



The Policy Attraction with Water Supply Infrastructure

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The political fallout from the release of the Guide to the Proposed Basin Plan in the Murray-Darling is illustrative of the difficulties associated with re-allocating water resources. The response of Minister Burke has been somewhat predictable, with a resurgent interest in public subsidy of irrigation infrastructure. This article is used to examine the policy background to the Guide and critically considers further subsidy of irrigation infrastructure. The paper concludes that infrastructure investment at the expense of the public purse will fail to deal with the problems at hand and generate a plethora of additional problems.

Key Words: *Water policy; Water planning; Water-use efficiency; Subsidy; Food security*

Introduction

Following the recent well-publicised release of the Guide to the Proposed Basin Plan (the Guide), there can be no doubt that water remains one of the most politically contentious resources, especially when it comes to its re-allocation amongst competing users. The somewhat remarkable media frenzy that attended some of these events is also testament to how little is generally understood of the economics of water and the challenges of policy formulation in this field. And perhaps not surprisingly, politicians have yet

again been all-too-keen to embrace simplistic arguments based on spurious interpretations of water-use efficiency and water savings to avoid directly dealing with the serious issues that attend historical water allocation approaches in this country.

Illustrative of the pervasiveness of the problem are the terms of reference on offer from the Standing Committee on Regional Australia. The Committee is charged with inquiring and reporting on the socio-economic impacts of the proposed Basin Plan. Of the three areas of reference ascribed by the Standing Committee, two make direct reference to technological 'fixes' either in the form of "delivering infrastructure and technologies aimed at supporting water-efficiency within the Murray-Darling Basin" or "options for water-saving measures or water return" (SCRA 2010). In addition, one of the three community views to be interrogated by the Standing Committee is centred on "measures to increase water efficiency and reduce consumption" (SCRA 2010). No direct reference is made to the cost of these interventions and the impacts on the broader economy in the longer term, arguably implying that any increase in localised water-use efficiency is meritorious in its own right.

For scholars and analysts of water policy in this country this is a remarkably disappointing trip 'back to the future'. Considerable intellectual, scientific and empirical work has already been undertaken to highlight the folly of further public involvement in irrigation infrastructure works, whether they be under the guise of 'efficiency' or other arguments (see, for a summary, Crase and O'Keefe 2009; Quiggin 2010; McClintock 2010). Additional public expenditure

in this field appears destined to further burden current and future generations of taxpayers, limit the adaptiveness of regional communities that have some reliance on irrigation, and weaken the capacity of the national economy more generally.

This brief paper provides a synoptic overview of the major flaws and contradictions in a policy response founded on public subsidy of irrigation infrastructure often disguised as water-use efficiency or water savings and, more recently, portrayed as productivity enhancement. I also explore the weaknesses embodied in the conceptualisation of water management solely as a supply-oriented problem.

The paper itself is divided into three additional parts. In section two I briefly describe the policy episodes that provide the context for the proposed Basin Plan and the public debate that emanated from the release of the Guide. Section three is used to systematically reflect on the interests of those involved in this debate along with some of the empirical and economic work around infrastructure and water supply decision generally. The final section offers some brief concluding remarks.

Water Scarcity and Over-allocation

As part of the 2004 National Water Initiative (NWI) all jurisdictions undertook to address the over-allocation of water resources. Notwithstanding that the notion of 'over-allocation' is itself problematic¹, the basis of this decision was

¹ Allocating water away from one use to another is efficiency enhancing up to the point where the marginal value in each use is equivalent. To argue that 'too much' water is allocated to

the overt decline in the ecological health of streams, especially those in the Murray-Darling Basin. Ample data were also on hand to suggest that the generous entitlements handed out in the wetter phases of the twentieth century were proving problematic during periods of extended dry.

Regrettably, addressing 'over-allocation', or more accurately shifting the available water resources from one beneficiary to another, is hardly a simple political task. And yet an economic perspective can be used to offer some guidance on how the chore might be sensibly approached.

At its most rudimentary level, redistributing water from consumptive users to benefit the environment has already been attempted on three fronts. First, there has been a program of infrastructure investment aimed at making water use more 'efficient'. Having subsidised infrastructure to enhance 'efficiency', the state has assumed that some of the purported 'water savings' can then be garnered for environmental use. Of the three policy approaches addressed in this paper, infrastructure investment has attracted most financial support, with \$5.8 billion allocated under the *Sustainable Rural Water Use and Infrastructure Program* within the Federal government's *Water for the Future* strategy. This is in addition to the investments made as part of the Living Murray Program and the undertaking to fund infrastructure designated as 'state priority projects' (CoAG 2008).

irrigation requires an understanding of the value of water in its alternative (environmental) use. This is no simple task because (a) there has been inadequate investment in the science to understand the impacts of diverting water to achieve ecological gains, and (b) tracing the relationship between ecological gains and the human value ascribed to those gains has also been underdeveloped. Whenever allocation decisions are made with little reference to the market, reaching equivalence across alternative uses remains a remote prospect, especially given the penchant for governments to under-invest in the science required to answer these two rudimentary questions.

The second policy approach to address over-allocation involves administrative or rule-based modifications to extractive rights, so as to reassign water for environmental uses. Perhaps the most prominent of these is the imposition of the Murray-Darling Basin Cap, although other examples, such as the reclassification of 'sales water' in Victoria and the recognition of environmental demands in state-based water sharing plans are also illustrative of this policy approach. Notwithstanding the negative publicity attracted when invoked, the administrative or rule-based approach has been employed relatively infrequently. Amongst other factors, the high political costs of this response probably account for its limited use until this point. It is also worth noting that, while politically costly, there are also economic costs to this approach insomuch as it impacts on the wider conceptualisation of property rights and sovereign risk².

Third, a repurchase or 'buyback' program has been deployed with the aim of accumulating an environmental water reserve by buying water from willing sellers. Buyback has been primarily undertaken through the *Restoring the Balance* Program, although smaller state-based programs have also been adopted (e.g. RiverBank in NSW). Initially \$3.1 billion was to be spent on buyback between 2007/08 and 2016/17, with most funds being acquitted between 2012/13 and 2016/17. However, the Productivity Commission (2010) reported that much of this expenditure was to be brought forward and

² Whilst governments are generally reluctant to undermine private rights, without the generous revenue from a minerals boom and faced with a chronic environmental problem the state could still opt to unilaterally reduce water access without compensation. Regrettably, the objectors to the buyback of water rights appear to be overlooking this point.

is now scheduled to occur between 2009/10 and 2012/13. By June 2010, buybacks had resulted in the accumulation of over 700 Gigalitres of water products of varying reliability. As a general rule, buyback has focussed on acquiring long term water access rights (sometimes termed 'permanent water' rights or entitlements) from willing sellers via an open and rolling tender. Most water has been sourced from regulated parts of the catchment (i.e. sections of the river system where dams are in place to capture and control flow). It is also worth noting that almost all achievements on this front are contemplated in volumetric terms, presumably assuming that simply diverting more water down the river will deliver an environmental outcome at least equivalent to the cost of securing that volume of water³.

It was against the background of these three policy approaches and the perceived slow pace of dealing with the over-allocation issue that the Commonwealth Water Act of 2007 was crafted⁴. The Act emphasised the need to take restorative and prompt action by ensuring that the water demands of the environment were met. The Act required that the Murray-Darling Basin Authority be established with the expectation that a Basin Plan be formulated on the best available science by 2011. The Plan was to be used as the mechanism for establishing Sustainable Diversion Limits (SDL) that reflected an Environmentally Sustainable Level of Take (ESLT). The ESLT for a water resource is defined as the level at which water can be taken

³ The limitations to this approach are addressed elsewhere (e.g. Ergas 2010; Bennett 2010; Crase, O'Keefe and Dollery forthcoming) but nevertheless warrant urgent attention by policy makers.

⁴ It is also worth noting that the original architect of the Act, former Prime Minister Howard, was arguably seeking political mileage with an impending election and weak polls preceding the formulation of the initial Bill.

from that water resource which, if exceeded, would compromise key environmental assets (KEA) of the water resource, or key ecosystem functions (KEF) of the water resource, or the productive base of the water resource, or key environmental outcomes (KEO) for the water resource. According to the Act environmental assets include water-dependent ecosystems, ecosystem services and sites with ecological significance. The Act was passed with the support of both sides of parliament in 2007 as were the subsequent strengthening amendments in 2008.

Notwithstanding the substantive difficulties of defining and then applying notions of this form, the Act poignantly made no direct mention of the operational apparatus by which the new SDL would be achieved. Put differently, it was not clear (at least from the Act) whether any changes to extractive use would be achieved by further infrastructure investments (which was already under scrutiny on hydrological and cost grounds – e.g. Crase and O’Keefe 2009), modifications to access rules by administrative process (which, as noted earlier, carry their own costs) or buyback. It was also apparent by now that the programs already in train were likely to deliver around 20 per cent of all extractive rights to the Commonwealth Environmental Water Holder as an environmental reserve (Keogh 2010). The means of bridging the ‘gap’ between the extant reserve and the new SDL was settled as part of the lead up to the Federal election in 2010 with the Labor Party declaring that it would use buyback to accomplish this task.

The Murray-Darling Basin Authority took the extraordinary step of releasing a Guide to the Proposed Basin Plan (the Guide) in October 2010. At the time it was claimed that this was to provide an opportunity for community consultation, over-and-above that which was mandated. The 'headline' was captured by the proposed SDL, and special attention was given to how this would impact on extractive users and others in regional communities. This had two components; the emphasis on an average 27-37 per cent reduction in extractions to achieve a 3000-4000 Gigalitre return to the environment, and the potential impacts on employment in particular communities. At the time, relatively little attention was given to outcomes from existing programs, like *Restoring the Balance*, that were scheduled to deliver about a 20 per cent reduction in extractions, even without the plan. There was also little attention paid to the decision that all reductions were to be achieved with the support of compensation via the public purse to willing sellers. Similarly, the fact that the Authority had already dismissed a higher SDL (4000-7600 GI) on the basis that "this would not represent an optimisation of economic, social and environmental outcomes" (MDBA 2010: xxi) was also broadly overlooked. Finally, almost no mention was made of the proposed phasing in of these changes – over many years in some jurisdictions.

The resultant response from particular sections of the community and the enthusiasm to explore particular aspects of this debate in the media manifested in several important responses by key sections of the polity. First, the Chair of the Authority claimed that there were weaknesses in some of the underlying science and publicly proclaimed that insufficient work had been

undertaken to examine the economic impacts of the re-allocation of water resources. Notwithstanding that significant research work had already been completed (e.g. ABARE-BRS 2010; Marsden Jacob 2010), the Authority announced in the midst of the consultation process that it would commission additional work to consider the regional economic and social consequences of re-allocation. Second, debate emerged around the legal interpretation of core components the Act. In this context particular attention focussed on the extent to which the designers of the Plan were expected to trade-off environmental, economic and social outcomes. The upshot was that the Minister announced that he had received legal advice that indicated that “environmental, economic and social considerations are central to the Water Act and that the Basin Plan can appropriately take these into account” (Burke 2010: 4). The Minister was keen to note that he did not offer this advice as criticism of the Authority, but it was nonetheless clear that there was an expectation that the MDBA should respond.

In a peculiar twist, the Minister also announced an enthusiasm for a suite of measures to address any re-allocation, especially given that the Prime Minister had already previously announced that buyback was to be the means by which the gap between SDL and existing limits would be breached. More specifically, Minister Burke announced that:

“Investment in all forms of infrastructure needs to take place. This includes centralised irrigation infrastructure, on farm infrastructure and works and measures to more efficiently and effectively manage our

environmental assets. The purchase of water allocations through the market will need to continue and this must only be from those who have chosen to put all or part of their allocation on the water market” (Burke 2010: 4).

The rationale for the shift in policy appears to lie in the presumption that irrigation infrastructure investments will bring forth a range of economic and social responses that will limit the impacts on regional communities, while simultaneously delivering on the required environmental changes. In this context Minister Burke (2010: 5) noted that “every extra efficiency in water use, and every productivity improvement derived from research and development *directly helps all* members of the community” (emphasis added).

This apparent faith in irrigation infrastructure investments and the underlying misguided attention to water supply to the exclusion of almost all else are addressed in the following section.

Faith in Public Subsidy for Water Supply Infrastructure

I noted earlier that three basic policy mechanisms have been deployed to deal with the re-allocation of water to environmental demands. Public investment in irrigation infrastructure has dominated these approaches, at least in fiscal terms. The basic idea of investing in infrastructure in order to ‘save’ water is premised on the notion that water that is not captured as part of evapotranspiration in the process of production has no value. However, there is a major flaw to this approach, especially in a river system that is fully

allocated. Water that seeps into groundwater or returns to streams has not 'gone to Mars' (Cruse 2010). Rather, because of its fugitive nature this water is often already allocated to another user and to halt its flow simply reallocates the resource in time and space. And yet the enthusiasm for such measures seems boundless, especially when sponsored by someone else's money (taxpayers). If the policy aim was to benefit some users of water at the expense of others, then public support for water-use efficiency programs might be considered worthwhile. However, this is not the *stated* ambition of the policy which is supposedly helping *all* members of the community.

The existence of a water market in the Murray-Darling for more than a decade and the assignment of a monetary value to water means that 'water saving' measures that pass economic muster have already been adopted by rational farmers (Cruse 2010). If an individual or collective farming groups can economise on the use of water inputs by installing technologies they will have done so up to the point where the costs of the infrastructure broadly equates the gains from water saving. Ironically, for individual farmers it is often not the incentive to save water inputs that has driven adoption of such technologies – rather it is the combined incentives to reduce labour costs and to better control the quality of outputs⁵. Public subsidy of infrastructure in these circumstances should be limited to those cases where there are overt spillover benefits that might not be captured by private interests, say in the form of preventing recharge of saline groundwater. In many cases this is the exception and not the rule, with water purportedly 'saved' by infrastructure

⁵ The irony is that the current rhetoric paints such technological fixes as the preservers of jobs in agriculture.

producing negative spillover effects to those with weaker rights (often environmental interests or downstream users). Much of the policy flaws in this regard can be traced to the weak understanding of concepts like 'water-use efficiency' and how it impacts on farmer behaviour.

Water-use efficiency is a term used to describe the ratio of water inputs to outputs. Most commonly it is expressed in Australia as tonne of output per Megalitres (e.g. 6 tonne per Megalitre). Whilst useful for those with an interest in the production of particular crops it is largely meaningless as a water policy metric. First, as has already been noted, tonnes per Megalitres at a given farm site takes no account of the purpose for which 'wasted water' was assigned. Even in production terms it is desirable, in some instances, to apply more water per tonne in order to prevent the build up of salts in the root zone for future crops. Second, water-use efficiency measures take no account of the value of outputs. Thus, excessively focussing on the water that can be saved via improved supply runs the risk of seriously violating the standard conditions for allocative efficiency. In simple terms, it is one thing to use the minimum quantum of water to produce a quantum of grapes and another thing entirely as to whether the market is willing to pay for those grapes. In this regard it is worth scrutinising the markets into which agricultural outputs from the Murray-Darling Basin are sold.

There is considerable confusion around the food and fibre that are produced in the Murray-Darling Basin and the incentives that underpin that production. An important distinction not always made clear exists between irrigated and

dryland agriculture. All-too-often it is noted that the Basin accounts for around 40 per cent of Australia's agricultural outputs (e.g. MDBA 2010: xv). What is less publicised is that about two thirds of this production commonly pertains to dryland agriculture, although this is obviously a function of annual water availability. For example, in 2006 the Gross Value of irrigated agriculture was about \$5.5 billion compared with \$15 billion for all agriculture in the Basin (ABARE-BRS 2010). In simple terms, a sizeable portion of the agricultural outputs from the Basin are not impacted by reforms to irrigation and this is often overlooked or obscured by debates pertaining to re-allocation of water.

Another important nuance is that much of the food and fibre produced in the Murray-Darling is destined for export – around 70 per cent. There are two reasons why this nuance has important policy ramifications. First, arguments pertaining to the food security of the domestic population are largely weakened by this reality, although this does not prevent extensive use of this relatively primal argument. Second, since Australia agricultural products are ostensibly sold into world markets where no market power is enjoyed by local producers, changes to irrigated agriculture in the Basin can be expected to have no discernable impact on output prices. To suggest otherwise is tantamount to scaremongering the local populace or rent-seeking.

Ergas (2010) succinctly describes the latter aspects of this behaviour and labelled irrigation lobbyists as “rent-seekers extraordinaire”. The economics to Ergas' argument is fairly straight forward although largely misunderstood (or conveniently ignore) by policy makers. Since the producers of agricultural

goods are price takers, any subsidy that reduces costs will result in an increase in extraordinary profits (what economists call rents). The perverse part of this policy is that under these circumstances producers will have an incentive to increase production, thereby using more water. To suggest that subsidising irrigation infrastructure will reduce water use goes against standard economic logic (as well as the logic of hydrology). It also ignores the voluminous international literature that shows that publicly-sponsored investment in irrigation infrastructure will ultimately increase water use, not decrease it (see, for example Perry 2009). Thus, if the intention is to use public funds to re-allocate water so it is held in streams, subsidised infrastructure investment misses the mark considerably.

Another important dimension to the economics of this debate pertains to the flow-on effects to others who are not directly associated with irrigated agriculture. As Minister Burke noted “those who work in town are never willing sellers” (2010: 4), implying that the benefits of buyback are more constrained than those that purportedly accompany infrastructure investment.

There are at least three important aspects to this approach which are clearly not understood. First, the adoption of water-use efficiency measures by farmers is not, of itself, driven by an incentive to shield the wider community from change. As noted earlier, there is ample evidence to suggest that such technologies are adopted with the intention of saving on labour costs. It is difficult to see how this can be rationalised against the claimed concerns for the employment and prosperity of other regional inhabitants.

Second, the use of (euphemistically labelled) economic analysis to model some of the regional flow-on effects gives rise to spurious and meaningless policy outcomes. For example, take the argument used to justify additional public investment in the Northern Foodbowl Modernisation Project in Victoria (later termed the Northern Victorian Irrigation Renewal Project – NVIRP – and subsequently dubbed the ‘Northern Dog’ by agricultural economists). Stage One of this project was funded by ostensibly taxing Melbourne’s water users to the tune of \$1 billion. Stage Two is to be supported by the federal taxpayer, but supposedly required that a due diligence test be passed before proceeding. To demonstrate that the benefits of Stage One outweighed the costs, the employment of labour generated by installing lavish irrigation technologies was included as a benefit. Notwithstanding the rudimentary arithmetic errors reported by the press (see, Fyfe 2010), this approach to estimating the benefits from forthcoming public investments is a nonsense. To apply this approach and make sensible comparisons would require the modelling of at least a reasonable sub-set of alternative future public investments and policy choices – an approach ignored in the assessment of NVIRP.

In order to demonstrate this point, imagine that an economic model was developed to assess the employment impacts of paying people in high unemployment areas of the Basin to simply dig a hole and fill it in again. The upshot would invariably be an increase in regional employment and regional income, as the recently employed increase their local expenditures. The likely

ridicule attracted by such a program in the press (and elsewhere) is unlikely to be silenced by claims from the proponents about the wider employment benefits and the retention of jobs in the region. And yet this is precisely the argument being used to rationalise large sums of public money being diverted to particular interests so that subsidised irrigation infrastructure is available to a few. If such measures are designed to benefit “all members of the community”, as claimed by Minister Burke, then clearly ‘the community’ does not include taxpayers.

Third, there is another important underlying assumption in the discussion about the flow-on effect of infrastructure versus buyback. This relates to the supposition that infrastructure offers sustainable employment for regional communities whilst buyback does not. The reality of the recent extended drought should bother both taxpayers and infrastructure devotees on this front. During the recent drought irrigators did not just confront lower-than-usual annual allocations; for many, a sequence of years with zero allocation was the reality. When this is the case, perennial enterprises that are geared to benefit from and support elaborate irrigation infrastructure become a significant burden. As it stands, the publicly-funded infrastructure in many of these projects (including NVIRP) does not attract a return to capital or a return on capital from the end users. In simple terms, irrigators are barely paying operating costs and the costs of renewal will ultimately come back to others (probably future taxpayers). Against this backdrop, to present irrigation infrastructure as the employment saviour for regional communities in the face of climate change is tantamount to a cruel hoax. Moreover, should the public

purchase be smaller during the next episode of drought and forced restructure, the 15,000⁶ beneficiaries of the present subsidies are unlikely to willingly distribute their spoils to those who are displaced.

Two final points pertaining to the policy choice between buyback and subsidised infrastructure warrant mention. A divide already exists between those who would willingly sell their water and the irrigation infrastructure enthusiasts (see, Holman 2010). Many irrigators are cognisant that water assets represent a substantial part of the equity in their enterprises. Moreover, the involvement of the government (or others) in the purchase of water to achieve environmental ends raises the price of water entitlements, thus increasing farmers' net worth. For those seeking to exit agriculture or for those willing to use the annual allocation market to manage water availability, buyback is viewed as a significant benefit. In contrast, those with strong political influence within community irrigation districts stand to gain most from infrastructure upgrades and would prefer to limit buyback. This has two elements: (1) the infrastructure enthusiast is able to buy water from their exiting neighbours at a discount only so long as government buyback is constrained and; (2) irrigators with influence can ensure that their own portion of the irrigation network is more heavily subsidised than others, thus raising the rents from their own land relative to others. Put simply, not all irrigators are favoured by subsidised irrigation infrastructure and not all members of the community can be expected to benefit. Thus, to present "every extra efficiency in water use, and every productivity improvement derived from

⁶ Another point often overlooked is that there are a relatively modest number of irrigated businesses in the Basin. When contemplating the spending of billions of dollars of public money on irrigation infrastructure this makes for a sobering denominator.

research and development [as] *directly help[ing] all* members of the community” is either breathtaking naïve or shows a complete disregard for the politics at work in this debate. In any case, given that infrastructure projects are already proving to be at least four times more costly than buyback (Productivity Commission 2010), and will likely become even more costly as the few low-hanging projects are implemented, the approach to infrastructure subsidy shows callous disrespect for the taxpayer and the welfare of the community at large.

Concluding Remarks

The governance of water is highly contested, as evidenced by recent events circumscribing the Murray-Darling Basin Plan. The historical focus on mastering water supply so that it routinely meets demand, regardless of economic value, has led to a strong tradition of engineering fixes in both agricultural and urban water contexts. Arguably, this is neither surprising nor limited to the Australian policy milieu.

However, in the Australian public policy domain this is (hopefully) a diminishing trend. The fixation with water-use efficiency and shoring up supply has prompted a naivety amongst policy makers who all-too-easily ignore or downgrade economic realities in favour of the next infrastructure project. The recent policy shift on the part of Minister Burke to overtly favour additional publicly-funded infrastructure investment is testament to the challenge for economists and those with the interests of taxpayers at heart. This is not helped by the ill-informed or mischievous pap offered by some who

carelessly promote ill-founded concerns about domestic food security and offer the notion of water-use efficiency as both panacea and dogma.

Economics has much to offer in both addressing the present problems of water re-allocation and ensuring that institutions are in place to manage longer term scarcity. A sensible approach allows for institutions that can account for the value of outputs, the demand for water and the contribution of complementary factors of production. The present policy approach focuses almost solely on supply of water inputs and is fixated with subsidising irrigation infrastructure at almost any cost. This is the antithesis of a sound policy response.

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