement over the difference between technical and economic efficiency in irrigation. Unfortunately, the *Plan* leans too far in the direction of an imposed solution based on crude approaches to benchmarking irrigation efficiency rather than a market-based solution that takes account for other factors confronting farm businesses and imposes greater discipline on the selection of environmental projects.

The economic rationalist's nightmare is that history may be repeating itself. Excessive reliance on engineering solutions to water shortages is a mirror image of the technology-driven ethos that created those shortages in the first place. This time however it is planned to recreate the glories of irrigation on brownfield sites instead of greenfield sites. Like Oscar Wilde's *The Picture of Dorian Gray*, irrigation is supposed to stay young forever. As remarked by Geoff Miller at the Australian session of the IAAE meetings at the Gold Coast last August, a tipping point may have been reached whereby agriculture is such a small proportion of the Australian economy that governments start to act rashly. There are few restraints on such behaviour in rich countries. The farm sector wants the money and urban dwellers want environmental problems tackled. Ineffective policies can be dressed up as stewardship. Parts of the environmental movement and some farmers' organisations have already demonstrated that they are happy to go down this road.

References

Corden, W. Max. (2005), 'Moscow, Markets, or Trust: The Uncertain Future of Australian Universities', paper for the 4th Annual Sir Leslie Melville Lecture in the ANU Toyota Public Lecture Series, 21st September 2005.

Council of Australian Governments (COAG) (1994), *Report of the Working Group on Water Resources Policy: Communiqué*, February.

Davidson, B.R. (1965), *The Northern Myth*, Melbourne University Press, Melbourne.

_____ (1969), *Australia Wet or Dry: The Physical and Economic Limits to the Expansion of Irrigation*, Melbourne University Press, Melbourne.

Dostoyevsky, Fyodor Mikhailovich (2003), *Crime and Punishment*, translated by David McDuff, Penguin Books.

Foran, B, Lenzen, M and Day, C. (2005), *Balancing Act: A Triple Bottom Line analysis of the Australian Economy*, Volume 1, CSIRO and University of Sydney.

Gordon, M. and Grattan, M. (2007) 'Turnbull eyes Asian food boom', *The Age*, 8 February 2007.

Hawke, R.J.L. (1989), *Our Country Our Future: Statement on the Environment*, Australian Government Publishing Service, Canberra.

Jones, Alan (2006), 'Solutions to water crisis should not be left as a pipe dream', *The Australian*, 27 December 2006.

Kleinman, R. (2007), 'Long-haul water plan will hurt Victorian farmers', *The Age*, 10 March 2007.

Paterson, J. (1987), 'The Privatisation Issue: Water Utilities', in Abelson, P. (ed.), *Privatisation: An Australian Experience*, pp. 181-204, Mosman, Sydney, Australian Professional Publications.

Prasser, Scott (2007), 'Premiers are out of their depth: The Rann-Beattie Proposal to offload water policy to an 'expert' commission is anti-democratic,' *The Australian*, 20 February 2007.

Quiggin, J. (2007), 'Key Issues in Australian Water Policy',
<http://www.uq.edu.au/economics/johnquiggin>

Randall, A. (1981), 'Property Entitlements and Pricing Policy for a Maturing Water Economy', *Australian Journal of Agricultural Economics*, 25 (3) 195-220.

Shorten, Bill (2007), 'National effort can solve water shortage: We must invest what it takes to waterproof our country', *The Australian*, 19 February 2007.

Ramsay, S. (2007), 'Bracks was right to reject PM'S Murray-Darling plan', *The Age*, 02 March 2007.

Topsfield, J., Grattan, M. and P. Ker (2007), 'Bracks to PM: my water plan is better', *The Age*, 21 February 2007.

Uren, David (2007), 'In the market for water', *The Australian*, 10 February 2007.

Victorian Government White Paper (2004), *Securing Our Water Future Together: Our Water, Our Future*, Melbourne.

Walsh, Peter (1995), *Confessions of a Failed Finance Minister*, Random House, Milsons Point, NSW.

Watson, A. (2007), "Bruce Robinson Davidson: 1924-1994", in John King (ed.), *Dictionary of Australian Economists*, Edward Elgar, (forthcoming).

Wentworth Group (2003), *Blueprint for a national water plan: the Wentworth Group of concerned scientists*, WWF Australia.

WATERING VICTORIA: THE GOOD, THE BAD AND THE UGLY

(Paper prepared for the Watering Victoria Symposium organised by the Centre for Public Policy of the University of Melbourne, September 24, 2008)

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Introduction

This paper is a variant of others written on water policy in Australia over recent years (Watson 2001, 2003, 2005, 2006, 2007a, 2007b, 2007c, 2007/2008, 2008a, 2008b).¹ The major conclusion of this version is that public policy for irrigation and water in Victoria over more than a century has been based on poor arguments about local economic, environmental and hydrological conditions that should have been, and still should be, the basis of policymaking. The emphasis is on irrigation with only a few remarks on urban water.

Around three-quarters of the water drawn from Victorian rivers and streams is used for irrigation. The irrigation lobby jealously guards this share despite all the changes in the economy since the irrigation era began in Victoria in the late nineteenth century. The most obvious is ongoing urbanisation and the relative decline of the agricultural sector. Until the last twenty years, popular and political support for irrigation was unchallenged except by the few who had engaged in serious research and analysis on the topic. In summary, irrigation had the numbers but irrigation, at least on the scale and in the way practised in Victoria, was not well supported by economic, climatic and environmental logic. If there were a single explanation for this it would be that politics works on different time scales to agricultural production, market developments and hydrological and environmental phenomena. This is challenging enough with the standard electoral cycle. It is especially damaging when politicians succumb to the self-imposed pressures and seductions of a daily news cycle.

Time is part of the story in other contexts. Assets used in water supply and irrigation are long-lived and inflexible. The upshot is that there is a big difference between the economics of investment before and after the event. Thus, greenfields horticultural developments with privately owned irrigation infrastructure are more profitable than either new or established plantings in old irrigation areas. Trading of irrigation water in recent years has allowed this to be reflected in the spatial distribution of irrigation. Why should so much public money be spent on infrastructure upgrades in places where water is being traded out in response to market forces? It would make more sense for governments to be concerned with social and environmental consequences of water shortages and water trade.

¹ Plagiarism of your own work is unfortunate but is excusable when the work reflects mainstream professional opinion that is neglected in the formulation of public policy. I thank many colleagues for their comments on this and earlier papers. Several endure the restrictions and conformity of the contemporary water bureaucracy and cannot be acknowledged. Frank and Fearless took voluntary redundancy from most of the Australian public service about twenty years ago. Grants-based funding has encouraged an uncritical response to water policy from the timid ranks of the academic and research community. People who know little economics think that grants-based funding is like competition in markets.

Much the same constraints on retrofitting the existing capital stock affect urban water. Water saving techniques like recycling of wastewater, rainwater tanks and stormwater capture could be goers in new urban developments but they are less likely to pass investment tests in established suburbs because it is so expensive to disturb the existing network of pipes in distribution systems and households. Most of these techniques are time and location specific, not universally applicable as so often implied by unsophisticated observers.

Water policy in Victoria over the years has oscillated between two competing and fundamentally illogical positions. Sadly, advocacy of simple solutions to complex problems has supplanted empiricism in water policy. After decades when damming every river and stream was a challenge to right-thinking men hell bent on establishing more irrigation schemes, a non-empirical version of environmentalism has surfaced as a political force in the last couple of decades. Blanket opposition to new dams for urban water supply is one of many unhappy expressions of such attitudes and influence.² Outright prohibition of new dams in favour of (say) rainwater tanks is manifestly foolish. There are decreasing costs of storage. The results of this obstinacy and green hair shirt mentality will be environmentally damaging as well as expensive. Investments more or less inevitable once new dams are precluded such as desalination and inter-valley pipelines have environmental effects that should be evaluated.

The tide began to turn against large-scale public investment in irrigation in the mid-1980s when it became obvious that irrigation was pressing against sustainable yield. And that was before a run of poor seasons in southeast Australia over the last ten years. Fiscal problems of state governments, particularly acute for Victoria, also meant that longstanding subsidies to irrigation needed to be re-examined. In essence, it was at last recognised that there was too much irrigation in Australia. Moreover, poor public administration had been a feature of irrigation for decades. Public water authorities saw themselves as servants of irrigators, or created for the benefit of their own employees, not the public interest.

The public sector struggles with contraction of activities that are a legacy of previous community attitudes and economic circumstances. Dealing with the consequences of over expansion of irrigation is not straightforward. Just because much past investment in irrigation was ill advised does not mean that existing public and private investments in irrigation cannot be used effectively. Today's policy should be forward looking.

After a brief period of reform of irrigation policy and administration that flickered after the mid-1980s, irrigation policy has regressed in the last few years. Ongoing severe drought and associated political panic is the major reason for the retreat. The previous dominance of engineers has resumed with most emphasis given to engineering solutions, ostensibly in pursuit of water savings. Not only are the claimed water savings costly, and problematic for hydrological reasons, public investment in irrigation infrastructure goes against sound principles of public finance. Off-farm and on-farm irrigation infrastructure should be the responsibility of irrigators, not governments (that is, other taxpayers). Buyback of irrigation licences would be cheaper but has so far only attracted limited political support.

² One commentator on an earlier paper described this stance as like a plague on both their houses approach. Not so. A pox more like it. The plague would be too kind to both groups.

The thinker from Tambo Crossing

Exceptional in the small group of early Australian critics of irrigation was Bruce Davidson, whose books *The Northern Myth* and *Australia: Wet and Dry* published in the 1960s should have ended the unqualified confidence of irrigation enthusiasts in Victoria and the rest of Australia. His analysis stands the test of time. Many aspects of his approach are still relevant. Above all, Davidson was an empiricist in the best sense of that term. He recognised that genuinely interesting questions of economic policy are matters where economic theory and the facts and circumstances of particular cases should be carefully weighed up; decision-making should not be based on prejudice, ideology or whim. Unfortunately, irrigation enthusiasts were, and remain, disinclined to contemplate the basis of their assumptions and conclusions, and were, and are, immune from contrary evidence and interpretations.

The economics that underlies Davidson's work is relatively straightforward – essentially, application of the principles of production economics and comparative advantage to a large arid agricultural exporting country like Australia. However, the supporting empirical research and documentation is extensive and meticulous. What Davidson brought to the table in the irrigation debate was a detailed knowledge of farming systems and agricultural technology, the realisation that water is one input among many in agricultural production and that commodity markets and farm structure are also pertinent to policy making. Davidson emphasised the significance of Australia's endowments of natural resources and market prospects to the success of agricultural industries and public investment in agriculture.

Davidson had a keen sense of the need for rigour in considering the appropriate role for government in a mixed economy. He was also clear headed about distributional issues. Most of these insights are missing from the contemporary policy debate. Politicians, so ready to trash their immediate partisan opponents, are apparently unaware or reluctant to admit that their predecessors have dealt them a very weak hand in dealing with increasingly difficult problems in water policy. Sometimes the same analytical error re-appears in different guise. Support for irrigation was often based on invalid observations on production per unit of land. These days, the innocent are often seduced by comparisons of gross value per megalitre (Perry 2007). This error – essentially, relying on partial productivity ratios – finds its silliest expression in ratbag ideas from the inner suburbs like virtual water and food miles.

As industrious and original as Davidson was (Watson 2007b), he must have obtained his ideas from somewhere. Davidson always acknowledged that the principal sources of his ideas were his teachers at the University of Melbourne, Yvonne Aitken, G.W. Leeper and S.M. Wadham (Batterham, Mauldon and Ockwell 1994). Wadham's understated scepticism on the role of irrigation in Australia is revealed in the standard reference work *Land Utilization in Australia* that he first co-authored in 1939 (Wadham and Wood 1939). The book had numerous editions published into the 1960s that influenced a whole generation of officials and teachers. Wadham was also part of the (second world) wartime Rural Reconstruction Commission that sought to redress the glaring mistakes of Australian agricultural policy of the interwar period, and earlier. The Eighth Report of the Commission on *Irrigation, Water Conservation and Land Drainage* remains a rigorous, and often droll, account of the pitfalls of the dogmas of irrigationism that still afflict contemporary policy.

For any unreconstructed irrigationists, several other ingredients of the Davidson critique are worth noting. Davidson turned conventional wisdom on its head. Contrary to driest continent rhetoric that had encouraged public and political interest in irrigation, Davidson pointed out that Australia has abundant water resources relative to its population even if water is usually in the wrong place at the wrong time. As stated above, the essential point is that more than one input should be considered in the design of public policy for land management. Land is abundant in Australia but capital and labour scarce. Where is the sense in concentrating available water on a small part of the landscape?

The extreme variability of Australian rainfall and runoff meant that capital requirements for water storage and distribution were high compared with other parts of the world where irrigation is practised. Davidson emphasised that the economics of irrigation worked best when water was being transferred between seasons of the same year rather than between years. Similarly, the variable length of the irrigation season increased the burden of on-farm capital costs. Arguably, contemplation of climatic variability is the key consideration that should inform irrigation policy because it leads immediately to consideration of the risks of irrigation and how, and by whom, these risks should be borne.

The irrigation cargo cult and its varied ramifications

The most influential figure in early Victorian irrigation development was Alfred Deakin. It was Deakin who encouraged the Canadian Chaffey brothers to come from California and found Mildura. Less well known is that Deakin's influence on the development of irrigation was already felt before his thirtieth birthday. Deakin was under the patronage of David Syme, proprietor of *The Age*. And that newspaper has struggled with its coverage of water issues ever since. Deakin was also a spiritualist. He was into channelling in a big way, in more than one dimension. Also well known for his protectionism, the most positive contribution Deakin made to Australia was his role in federation.

Initial political decisions favouring irrigation were largely prompted by the difficulties of coming to terms with Australia's uncertain climate. It turns out, as argued above, that more careful examination of the implications of rainfall variability and episodic drought leads to exactly the opposite conclusion. Irrigation is a dubious proposition because of the effects of rainfall variability on capital costs.

As Davidson and others pointed out, a further reason for widespread political and popular support for irrigation was the push for closer settlement in pursuit of poorly thought through egalitarianism in land ownership. In his 1981 book *European Farming in Australia: An Economic History of Australian Farming*, Davidson – by temperament, an extraordinarily egalitarian fellow – provides a devastating critique of the inadequacies of closer settlement as the basis of Australian farming systems, given the financial risks of farming brought by a fickle climate and dependence on export markets. With a concentration of farms of similar vintage and size, closer settlement areas also found it difficult to cope with technical change. Once irrigation was built on closer settlement with farms of sub-economic size, any opportunity for irrigation to help to manage drought risks went out the window.

In effect, the misplaced egalitarianism of closer settlement condemned irrigators to a frugal existence and/or dependence on government support through home consumption price schemes and other devices. More so at the time of writing *Australia Wet or Dry*, irrigated industries were characterised by higher rates of assistance than dry land industries (grains, meat and wool) 'where large areas of land could be combined with a limited labour force to produce commodities for which an export demand exists' (Davidson 1981, p.424). Severe low-income problems persist in the old irrigation districts to the present day.

The yeoman ideal of the late nineteenth century that underpinned closer settlement was a poor farming model for Australia. But it left a pervasive political legacy with the spatial concentration of farms with poor economic prospects. An electoral system based on single member electorates leverages the political influence of irrigators. Political activity works best if plenty of colour and movement, and a sense of grievance, real or imagined, can be injected into campaigning. Playing to the gullibility of journalists and their craving for excitement does no harm either. An example is the Plug the Pipe group in northern Victoria that is energetically resisting proposals to transfer water to Melbourne. Twice the volume of the proposed transfer has already left the Goulburn Valley via water trading to irrigators in northwest Victoria. Just as much again will be traded in the next few years from the Goulburn Valley because of the contracted water requirements of corporate horticultural plantings already in the ground. This has escaped the notice of the Plug the Pipe group and newspaper and television outlets. The fears of the Plug the Pipe group that the planned water savings to supply the pipeline will not eventuate may prove to be well grounded.

It is ironic that the structure ostensibly built up over a century to protect against drought has finally failed to cope with drought. Although many commentators want to do so, there is no need to invoke the phenomenon of climate change to explain current water shortages. Recent rainfall is within the bounds of past experience. Not just low rainfall, water shortages have been exacerbated by other factors that have diminished runoff – more farm dams and plantations in upper catchments, bushfire regrowth, increased groundwater extraction and lower return flows associated with increased on-farm water use efficiency (WUE).

Making climate change the starting point in discussions of irrigation policy muddies the key issue. There is too much irrigation in Australia brought about by political romanticism and poor public administration, including the excessive influence of testosterone charged engineers. Moreover, for those who want to appeal to climate change as the source of current difficulties, surely it would follow that infrastructure renewal in established irrigation areas is a chancy proposition. Future rainfall might not be there to support so much irrigation. Yet, the prospect of climate change was recently claimed by Premier Brumby as a justification for substantial publicly funded investment in irrigation infrastructure.³ Whatever the technical merits and water saving potential of the Food Bowl Modernisation Project (FBMP) in northern Victoria, climate change is a poor rationale.

³ Mr Brumby also appealed to the vision thing in defence of the FBMP, likening its supporters to the visionaries who backed the Snowy Mountains Scheme in the 1940s and 1950s. A stretch that suggests either a poor sense of political history or a highly developed sense of humour. He might not have his present job if the Snowy Scheme were universally appreciated.

Irrigation farmers and irrigation areas vary in economic efficiency and their environmental effects. The relative profitability of irrigated industries has changed radically in the past and will in the future. Improvements in irrigation technology are also major determinants of these changes. Supporters of irrigation behave as if every part of the irrigation network is equally efficient and has to remain intact. The political argument over irrigation has sharpened in the last twenty years not only because of water shortages related to rainfall and runoff, but because the wool industry, once dominant in inland Australia, was poleaxed by the collapse of the reserve price scheme in the early 1990s. Graziers switched to irrigated industries partly by default in the Northern Valleys of the Murray-Darling Basin, undermining the stability of interstate sharing arrangements within the Murray-Darling Basin. The mixed fortunes of agricultural commodities continue to influence the economics of irrigation in Victoria. There is a serious slump in the wine grape industry exacerbating the adverse effects of water shortages. Unusually high prices for dairy products have the opposite effect.

Within the Murray-Darling Basin, the states have adopted different approaches to risk management. New South Wales and Queensland have a higher proportion of irrigated annual crops and Victoria and South Australia more permanent plantings. A difference is between the interruptibility of the activities. Water allocations to the much-maligned rice and cotton industries can be easily matched to available water supplies. Dairying – an intermediate case with respect to interruptibility of the production system because purchased feed can substitute for irrigated pasture – is particularly important in Victoria. Whether the irrigated dairy industry would survive a return to historical prices is moot. Local objections to rice and cotton production are naïve; the salient issues are the amount of water extracted from the river system and environmental effects not how the water is used, which should be a purely private decision. Worse still, constant bleating about rice and cotton is counter-productive – alienating farmers, and making resolution of already-intense interstate rivalries less likely.

The political fascination with irrigation is international in both developed and developing countries (Leslie 2005). Despite all the well-publicised difficulties, Australia has managed irrigation and water far better than most other countries. In particular, the record of centrally planned countries is appalling. Unlike food exporting and urbanised Australia, a lot of countries are playing for keeps in water policy because of the possible threats to food supply for their substantial rural populations. Water shortages and declining water quality in northern China are a serious threat to continued Chinese economic growth. Not dissimilar issues afflict India. For both countries, management of groundwater is a particularly serious problem; made worse by better pumps and rural electrification in recent years.

Few economic activities can claim to have stimulated the development of an entire sub-field of economics – benefit-cost analysis – that was originally conceived in the desire to bring some discipline to the evaluation of public investment in irrigation projects in the United States. The application of benefit-cost analysis to irrigation proposals reached its zenith in Australia in the 1960s and '70s, not that much notice was ever taken of the results – of which, the Ord River Scheme in Western Australia was the most invidious example. That white elephant is supposed to multiply following the recent change of government in Western Australia. Whether that turns out to be an improvement on previous election promises to pipe water from the Kimberleys to Perth – the infamous far canal project – only time will tell.

Hand waving about environmental effects statements, due diligence and business cases still occurs in Victoria. But usually after the political decisions have been taken. For example, a report by the Victorian Auditor-General's Office (VAGO) indicates the haste with which decisions were reached to go ahead with the FBMP (VAGO 2008). The Victorian Water Plan of June 2007 – incorporating the FBMP, a pipeline from the Goulburn River to Melbourne and a desalination plant – was prepared in six months, with minimal consultation with those affected. This is an echo of the way drought-induced panics triggered Australian adventures with irrigation in earlier times. The old saw that 'when there is an election, politicians feel a dam coming on' has reappeared in modern dress.

Water use efficiency – a cargo cult for the new Millennium

With severe drought superimposed on an irrigation system characterised by over-allocation of available water, interest shifted to potential remedies if increasing conflicts between irrigators and accelerating environmental damage were to be avoided. First thoughts turned to improvement of irrigation efficiency as a way of providing additional water. This seems natural enough. But on closer examination the popular and political fixation on WUE turns out to have similar failings to the earlier fascination with irrigation. A raft of state and Commonwealth Government programs has been established in the name of WUE culminating in the multi-billion dollar Howard-Turnbull *National Plan for Water Security* of early 2007, now operating more or less unchanged as the Rudd-Wong *Water for the Future Plan*, except that the Rudd-Wong version gives more emphasis to water buyback. In both cases, substantial public investment in off-farm and on-farm irrigation infrastructure is envisaged.

Several questions arise. First, there are matters of public finance and public administration. What happened to implicit and explicit government objectives since the early 1990s for irrigators to stand on their own feet? How does government provided infrastructure stack up with an alleged objective of cost recovery, sometimes referred to as full cost recovery, which has been bandied about since the 1994 Council of Australian Governments (COAG) water reforms? Post COAG, price regulators turned economics handsprings to conjure up the spurious distinction between upper bound and lower bound pricing for urban water and irrigation water respectively. How do they treat capital investment that will eventually have to be replaced now that government is paying rather than irrigators?

Second, there are questions of implementation and incentives. What criteria are available for governments to choose between competing off-farm and on-farm infrastructure investments? Prima facie, water authorities and irrigators are best placed to judge what investments best suit their own circumstances. In the absence of clear criteria, would grants-based funding of irrigation infrastructure degenerate into a political contest along the lines of the whiteboard episode of a decade or so back? What message is sent to water authorities and irrigators who have already invested in water saving projects on their own account? In this context, it is worth noting that there are already powerful private incentives for water authorities and irrigators to invest in water saving in the era of water trading. The price of traded water is now more important for farmer decision-making than the price charged by water authorities.

Third, and probably most contentiously, are the claimed water savings from investment in irrigation infrastructure – whether public or private – all they are cracked up to be? Are what are being called losses really losses, or merely transfers of water between irrigators or within the landscape?

The remarks that follow are partly based on papers by Perry (2007) and Lin Crase and Sue O’Keefe of La Trobe University (Crase and O’Keefe 2008). Perry emphasised differences between engineering ideas of water efficiency and those of hydrologists and economists.⁴ Many so-called losses are recaptured for use elsewhere. This applies to return flows and outfalls from channels in gravity irrigation networks. Claimed losses may be available at a later date, such as when water that seeps from channels to groundwater is subsequently pumped for irrigation. Perry argued that at the wider scale of basin analysis, clear distinctions should be made between consumptive uses, which remove water from the current hydrological cycle, and non-consumptive uses, which return the water for potential re-use.

Similar ideas were brought to local attention in an unheralded paper by Oliver Gyles (2003).⁵ His insights were informed by observations and experience of irrigation in the gravity irrigation districts of northern Victoria where seepage from the channel system and other losses are supposed to account for 750 gigalitres, or 30 per cent of the water available to Goulburn-Murray Water (G-MW) (Hopkins 2008). This line of argument is being pushed as part of the case for the FBMP, now often described as the Northern Victorian Irrigation Renewal Project (NVIRP) or the Northern Dog in less polite circles.

Gyles recently elaborated his thinking about the FBMP/NVIRP in an unpublished letter to the editor of *The Age* that he kindly provided to the author.

The letter was as follows:

The Editor
“The Age”

John Brumby’s claim that significant real water savings can be made will only stand up if he can either show how the water in irrigation channels that is not delivered to customers is irretrievably lost or where it is accumulating.

⁴ Stripped to its bare essentials, the confusion comes about because different specialists are thinking of problems at different scales. What might be true for an individual project or part of the river system is not true at the basin scale. Confusion over water accounting occurs because of confusion over stocks and flows, much the same as confusion over capital and income in financial accounting, tax administration and on the screens of overpaid financiers.

⁵ In an unhealthy, intemperate display, a crass attempt was made by someone on the periphery of the Victorian water bureaucracy to stop publication of the paper by Gyles in a professional publication of the Australian Agricultural and Resource Economics Society. Gyles was in good company. Bruce Davidson ran foul of the CSIRO establishment and the Commonwealth Government who tried to block publication of his research on the Ord River Scheme in the mid-1960s.

This undelivered channel water can only be truly lost from the integrated water management system of northern Victoria if it flows into a very saline water body or evaporates.

Otherwise it is already being used for environmental flows or irrigation.

G-MW and DSE's own data show that aquifer levels are falling. Therefore any seepage from the irrigation system is being recycled by groundwater pumpers, including G-MW itself which is funded by governments to pump groundwater back into the channel system.

If surface water that has escaped from the channel system does not flow back to the river or is not diverted for irrigation it must either completely evaporate or accumulate. An 800 square kilometre lake would be needed to completely evaporate the 800 GL claimed to be "lost".

Find us a vast area of evaporation surface Mr Brumby, or admit the "Food Bowl" project is a scheme to appropriate 150 GL of irrigators' bulk water entitlement.

Oliver Gyles
Agriform P/L
Shepparton

5th June, 2008

Supporters of FBMP/NVIRP also often claim that metering errors of around 10 per cent on average represent losses that could be eliminated with implementation of this expensive project (Hopkins 2008). This is a typical example of the accounting conundrums that have bothered analysts of inter-temporal phenomena through the ages. Surely, savings from eliminating metering losses are not savings of water as usually understood but instead are losses to irrigators who were previously using under recorded water in irrigated production. There may be equity issues caused by inaccurate metering at different rates but the FBMP is an extraordinarily expensive way to correct these errors.

A full benefit cost analysis of the FBMP would also account for any changes made necessary to on-farm irrigation layouts. Total channel control has lower flow rates in channels and thus slower irrigation on farms. Slow irrigation results in waterlogging problems, slower pasture growth, lower quality pasture and increased groundwater accessions.

A final comment on WUE follows from reflecting on research on the actual behaviour of irrigators. Other resources are used in the production of irrigated commodities. Detailed studies of irrigation in practice revealed that labour saving was just as important in choosing water saving techniques like laser levelling as water saving per se (Cary and Wilkinson 1997, Cary et al. 2002). Concentration on water on its own is an example of the dangers of taking a narrow view of the complexities of farmer decision-making. The implications of sunk costs are usually ignored. The costs of retrofitting elaborate capital equipment and irrigation layouts are easily underestimated. New horticultural developments based on modern production systems are already shifting away from the FBMP gravity irrigation area to the Victorian Murray Valley and South Australian Riverland for several reasons – including greater water security and the operational advantages of private irrigation infrastructure.

Understanding and dealing with environmental issues associated with irrigation

The debate over irrigation is now also concerned with the environmental effects of irrigation. Environmental policy is difficult. In part, this is because of tangible and measurable long-term effects of irrigation on the riverine and riparian environment. But the political economy of the environment is fraught because an increasingly affluent Australian community places a higher value on the natural environment. Irrigation was once a state-sponsored activity with all that implies for the attitudes of the current generation of irrigators. The interplay of these influences leads to complex policy problems – technically, economically and politically. The politics is especially tricky because of interstate rivalries and the shared responsibilities of state governments and the Commonwealth in managing the Murray-Darling Basin.

The riverine environment has numerous dimensions including waterbirds, riparian vegetation and associated avian fauna, floodplains, wetlands, fish – native and introduced, macro-invertebrates in the river, water quality and more. All these dimensions are affected by the extraction of substantial amounts of water for irrigation. Some environmental changes are irreversible – analogous to the sunk costs of irrigation infrastructure, and are no longer worth bothering about. Making this call is not straightforward, as indicated in the current controversy over the future of the Coorong and the Lower Lakes of the Murray River.

Occasionally irrigators try to deny that taking so much water out of Australian river systems has had deleterious effects on the environment. But this is scarcely credible and is probably counter-productive in solving the political problems associated with competing claims on varied services provided by the environment. No more productive are environmentalists' arguments prefaced on the notion that restoring some original state of nature is desirable, or even possible. A lot of environmental disputes are ultimately empirical questions. An interesting example from outside irrigation is logging in Melbourne's water catchments. Ending the small amount of logging that now exists, as so strenuously urged by some, would make a minuscule difference to the amount of water available to Melbourne, and then with a considerable time lag.

In the context of environmental policy, it is also worth noting that there are positive effects from a regulated river system – flood control, for example. Water storages and weir pools in rivers regulated for irrigation provide recreational amenity to residents and non-residents alike. Bird life is abundant in the man-made environment of a river system regulated for irrigation.

By far the hardest conceptual issue in dealing with environmental issues associated with irrigation is establishing the starting point for analysis. A subtle paper by Hillman (2007) in the recent collection of essays edited by Lin Crase is a fine introduction for non-scientists. Hillman carefully distinguishes between the environmental aspects of a regulated working river that are flow and non-flow-related. His stance is similar to that which should be adopted in economic policy making, carefully establishing where we are, and then deciding what, when, and how, environmental improvements can be made.

The unusually long run of poor seasons has seen water storages in the southern-connected Murray-Darling Basin at record low levels, to the extent that even permanent horticultural plantings are now at serious risk. There have been numerous indications of the increasingly deleterious environmental effects of irrigation. Increasing salinity has been recognised as a serious issue in Australia at least since the 1970s – for irrigated land, dryland farming and waterways. Salinity has been an issue for irrigation since time immemorial, although apparently not enough of an issue for early Australian irrigation schemes to be developed taking account of timeless knowledge about the threat of salinity (Barr and Cary 1994).

Substantial progress has been made in dealing with salinity. The Murray-Darling Basin Commission, and its predecessor organization the River Murray Commission, has dealt with salinity via monitoring programs and salt interception schemes, with the latter another ingredient in reduced river flows. New developments have been restricted to less salt prone areas in the last fifteen years via zoning rules based on local government planning powers. The test for control of salinity will come if a return to wet years mobilises accumulated salt from floodplains.

A defining moment for community acceptance that environmental problems of irrigation were significant was the spectacular blue-green algal bloom over 1000 km long that occurred in the Barwon-Darling River system in October and November of 1991. More recent events reinforce those concerns. The Lower Lakes of the Murray and the associated Coorong ecosystem have been damaged, possibly beyond repair. The equanimity with which some advocate removing the barrages and flooding the Lower Lakes beggars belief. It may be too late to avoid serious damage but the reality is also that large parts of the Lower Lakes would become hyper marine (saltier than seawater) and biologically inert following flooding. OK for water skiing, but not much else.

The Wentworth Group (2008) has just entered the fray on the Coorong and Lower Lakes with a detailed submission to the current Senate Inquiry. The submission makes a strong scientific case that removing the barrages and flooding the lakes should be an absolute last resort. Contestably, but consistent with their previous approaches to environmental policy for the Murray-Darling Basin, the Wentworth Group emphasise the aggregate flows required to restore the Basin to environmental health. The amounts suggested are substantial and not likely to be acceptable in irrigator and political quarters. The Wentworth Group over the years has concentrated on the endpoint rather than the process of environmental evaluation and remediation. This has attracted a lot of attention. But has it achieved comparable results? Arguably, a superior approach is to deal with environmental issues project by project. Given so much uncertainty in markets, climate and the efficacy of environmental programs, an adaptive stage-by-stage approach is probably better than any long-term plan.

For non-economists, a good starting point for understanding the way economists think about environmental problems is a seminal paper 'Environmental economics and the Murray-Darling river system' by John Quiggin (2001). Quiggin elaborated various economic theories and their policy implications for environmental management – the idea of externalities associated with Pigou, ideas about property rights originating with Coase and contemporary developments flowing from the idea of sustainability. Quiggin argued that all these theories are applicable to different aspects of environmental management. Getting the balance right is

a challenge to public administration. Creating the right climate for disciplinary cooperation is also a challenge that is not always achieved in Australia as reflected in constant changes in administrative arrangements for government environmental agencies. Restructuring administrative arrangements usually means those in charge are not sure what they should be doing or are unable to resolve underlying political conflicts. Both explanations apply in the contemporary debate over the environmental effects of irrigation in Australia.

The work of Pigou leads to an emphasis on taxes and subsidies to align private and social incentives. In principle, taxes could be applied to parties damaging downstream water users but the complex hydrology of the Murray-Darling makes identification of offenders nigh on impossible. Further, the state has been involved in the creation of the environmental problems. Their belated involvement in their correction has to be carefully handled. The history of Australian irrigation gives a sharper political edge to the widespread belief that 'government got us into this mess, now it can help get us out of it'.

The analysis of Coase is the basis of the property rights approach. Coase challenged the reliance of Pigou on government intervention. Quiggin explains how the approach of Coase cannot cope with situations where ownership of rights needs to change because of difficulties with their initial assignment. Interest in property rights has led to research on the implications of common property in the irrigation system and potential for local management (Marshall 2008). Australian interest in water trading is in part derived from the property rights school. Recent support for buyback of irrigation entitlements and allocations extends the property rights approach into the realm of environmental policy.

Reasonably, farmers are at pains to assert the security of their property rights. Less reasonably, farmers' organizations resist steps to allow non-farmers to own water rights and for governments to engage in water purchases for environmental purposes. It is an odd property right that limits how the right can be exercised and who can hold the right. In fact, there is a big difference between what individual irrigators think and the way they act, and industry statements ostensibly made on their behalf. Increasing water purchases by governments for the environment and urban use have positive effects on irrigators' wealth and are not as unpopular with irrigators as the irrigation establishment would have it. Much of the opposition to water trading for environmental purposes comes from businesses and residents in country towns.

Interest in sustainability is not associated with a particular person or school of economics. Pannell and Schilizzi (1999) argue that the multi-faceted nature of sustainability can be reduced to three basic concepts: environmental stability, intergenerational equity and economic efficiency. In their view, the term sustainability is worthwhile as an expedient but actual decision-making should be based on measurable objectives. Sometimes the idea of sustainability is used loosely to include social objectives. At times, the term sustainability has degenerated into a catch phrase – a statement of principle, without any real content. Too often, the cloying rhetoric and mind numbing obsessions of environmental politics transcend human appreciation of the physical and biological world and the management of the environment for sustainability in any meaningful sense.

Similarly, the idea of integrated catchment management is vague. Catchment authorities are being given more responsibility in providing environmental services to farmers but have no independent funding base. The ambiguity of the catchment management concept has created many problems in Australian environmental management. What does integrated catchment management really mean? Catchment management suffers from the uncertainties and bad practices associated with excessive reliance on grants-based funding. Catchment management is a further symptom of the erosion of the influence of science-based professionals in environmental management over recent years. Catchment management is an odd basis of organising services to farmers in a large flat country.

Sustainability principles lead to thinking about discount rates and the development of rules that will maintain natural systems. The river system has multiple environmental attributes, flow and non-flow related. The clues to environmental policy are to recognise the difference between reversible and irreversible environmental damage; to separate on-site and off-site effects; to distinguish public and private responsibilities for the environment; and, consider the appropriate division of financial responsibilities between Commonwealth, state and local governments. Environmental policy in Australia is unfortunately trapped in the mire of cost shifting and tortuous financial arrangements. There is a bad mismatch of the availability of money at the Commonwealth level and technical skills and local knowledge in the states.

Quiggin concluded that an eclectic approach drawing on externality, property rights and sustainability approaches is appropriate for Australian irrigation policy. While this conclusion is appealing, a problem with eclecticism is that it is hard to maintain the discipline and rigour necessary to sustain an eclectic approach. It is easy to slide from eclecticism to opportunistic decision-making. The defence is strong public agencies keeping their distance from special interests. Environmental policy making is often compromised by well-intentioned concerns for the welfare of farmers and other rural people. The size of farms is relevant if farmers are to undertake environmental remediation on their own account. The so-called triple bottom line is an inadequate criterion. Social concerns that are interpreted as requiring Government support of small farms may be inimical to the resolution of environmental problems.

Figures for fools – virtual water and food miles

This part of the paper will offend some. Not deliberately, or with the intention of being an ageing smart arse – although ageing would be accurate – but because the concepts of virtual water and food miles are flawed and damaging when taken seriously. Sadly, taking virtual water and food miles seriously seems to be the case judging from numerous contributions from the eccentric ranks of letter writers to newspapers.⁶ However, the ideas behind virtual water and food miles are silly and can be shot down with not that much effort.

Calculations of how much water it takes to create a beer or a steak serve no useful purpose in the development of water and environmental policy. Nor does the distance food travels from producer to consumer. A virtual industry is being established by academics with nothing to better to do making calculations of what is known as virtual water. Virtual water and snake

⁶ A non-Victorian reader of a draft of the paper pointed out that virtual water and food miles are mainly Melbourne afflictions.

oil do mix. Virtual water does not distinguish water falling from the skies and used *in situ* from water obtained by irrigation from regulated rivers or pumped from groundwater. Water is added up willy nilly irrespective of the place and time water is available, its opportunity cost or its environmental implications. Calculations of virtual water ignore spatial and temporal issues at the heart of rational discussion of environmental policy for irrigation – groundwater connectivity, farm dam and plantation effects on run-off, and return flows.

Oddly, given the way the idea has been abused in Australia, the concept of virtual water had respectable origins (Appels et al. 2008). The idea of virtual water was first introduced by international officials concerned that arid countries in the Middle East were pursuing policies of food self-sufficiency when it made economic and environmental sense to import water-intensive products. In the hands of some unsophisticated Australians, virtual water morphed into arguments in favour of restricting exports of water-intensive products. Probably befitting a meaningless concept, not much thought goes into calculating virtual water. Often, data from European production systems are carelessly transferred to Australia. There is a vast difference between grain-fed beef production in the northern hemisphere and the rangelands and grazing-based production systems important in Australia. Policy prescriptions have also been made to wind back the Victorian dairy industry without even noticing that Victoria has a mixture of irrigated and natural rainfall dairy farming (Appels et al., p.9).

How much water should be used in food production depends on the alternative uses of the water, including environmental uses that can only be decided by valuing the environmental services of rivers and considering the design, cost, funding and sequencing of environmental programs. Apart from being confused about space and time in water use, enthusiasts for virtual water also reflect widespread public ignorance of water measurement, hardly surprising the way politicians and journalists shift lazily from litres to megalitres, adding and subtracting zeros at random. In any case, if we took seriously calculations of virtual water, we would not feel guilty. Instead, we would conclude that Australia should export plenty of water embodied in its agricultural exports. Australia has much more water in relation to its population than most other countries. Ratios like average rainfall per unit of area and dry continent rhetoric were the basis of Australia's flawed irrigation policy, all the way back to Alfred Deakin.

It is annoying and disturbing that the Victorian Water Trust (VWT) has funded virtual water studies at a cost of around \$200 000. The VWT stands condemned not just for wasting public money on nonsense calculations of virtual water but also for its expenditures on water saving in public housing. The VWT recently contributed to the \$1.2 million spent installing greywater recycling in a deprived public housing estate in Melbourne to save two megalitres of water. The estate is almost opposite the headquarters of the Brotherhood of Saint Laurence who have much better ideas on how such sums might be spent.

Sometimes, calculations of virtual water are presented as an argument for vegetarianism. This is to miss the point. Vegetarianism is a perfectly legitimate personal choice based on attitudes to animals or doubts about their ethical treatment in modern livestock production. The dubious empirics of virtual water should have nothing to do with that choice.

A (dodgy) cousin of the concept of virtual water is the equally vacuous idea of food miles. Food miles often surfaces in the epicurean columns of newspapers and in the musings and ravings of youthful wireless announcers, echoed by their nuff nuff talkback callers. A charitable view of food miles could be that it is a carelessly-put case for eating fresh food in season when it is plentiful and cheap, as if such a case were needed for anyone with taste buds and a limited budget. It is not surprising that restaurant proprietors and anxious chefs are on the look out for new angles in the constantly changing and competitive food trade. Food miles is the latest in a long line of stunts designed to get customers through the door.

Like virtual water, food miles is, somewhat ironically, not a home-grown product. It appears to have been dreamed up in Britain as a roundabout argument in favour of self-sufficiency in agricultural production. Hence, the imperial measurements used in the standard hundred mile limit applied to their purchases by food miles enthusiasts. A lot of great things have come out of Britain. Matters to do with cuisine are not one of them.

Distance travelled is an inadequate proxy for any environmental damage associated with food production. Not all modes of transport have the same environmental effects. Transport by sea is less costly than land transport. An obvious counter case to the doctrine of food miles is the grain trade. China and India, for example, would now do far better to concentrate on imports of grain to feed coastal cities rather than maintain economically and environmentally damaging policies of self-sufficiency. Expanding grain imports, ignoring stupidity like food miles, would ameliorate pressure on stressed land and water resources in China and India.

The recent fashion for virtual water that ignores the where, the when, and the how much of water use, is yet another blind alley in the discourse on water policy. Appallingly, for a society that has enjoyed the benefits of mass education for a century or more, concepts like virtual water and food miles have achieved undeserved credibility. Neither has anything useful to contribute to water or environmental policy.

The worst thing that could happen if the queer quinella of virtual water and food miles continued to be taken more seriously than warranted would be if burdensome labelling standards displaying virtual water calculations and distances food has travelled were imposed on food retailers, to be passed inevitably to hapless consumers.

Concluding comments

Irrigation in Victoria has a chequered history. Irrigation was conceived in response to drought but the most recent, and continuing, drought has exposed yet again the vulnerability of irrigated farming in Victoria to the realities of settlement history, markets, climatic variability and the costs of other inputs. Recent evidence is that inherent economic disadvantages persist for some irrigated industries. Migration policies are now being adjusted so that some horticultural crops can be harvested.⁷

⁷ It would be a different story if the changes applied to all seasonal industries. This is yet another example of exceptionalism in the treatment of Australian farmers. The phenomenon is most apparent in the social security system where different rules apply to farmers.

There is a genuine low-income problem in some parts of Victorian irrigation. This is most acute in horticultural districts where a large number of smaller irrigators switched in the 1990s from previously protected dried vine fruit production to wine grapes dependent on a competitive world market. While wine grape production is profitable when conducted on sufficient scale to allow mechanisation and a spread of varieties, it is a risky business for small producers.⁸ The problem is most acute for small producers with uncontracted grapes of now unfashionable varieties. The low-income problem was hidden during the expansion phase for wine grapes when prices were higher and new commercial plantings provided plenty of part-time work for smaller producers.

Horticulture is not a big user of water and the cost of water is not a high proportion of total costs. While this might appear an advantage in times of acute water shortage, the counterpoint is that smaller horticulturists did not benefit as much from the financial windfall that occurred when water trading was introduced around fifteen years ago.

The story is different for the irrigated dairy industry in northern Victoria. The effects of drought on the irrigated dairy industry are mitigated by exceptionally high prices for dairy products that allow, at least for the time being, profitable production systems based on annual pastures and purchased feed. Dairy farmers in Victoria were more significant beneficiaries of water trading because they acquired substantial assets. Not only that, dairy farmers entered the current drought advantaged by a most generous adjustment package after the dairy industry was deregulated in 2000. Painful as it might be, dairy farmers and mixed farmers in the Goulburn Valley will be able to adapt to water shortages while dairy prices remain high.

The rules of the game with respect to financial management and farm survival have changed radically with market deregulation and water trading in irrigated industries. This is especially so in Victoria where the irrigation system was traditionally run conservatively. Timing of water sales and purchases is key to success in the volatile market for temporary water. The role of government is limited when it comes to competition for water between industries and farmers within the one industry.

Genuine public policy issues can arise in the water market because of the threat of insider trading. Announcement effects on water markets following from government decisions on water allocations and buybacks for environmental purposes should be more transparent.

Irrigation policy is not helped by ongoing optimism and posturing over public investment in water use efficiency in the quest for water for environmental purposes. Several programs have been in train for many years – Water for Rivers to obtain water to return to the Snowy, the National Water Initiative, the Living Murray exercise of the Murray-Darling Basin Commission and state-based initiatives like Riverbank in New South Wales and the Victorian Water Trust. Then along came the multi-billion dollar Howard-Turnbull plan closely followed by the Rudd-Wong plan. Water shortages and water trading provide plenty of incentives in any case for water saving by the private sector.

⁸ The boom and slump in the wine industry was exacerbated by the arrival in the wine industry of self-serving boofhead brewers. Victorian officials poncing about pronouncing export targets for wine (and agricultural products generally) were no help either.

The public sector has been trawling for additional water savings for years. It is about time the penny dropped and governments recognised that further water savings are not readily available, at least for any projects with even a faint chance of passing benefit-cost tests. The FBMP/NVIRP (or Northern Dog) is the paradigm Victorian case of undue faith in engineering solutions to water policy problems that has plagued irrigation for aeons.

Buyback of water for environmental purposes is a far better bet for public expenditure provided that greater discipline is applied in the buyback process emphasising how environmental improvements will be achieved, how much society values them and how the various schemes (local to interstate) are to be coordinated. Unlike investment in on-farm and off-farm irrigation infrastructure, progress in environmental management and dealing with welfare problems in irrigation areas is still dependent on government action.

References

- Appels, D, Watson, A., Briggs, D. and Woolston, M. (2008) 'A Virtual Paper on Virtual Water', *Connections*, Paper Number 2. (Available on the website of the Australian Agricultural and Resource Economics Society).
- Batterham, R., Mauldon, R. and Ockwell, A. (1994), 'Bruce Robinson Davidson 1924-1994', *Australian Journal of Agricultural Economics*, 38 (1), 121-124.
- Barr, N. and Cary, J. (1992), *Greening A Brown Land: The Australian Search for Sustainable Development*, Macmillan Education, Melbourne.
- Cary, J.W. and Wilkinson, R.L. 1997. 'Perceived profitability and farmers' conservation behaviour', *Journal of Agricultural Economics*, 48 (1), 13-21.
- Cary, J.W., Webb, T. and Barr, N., F. (2002). Understanding landholders' capacity to change to sustainable practices: insights about practice adoption and social capacity for change. Agriculture, Fisheries and Forestry Australia, Canberra,
- Cruse, L. and O'Keefe, S. (2008), 'The Paradox of National Water Savings', Paper prepared for the Conference of Economists, Gold Coast, October.
- Davidson, B.R. (1965), *The Northern Myth*, Melbourne University Press, Melbourne.
- Davidson, B.R. (1969), *Australia Wet or Dry: The Physical and Economic Limits to the Expansion of Irrigation*, Melbourne University Press, Melbourne.
- Davidson, B.R. (1981), *European Farming in Australia: An Economic History of Australian Farming*, Amsterdam, Elsevier.
- Gyles, O. (2003), 'Valuing benefits of increasing water use efficiency', paper presented to the 47th annual conference of the Australian Agricultural and Resource Economics Society, Fremantle, February. (www.agrifood.info/connections/autumn_2003/Gyles.html)

Hillman, T. (2007) "Ecological Requirements: Creating a Working River in the Murray-Darling Basin" in L. Crase. (Ed.) *Australian Water Policy: The Impact of Change and Uncertainty* (Washington, RFF Publications).

Hopkins, P. (2008), 'Saving water is like turning on a tap', *The Age*, 09 August 2008.

Leslie, J. (2006). *Deep Water: The Epic Struggle over Dams, Displaced People, and the Environment*. Picador. New York.

Marshall, G. (2008), Nesting, Subsidiarity, and Community-based Environmental Governance Beyond the Local Level, *International Journal of the Commons*, 2 (1), pp.75-97.

Pannell, D.J. and Schillizi, S. 1999. 'Sustainable Agriculture: A Question of Ecology, Equity, Economic Efficiency or Expedience', *Journal of Sustainable Agriculture*, 13 (4), 57-66.

Perry C (2007) Efficient irrigation; inefficient communication; flawed recommendations. *Irrigation and Drainage*, 56, 367-378.

Quiggin, J. (2001), 'Environmental economics and the Murray-Darling River System', *Australian Journal of Agricultural and Resource Economics*, 45 (1), 67-94.

Rural Reconstruction Commission, *Irrigation, Water Conservation and Land Drainage*, Eighth Report to the Honorable J.J. Dedman, M.P., Minister for Post-war Reconstruction, Dated 11th day of December, 1945.

Victorian Auditor-General's Office (VAGO) (2008), *Planning for Water Infrastructure in Victoria*, Victorian Government Printer, Melbourne, April.

Wadham, S.M. and Wood G.L. (1939). *Land Utilization in Australia*, Melbourne, Melbourne University Press.

Watson, A. (2001) "Money and the Environment", *Agenda*, 8, 89-96.

Watson, A. (2003) "Approaches to Increasing River Flows" *Australian Economic Review*, 36 (2), pp.213-24

Watson, A. (2005) "Competition and Water: A Curmudgeon's View" Paper prepared for the conference 'Relationship Between Essential Facilities and Downstream Markets' organised by the Australian Competition and Consumer Commission – Gold Coast, Queensland, Australia, 28th July 2005.

Watson, A. (2006) "Contemporary Issues in Water Policy" Talk prepared for a 'Vital Issues Seminar' organised by the Parliamentary Library, Parliament House, Canberra, June 21 2006.

Watson, A. (2007a) "A National Plan for Water Security: Pluses and Minuses" <http://www.agrifood.info/connections/2007/Watson.html> (Accessed March 6, 2008).

Watson, A. (2007b), 'Bruce Robinson Davidson: 1924-1994', in J.E. King (ed.), *A Biographical Dictionary of Australian and New Zealand Economists*, Edward Elgar, pp.81-84.

Watson, A. (2007c) "The Flawed History of Irrigation in Australia: Faltering Attempts at Reform" Paper prepared for the Symposium 'Water Matters' organised by the ANU Emeritus Faculty, the ANU Water Initiative and the ANU College of Science as part of the Australian Science Festival, Canberra, August 24-25.

Watson, A. (2007/2008) 'Public Investment in Irrigation Infrastructure: Inspired Solution or Folly?' *Dissent*. Number 25, Summer, pp.31-33.

Watson, A. (2008a) 'Water Policy – Outside Looking In', Paper prepared for Outlook 2008, Canberra, March 4.

Watson, A. (2008b), 'Water Policy in Australia: Old Dilemmas and New Directions', paper presented at an *International Workshop on Sustainable Water Management Policy in Agriculture: Institutional Options and Issues* organised by the Korea Rural Community and Agriculture Corporation and Ministry of Agriculture and Forestry, Korea and held in Seoul, Republic of Korea, May 15-16.

Wentworth Group of Concerned Scientists (2008), Submission to the Senate Inquiry into the Urgent Provision of Water to the Coorong and Lower Lakes, September.

Competition and Water: A Curmudgeon's View

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(Paper prepared for the conference 'Relationship Between Essential Facilities and Downstream Markets' organised by the Australian Competition and Consumer Commission – Gold Coast, Queensland, Australia, 28th July 2005.)

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 it 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 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 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 unnoticed¹ 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.

¹ 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 1992). 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).² 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?"

² 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.³ 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 from parts of the environmental movement, irrigator interests favour more secure property

³ 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.

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."⁴ 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."

⁴ 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 Chaffey's 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 (2004) 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.⁵

⁵ 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 were set 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.⁶ 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.

⁶ 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).⁷ 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

⁷ 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.⁸ 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 of 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?⁹ 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?

⁸ 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.

⁹ 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 preceded 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 Burnet 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.

References

ABC Online, 'Levy mooted for Murray food.'
<http://www.abc.net.au/news/newsitems/200503/s1333944.htm>

ACIL Tasman (2003), *Scope for Water Use Efficiency Savings as a Source of Water to Meet Increased Environmental Flows – Independent Review*, Report to the Murray-Darling Basin Commission, Canberra.

Barr and Cary (1992), *Greening A Brown Land: The Australian Search for Sustainable Development*, Macmillan Education, Melbourne.

Bryan, B. and Marvanek, S. (2004), *Quantifying and valuing land use change for Integrated Catchment Management evaluation in the Murray-Darling Basin 196/97 – 2000/01: Stage 2* Report to the Murray-Darling Basin Commission, CSIRO Land and Water Client Report.

Bjornlund, Henning (2003), 'Empirical Evidence of Factors Driving Prices Paid, Volumes Traded and Number of Transfers in Permanent and Temporary Markets', Section 2 of Draft Final Report for ARC-SPIRT Project, 'Elements of the Next Generation of Water Market Policies, which are Socially Equitable and Ecologically Sustainable Within Rural Communities.'

Council of Australian Governments (CoAG) (1994), *Report of the Working Group on Water Resources Policy: Communique*, February.

Crean, J. (2003), 'Agri-environmental conservation – the case for an environmental levy', paper presented to the 47th annual conference of the Australian Agricultural and Resource Economics Society, Fremantle, February.
(http://www.agric.uwa.edu.au/ARE/AARES/News/Con_Spg_2003.htm)

Davidson, B. (1965), *The Northern Myth*, Melbourne University Press, Melbourne.

——— (1969) *Australia Wet or Dry: The Physical and Economic Limits to the Expansion of Irrigation*, Melbourne University Press, Melbourne.

Department of Agriculture, Fisheries and Forestry (2005), *Stocktake: Australian Agriculture and Food Sector*, Canberra.

Dwyer, T. (2005), 'The Economics of Water Supply – Scarcity or Abundance', mimeo.

Foran, B, Lenzen, M and Dey, C. (2005), *Balancing Act: A Triple Bottom Line analysis of the Australian Economy*, Volume 1, CSIRO and University of Sydney.

Frontier Economics (2005), *Review of pricing policies prepared for Goulburn-Murray Water*, Melbourne.

Gillespie and Bennett (2004) 'Linking Science, Community Consultation and Economics: The Living Murray Project', paper presented to the 48th annual conference of the Australian Agricultural and Resource Economics Society, Melbourne, February.

Goesch, T. and Heaney, A. (2003), *Government Purchase of Water for Environmental Outcomes*, ABARE eReport 03.22.

Gyles, O. (2003), 'Valuing benefits of increasing water use efficiency', paper presented to the 47th annual conference of the Australian Agricultural and Resource Economics Society, Fremantle, February. (www.agrifood.info/connections/autumn_2003/Gyles.html)

Godden, D. (2005), Review of 'Economia: New Economic Systems to Empower People and Support the Living World', by Geoff Davies, *Australian Journal of Agricultural and Resource Economics*, 49 (2). 233.

Independent Pricing and Regulatory Tribunal of New South Wales (IPART) (1996), *Bulk Water Prices: An Interim Report*, Sydney, October.

Industry Commission (1992), *Water Resources and Wastewater Disposal. Report No. 26*, Australian Government Publishing Service, Canberra.

Lane, M. McDonald, G. and Morrison, T. (2004) 'Decentralisation and Environmental Management in Australia: A Comment on the Prescriptions of the Wentworth Group.' *Australian Geographical Studies*, 42 (1), 103-115.

Lim, R.K.H. and Dwyer, T.M. (1999), *Infrastructure Pricing, Provision and Process: Implications for Rural Australia*, RIRDC Publication No. 99/162, Rural Industries Research and Development Corporation, Canberra.

Macintosh, A. and Denniss, R. (2004), *Property Rights and the Environment: Should farmers have a right to compensation?* Discussion Paper Number 74, Australia Institute, Canberra.

Marohasy, J. (2003), 'Myth & the Murray: Measuring the real state of the river environment,' *IPA Backgrounder*, 15 (5).

_____ (2004), 'Environmental Fundamentalism', *Policy*, 20 (3), 41-45.

Moran, A. (2005), 'It's all a big snow job', *The Age*, Melbourne, July 4.

Murray-Darling Basin Commission (2005), *Survey of River Red Gum and Black Box Health along the River Murray in New South Wales, Victoria and South Australia – 2004* (Brett Lane and Associates: Ecological Research and Management), MDBC Publication No. 06/05.

Murray-Darling Basin Ministerial Council (2002), *The Living Murray: A discussion paper on restoring the health of the River Murray, Stage 1: Informing and engaging the community*.

Musgrave, W. (1996), 'The Irrigation Industry in the Murray-Darling Basin and Aspects of its Reform', in J.J. Pigram (ed.), *Security and Sustainability in a Mature Water Economy: A Global Perspective*. Armidale, Australia: University of New England, Centre for Water Policy Research.

_____ (2000), 'The Political Economy of Water Price Reform In Australia', in Ariel Dinar (ed.), *The Political Economy of Water Price Reforms*, Oxford University Press, A World Bank Publication, 299-319.

National Water Commission (2005), *Water Smart Australia Programme Guidelines*, Australian Government Water Fund, Water Smart Australia.

Pannell, D. (2004), 'Thinking Like an Economist 4: Who Should Pay for the Environment?' *Pannell Discussions* No. 21. 11 October. Available on the net at <http://www.general.uwa.edu.au/u/dpannell/pd/pd0021.htm>

Paterson, J. (1987), 'The Privatisation Issue: Water Utilities', in Abelson, P. (ed.), *Privatisation: An Australian Experience*, pp. 181-204, Mosman, Sydney: Australian Professional Publications.

Pratt, R. (2005). Address to Water Summit, March 30 2005.

Pratt Water (2004), *The Business of Saving Water: The Report of the Murrumbidgee Valley Water Efficiency Feasibility Project*, December.

Sieper, E. (1982), *Rationalising Rustic Regulation*, CIS Research Studies in Government Regulation 2, Centre for Independent Studies, St. Leonards, N.S.W.

Randall, A. (1981), Property Entitlements and Pricing Policy for a Maturing Water Economy, *Australian Journal of Agricultural Economics*, 25 (3) 195-220.

Read Sturgess and Associates (2000), *Rapid appraisal of the benefits and costs of nutrient management*, prepared for the Department of Natural Resources and Environment.

Smith, D. I. (1998), *Water in Australia: Resources and Management*, Oxford University Press, Melbourne.

Snowy Hydro Limited (2005) 'Briefing Paper to the National Competition Council', 24 February.

Snowy Mountains Engineering Corporation and Psi-delta (2001), *Alfred Deakin Irrigation Project Feasibility Study*, Volume 1.

Victorian Government White Paper (2004); *Securing Our Water Future Together: Our Water, Our Future*, Melbourne.

Watson, A.S. (1995), *Conceptual Issues in the Pricing of Water for Irrigation*, Dairy Research and Development Corporation, Melbourne, December,

_____ (2005) 'Airport Environmentalism', Review of Claire Miller, *Struggle for the Snowy: The Grassroots Campaign to Save a National Icon*, *Agenda* (forthcoming).

Wentworth Group (2002), *Blueprint for a living continent: a way forward from the Wentworth Group of concerned scientists*, WWF (World Wide fund for Nature) Australia.

_____ (2003), *Blueprint for a national water plan: the Wentworth Group of concerned scientists*, WWF Australia.