NSW Parliament Water Management Inquiry 2010

This submission briefly addresses likely impacts of climate change on the availability of water resources in the Namoi Valley as well as approaches to the management of water resources by water users in that region but is particularly focused on the Inquiries final reference point: best practice in water conservation and management.

Introduction

The Water Market introduced by the *Water Management Act 2000 NSW* ('the WMAct') is not a responsible approach to water conservation and management because it embodies a "hands off" approach these responsibilities, ignoring positive incentives to promote sustainable water use so to diminish irrigators economic reliance on unsustainable practices such as flood irrigation. Moreover, in assuming that all irrigators over use water, it fails to assess the viability of sustainable water use already successfully practised in NSW.

Water Market

Since a market is simply one of a number of instruments for managing water resources in a sustainable fashion, freedom of choice is inevitably limited by the requirements for sustainability. The law cannot create a market, but instead recognises or puts in place arrangements 'that enable potential or actual

participants to trade with confidence.'[1] Economic commercial aspects common to markets (in particular, value of the asset) include:

- 'competitiveness: which requires a sufficiently large number of traders in a market so that one, or a few, cannot dominate it'[2]
- comprehensive information relating to risks inherent to legal, resource, hydrological and environmental concerns so to establish the assets relative commercial value, and
- ownership of the relevant asset.[3] Exclusive ownership, typically a right of property is essentially title that is traded. However, 'water in its natural location belongs to nobody in particular, it may belong to a person when a person lawfully exercises rights of access to it by taking it into physical possession.'[4] Therefore, the right accrued is not a tangible asset as the owner cannot possess the water without difficulty.

These factors influence the degree of confidence in the market by providing 'freedom of choice based on individual ownership together with full knowledge and an open process.'[5] While government agencies may have been involved in creating a framework for these arrangements, no such agency is directly involved in establishing, operating or maintaining such a system, this is the role of the market which relies in a practical sense on irrigation corporations.[6]

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[1] Fisher DE Markets, water rights and sustainability 2006 23 *Environmental Planning Law Journal* 100
[2] Ibid at 105.
[3] Ibid at 104.
[4]Ibid at 105.
[5] Ibid at 105.
[6] WMAct Chapter 4 division 2.

The National Water Initiative ("NWI") identifies a water access entitlement as an interest 'capable of being traded as freely as possible', expressing the asset in two different ways: first as a 'perpetual or open-ended share of the consumptive pool of a specified water resource as determined by the relevant water plan'[7]; secondly, it is 'a perpetual or ongoing entitlement to *exclusive* access to a share of water from a specified consumptive pool as defined in the relevant water plan.'[8] 'The former refers to a share of a water resource and the latter to exclusive access to a share of water.'[9] Thus, although it is no more than a right of access to a share of a common water resource, '[t]his interest is capable of individual ownership'.[10] However, water access entitlements do not give any rights in relation to a particular quantity of water or a particular use of the water, a priority which is achieved by allocating water to a water access entitlement.[11] Additionally, regulatory approvals enabling water use at a particular site for a particular purpose are required before extraction,[12] and are consequential to a share of a water resource.

> The commercial value of a water access entitlement is necessarily a reflection not only of the water access entitlement itself, but also of the water allocation and the water use approval. In this sense, a water access entitlement is a fiction while water allocations and water use rights are real.[13]

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[7] Council of Australian Governments, *Intergovernmental Agreement on a National Water Initiative* (2004). at [28].
[8] Ibid at Sch B(i) and (ii) emphasis mine.
[9] Above n 1 at 106.
[10] Ibid.
[11] Id at 106 and above n 7 at [29].
[12] Id at 106 and above n 7 at [30].
[13] Above n 1 at 106.

Additionally, water use approvals identify the purpose for which the water may be used and the extraction infrastructure to be used at a particular location. 'While a water allocation specifies either consumptive or environmental purposes, a water use approval specifies the actual purpose for which the water may be used.'[14]

> The relationship between these three instruments has substantial implications for a market regime. This is particularly important in the case of a transfer. Each of these three instruments may be transferable. But unless each is held by the same person, the capacity to benefit from them may be severely limited.[15]

Trade is not likely to occur unless a transferee holds an approval for water use as the value of both the entitlement and allocation is severely compromised.[16]

Definitive water allocations (defining actual availability of water), are essential to dispel uncertainty and meet the requirements of 'full information', identified above, as well as the hydrological issues associated with using it. A functioning market requires that a particular water allocation is capable of identification at any time 'if it is to be physically moved or conveyed from one location to another as a consequence of a transfer of one of these instruments.'[17] 'This is particularly

[14] Id at 107.
[15] Ibid.
[16] Ibid at 108.
[17] Id at 107.

difficult because of the physical characteristics of water. Water – unlike some other natural resources – is not confined within cadastral boundaries.'[18]

As such the NSW water market is confounded by the nature of the resource prompting reliance on certainty of identification of the resource which is an unsatisfactory simplification to the extent that it is actually burdened by the exigencies of regulation and policy imperatives.

> Titles and approvals are the instruments able to be transferred, dealt with and hence traded in a market. The commercial value of these titles and approvals depends not only upon the way they are structured but also upon the range of prohibitions, restrictions and conditions in the form of rules contained either in the legislation or in the plans. These arrangements are far from simple. Their transparency, stability and predictability depend entirely upon the detail of the relationship between the various elements of the system.
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> Markets, water rights and sustainable development cannot come together effectively in a unified system except in accordance with such a complex legal structure. A market is predicated upon freedom of choice. Planning and regulation are predicated upon restriction of choice. A legal system is capable of acknowledging or creating an open trading system in water rights but the law cannot create unrestricted

[18] Ibid.

> trading in water rights consistently with the sustainable development of water resources.[19]

Water prices

The function of the water market is to raise the value of the resource to its highest point. A number of factors, gleaned from the active water market, have impeded this function:[20]

> Prices paid in the market for water entitlements should not reflect immediate fluctuations in supply and demand for water and commodity prices, as was found for prices in the market for water allocations. The purchase of a long-term water entitlement is a capital investment and should therefore reflect longer-term factors in the economy and long-term trends in commodity prices and supply factors. Macro-economic factors are expected to play a more significant role in setting prices as should lagged commodity prices and supply indicators. It should further be considered that transfers of water entitlements are often subject to a long approval process, and that a price agreed on for a transaction approved in December is therefore likely to be negotiated between June and September or even earlier. The price agreed on has therefore been based on the economic signals at that time.

[19] Ibid at 112.
[20] Bjornlund H and Rossini P 'Fundamentals Determining Prices in the Market for Water Entitlements – An Australian case study.'(2007) 23 *International Journal of Water Resources Development* 537 at 537.

In these circumstances price uncertainty is likely to have an impact on the ability of the water market to meet its goal of raising the value of water to its highest price.

Uncertainty

The National Water Commission has admonished the NSW government for subverting the security of entitlements:[21]

> Security of water access entitlements is a key tenet of the National Water Initiative, and such security is challenged by decisions to reduce water allocations carried over or traded into accounts. Under the National Water Initiative NSW has agreed to clearly specify entitlements and to foster a soundly based and confident understanding of these entitlements by entitlement holders. The recent events call into question the management of water entitlements and allocations in NSW, particularity in a period of extreme water scarcity. It will therefore be important for the NSW government to make every effort to restore confidence in water entitlements, and in its arrangements for managing allocations.

The difficulty of bringing together private and public interests is palpable in relation to the transferability of water allocations but more particularly, water use approvals, as the criteria for accreditation may be different for the transferee in comparison to the transferor in light of the following circumstance:

[21] Australian Government National Water Commission http://www.nwc.gov.au/www/html/844-water-allocation-decisions-in-nsw.asp

> [A] water use approval requires consideration of a whole range of matters – eg hydrological and environmental – that are site-specific and location-specific and that are not directly relevant to the wider and more strategic issues underlying the grant of water access entitlements and water allocations.[22]

Environmental water

While the NWI implies the relevance of market instruments for the purpose of providing environmental water, 'the critical difference between arrangements for the use of water for consumptive as distinct from environmental purposes is the status of the holder of the water access entitlement, the water allocation and the water use approval.'[23] Sustainable water use is therefore not an obvious criterion for assessing sustainability of a particular water resource.

In this way the water market fails to properly recognise the legislature's intrinsic focus on the deriving sustainability of the resource.

Water allocation

A water allocation is defined as the specific volume of water allocated to water access entitlements in a given season, a period specified and defined according to rules established in the applicable water plan.[24]

[22] Above n 1 at 110.
[23] Ibid.
[24] Above n 7 at schedule B(i)

'Water allocation mechanisms 'are critical tools for effective water resources management'[25] Water allocation models have been widely used in the formation of Australian water policy.[26]

> Historically, water allocation models have been applied with success in the context of policy formulation. However the current generation of models is not well positioned to deal with future demands. This is primarily since they have been built on relatively inflexible assumptions and processes reflecting historical system and user behaviour.[27]

Water allocation models are also used to set the expectations of water entitlement holders regarding their "security of supply" which plays a 'significant role in determining the level of investment associated with irrigation and water use. Uncertainty around the security of supply has been shown to have significant negative impacts in reducing investment and undermining incentives for development'[28]

Despite the importance of water allocation models, they are relatively under-researched and probably under-scrutinised.[29] This in mind, the most important aspects of such models 'are constrained by the physical realties of a given water system and incorporate, at least': [30]

1. resource assessment, (hydrologic variability and storage capacity),

[25] Etchells T, Malano H Identifying Uncertainty in Water Allocation Modeling at 2484.
[26] Id at 2485.
[27] Ibid at 2484.
[28] Ibid.
[29] Ibid.
[30] Ibid at 2484.

2. allocation framework, (procedure for allocation and regulations, and

3. the demand module (reflecting water user behaviours).

Water sharing

All NSW water sources will come under the WMAct arrangements once all Water Sharing Plans ('WSP's') are implemented, where the only limitations to trade are those occurring as a result of environmental or physical constraints. WSP's 'aim to remove non river health/hydrological barriers to trade '[31]

> Legally enforceable rules are contained either in the legislation of general application or in the plans which relate to particular water resources. The plans create water access entitlements; state who may hold them; and state whether they are transferable or not. The plans also state how and when a water allocation is attached to a water access entitlement. Plans do not authorise any activity in relation to the water, the use of the water or the use of the land in relation to the water. The plans, however, do create a set of rules and the expectation is that compliance with these rules will ensure the sustainable management of the water resource to which the plan applies. Whether they do so or not depends, of course, upon the effectiveness of the statutory regime in question and upon the quality of decision-making by government agencies in formulating the plans in accordance with the statutory regime. In other words, the plans and the rules contained

[31] NSW Implementation Plan for the National Water Initiative at 2006 at http://www.nwc.gov.au/resources/documents/NSW-NWI-Implementation-plan_WaterReform.pdf

> within them neither empower individuals nor authorise the exercise of rights by them in particular sets of circumstances.[32]

There are three stages through which irrigators pass when needing to deal with reduced access to water:

1. Getting more water,
2. using water more efficiently; and
3. allocating water more equitably.[33]

These stages predict irrigator behaviour although, unfortunately, they do not directly inform a WSP. There is no requirement for irrigators to be represented in the formulation WSP's, their only influence is by way of a right to be consulted.[34]

Over allocation and historical usage

The period 1995 to 1999 saw important changes to the management of NSW groundwater licences. 'Legislation drafted a century before concentrated on the need for proper construction of bores and its funding.'[35] The licensing of bores was better regulated when declining artesian flows and waste prevention issues required action. 'Groundwater licences were at first unrestricted and perpetual. Area

[32] Above n 1 at 111.
[33] Kuehne G, Bjornlund H 'Water scarcity and social adaptive capacity' MEWREW Occasional paper no. 9, Water issues study group- School of Oriental and African Studies London1999 at 1-40.
[34] Above n 7 at [95].
[35] Tan Poh-Ling 'Water law reform in NSW – 1995 to 1999' (2003) 20 *Environmental Planning Law Journal* 165 at 182.

restrictions were imposed after 1972, and volumetric allocation was introduced from 1983.'[36]

Previous attempts to integrate ESD were based on a misunderstanding of the resource:

> Allocation policies and practices were based on an inaccurate understanding of the resource. Take, for example, the concept of sustainability which was applied to the depletion of aquifers in 1991. Allocation guidelines were adopted on the basis that a third of the aquifer could be extracted over 30 years, and that a proportion of the extracted volume would recharge over this period. … Yet just six years later, in 1997, sustainable yield was redefined to mean "that proportion of the long term average annual recharge which [could] be extracted each year without causing unacceptable impacts on the environment or groundwater users". Thus defined, sustainable yield amounted to between 105,000 and 150,000 ML per year, less than *half* of the 1991 limit. Although groundwater was dangerously over-allocated, actual use of the resource was much lower – only about 9% of total allocation.[37]

In 2005 the NSW and Australian governments, stating that it was 'vital that the management of groundwater resources was practical, equitable and sustainable'[38],

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[36]Ibid.
[37] Ibid at 182 - 183
[38] Achieving sustainable groundwater entitlements program
http://www.naturalresources.nsw.gov.au/water/groundwater_entitlements.shtml

agreed to recognise the water-dependent investment made by licence holders and the value of all groundwater entitlements, whether extracted or not, to reduce NSW water entitlements. The Achieving Sustainable Groundwater Entitlements program ('the ASGE Program') contained main components: [39]

- the reduction of water entitlements based on historical extraction,
- a financial assistance package for licence holders of up to $100 million,
- a Community Development Fund of up to $9 million to help strengthen communities, and,
- up to $1 million for the implementation of the ASGE program including the costs for completing valuations and consultation.

The reduction of entitlements, implemented by way of the ASGE Program, was made by calculating the history of extraction of a licensee's 5 year five-year renewable groundwater licence under the *Water Act 1912 NSW* current at the time to determine the active entitlement, the remainder of the licence was considered inactive or sleeping. The active and inactive entitlements of the licence were weighted when shares in the relevant water source were reissued pursuant to the WMAct. This procedure recognised the active entitlement whereas the inactive component was reduced to zero entitlement and formed the basis for a Federal financial assistance payment. [40]

This basis for the reduction in entitlements to meet sustainable yields replaced an 'across-the-board' approach that failed to consider levels of historical extraction.

[39] Ibid.
[40] Ibid.

Despite championing sustainability as the driving force of the reductions, the new approach was defective in that it failed to consider whether actual historical extractions were sustainable. It is not obvious that this was an equitable allocation of resources as the new water entitlement is to be further reduced to rectify residual over allocation in hot-spot areas according to the relevant WSP.

Over allocation of groundwater resources in the Namoi Valley and water sharing

The following comprehensively summarises the relevant features of over allocation in the Namoi Valley:

> The Namoi region is in north-eastern New South Wales and represents 3.8 percent of the area of the Murray-Darling Basin (MDB). The region is based around the Namoi, Manilla and Peel Rivers. The population is 88,000 or 4.5 percent of the MDB total, concentrated in the towns of Tamworth, Gunnedah, Boggabri, Narrabri and Wee Waa. The dominant land use is cattle and sheep grazing. Wheat, cotton and other broadacre crops are grown on the alluvial floodplains. Around 112,000 ha were irrigated in the year 2000 with around 80,000 ha (or over 70 percent) used for cotton production. The region has one wetland of national importance, Lake Goran, adjacent to the Liverpool Plains. Keepit and Split Rock dams store water for irrigation supply. The region uses 2.6 percent of the surface water diverted for irrigation in the MDB. Surface water diversions were around two-thirds of total water use in 2000/01 and around one-third of total water use in 2003/4. The region has the

> highest level of groundwater development in New South Wales and one of the highest levels of groundwater extraction in the MDB. Groundwater use in the region is 15.2 percent of the MDB total.[41]

Future projections based on climate change factors

Throughout the drought and despite the spectre of climate change, average annual rainfall and runoff in the Namoi (1997 to 2006) were not statistically different to long-term average values, a model based on the last ten years was therefore considered unnecessary.[42]

The climate is wet and dry:

> The northern system basin consists of ephemeral rivers; we are not a snow melt system. Wet and dry is normal for us, and our infrastructure and policy set is geared around this reality.[43]

The environmental assessment of the Namoi's future climate was 'limited to a partial analysis of potential changes in the hydrologic regime affecting the anabranches and billabongs associated with the Namoi River' which found that, due to water resource development, the average period between flooding of the Namoi River billabongs and wetlands was extended by approximately 27 percent and that the size of flood events has decreased by 150 GL.[44] Hydrologic diminution affects

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[41] CSIRO Murray Darling Basin Sustainable Yields Project Water Availability in the Namoi 2007 at 3.
[42] Ibid at 3.
[43] Public Submission to Water Market Rules Issues Paper by Namoi Water 9 May 2008 http://www.nswirrigators.org.au/pdf/catchment_profiles/Namoi.pdf Namoi Water is the peak representative organisation for water entitlement holders in the Namoi Catchment Area of NSW.
[44] Above n 41 at 11.

ecological processes and character of an ecosystem.[45] The best estimate of the 2030 hydrological health of the Namoi River billabongs and wetlands mimics current conditions.[46] In relation to river flows, the minimum flow rule in the water sharing plan is met under all modelled scenarios containing minimum flows at their lowest under the dry extreme 2030 climate model whereas the best estimate reproduces current conditions.[47]

> What the best science does tell us though, is that our current crisis, both environmental and economic, is manmade. This crisis would've happened with climate change or without climate change because we have over-allocated water in the Murray Darling Basin.[48]

Responsibility of government

> Many taxpayers I think find it strange that Government is spending $10-billion to buy water back from irrigators that was originally given away for free. It is the right thing to do. Why is that? Because the over-allocation was made by Governments on behalf of taxpayers. They made a mistake. Governments in the past made very very big mistakes. Someone has to pay for those mistakes.[49]

Irrigators believe that costs should be allocated in proportion to the contribution made to creating the cost or demand the service or product which infers

[45] Ibid.
[46] Ibid.
[47] Ibid.
[48] Peter Cosier, Wentworth Group of Concerned Scientists Transcript Four Corners 'Buying Back the River' 20th October 2008 http://www.abc.net.au/4corners/content/2008/s2396233.htm
[49] Ibid.

Government responsibility for covering the WSP related costs to rectify policy shortcomings.[50]

Since completion of the Keepit Dam in 1961 substantive irrigation has been carried out in the Namoi Valley of Northern New South Wales (NSW), mostly to produce cotton. In 2000, 730 licences to extract groundwater, were held by 650 individuals, accounting for just under one third of the land irrigated in that valley.[51]

The average extraction rate of these licences was approximately 233 ML however, pre-WMAct licence allocation allowed 600ML per licence. The implication of this over allocation was that if all the licences holders activated their licences and withdraw what they are legally entitled to use, this would account for more than double the sustainable yield.[52]

> As in the Macquarie, the over-allocation of groundwater in the Namoi has been extreme and has occurred despite no new information post 2000 about sustainability levels and despite user's pleas to the Department as far back as the 1980s to limit issuing of new licences based on resource concerns. Now groundwater irrigators face an average loss in entitlement of around 60% across the Namoi.[53]

[50] Above n 43
[51] Kuehne G, Bjornlund H "Custodians" or "Investors": classifying irrigators in Australia's Namoi Valley in Sustainable Irrigation Management, Technologies and Policies eds Lorenzini G, Brebbia C 2006 WIT Southhampton at 226.
[52] Id at 229.
[53] Namoi Water Response to CIE Cost Sharing Review Report – for IPART 2006 Bulk Water Pricing Review at 5.

Statistics citing irrigation as using up to 70+% of all available water are unhelpful and misleading to the extent that this ignores local regional variability. The Namoi uses 37% of available water which is nevertheless an unsustainable level of use.[54]

The reasons cited for local over allocation are: [55]

1. a lack of scientific research quantifying the available recharge;
2. the responsible State Government department sought to encourage the use of water up until the 1970's;
3. it was thought that the resource could be "mined" for a period of time, and then recharge would occur when wet years returned; and
4. water, at least initially, was not highly valued which meant that some of the licences granted were expected to remain inactive.

Namoi Groundwater Sharing Plan

The introduction of the Namoi WSP in relation to groundwater was a difficult and frustrating compromise.

> After many delays, and a divisive and conflict ridden development period … and after four deferrals in three years the NSW government will on 1 July 2006 start implementing the final Water Sharing Plan ('WSP'). The NSW government in conjunction with irrigators developed

[54] Above n 41.
[55] Above n 51 at 227 citing Kuehne G Bjornlund H Frustration, confusion and uncertainty: qualitative responses from Namoi Valley irrigators 2006 33 *Water* 51

> the WSP to specify the changes needed to water use and to map the way forward to sustainability.[56]

Basis for water sharing under the plan

Further reductions to entitlement under the Namoi groundwater WSP are imminent: [57]

> Some of the more over allocated zones will need to make cuts to entitlements of up to 87%. Some licence holders (9%) will have no cuts, 47% will have a cut of about 40% 35% will have a cut from 50% to 75% and 8% will be cut 75% or more. These entitlements will have most pronounced and immediate effect on licence holders who are using a substantial proportion of the use (high history of use). The impact on licence holders traditionally using a small proportion of their entitlement (low history of use) and licence holders who have never developed their properties to use their entitlement (inactive irrigators) will be less pronounced and immediate and mainly relate to the future potential and value of their property.[58]

These reductions failed to accommodate water users already employing sustainable water use practices. Primary producers understood that NSW water resources were unsustainably allocated long before government recognition of the problem. Those who developed and implemented sustainable water infrastructure to maintain the

[56] Above n 51 at 227.
[57] Water Sharing Plan For The Upper And Lower Namoi Groundwater Sources 2003 clause 14 which gives effect to s 5 (3) of the WMAct, and in accordance with sections 20 (2) (c) and 21 (e) the WMAct which legislates additional provisions in WSP's.
[58] Above n 51 at 227.

viability of their agricultural business are punished under the massive reduction in allocations cited above due to the fact that they have already reduced their water use to a sustainable level. As such these reductions were calculated within the inactive component of their previous licence and have been lost under the WMAct licensing regime. They now face a reduction to their water allocation to a level far below what could be recognised as base water use efficiency and therefore ultimate sustainable use. The unfairness of this penalty is conspicuous when considering the context in which over allocation is to be addressed is theoretically the achievement of sustainable use of water resources.

A major problem with stakeholder satisfaction regarding the WSP was that although public consultation appeared to be an imperative of the reform agenda (and could be assumed to provide a solid basis for stakeholder acceptance of a reduction in entitlements) Namoi irrigators had no direct influence the formulation of the WSP.[59]

> It seems that the consultation process associated with the development of the WSP's could have been better managed. The effects of an imperfectly conducted consultative process on the stakeholders involved are clear: Poorly designed and inadequate measures for information, consultation and active participation in policy-making can undermine government – citizen relations. Governments may seek to inform, consult and engage citizens in order to enhance quality, credibility and legitimacy of their policy decisions…only to produce the

[59] Kuehne G Bjornlund H Frustration, confusion and uncertainty: qualitative responses from Namoi Valley irrigators 2006 33 *Water* 51. An electronic version can be found at http://www.waterresearch.net/docs/articles_chapters_refereed/Water%202006_Kuehne%20and%20Bjornlund.pdf

> opposite effect if citizens discover that their efforts to stay informed, provide feedback and actively participate are ignored, have no impact at all on the decisions reached or remain unaccounted for.

The consequent frustration could be said to have been caused by amendment to the WMAct in 2004. That amendment determined that crucial parties identified as to be consulted with, when preparing a plan was to be at the discretion of the Minister.[60]

This frustration produces serious implications regarding the ultimate success of WSP's.

> Up until now the plans, with changing methods of entitlement reduction and repeated deferrals of implementation dates have also been seen as contributing to their uncertainty, rather than reducing it. Combined, this has led to feelings of disillusionment and disaffection. Some of their disquiet can also be attributed to a, now apparently mistaken, belief that they were to be involved with the formulation of the WSP rather than just providing an opinion. It seems that this combined with the failure to consult appropriately has further damaged an already strained relationship between licence holders and the government. Despite serious concerns with the consultation process most licence holders are indicating a reluctant preparedness to accept the pain of the WSP, which for most is reduced access to water. It is possible that when the plans are finally implemented the dissatisfaction

[60] Ibid.

> with the development of the plans, and with the way the consultation process was conducted, will be replaced with a criticism of the outcomes.[61]

Uncertainty

Namoi Valley licence holders are not atypical in reporting a strong feeling of uncertainty regarding water availability and the situation that they will face during and after the expiration of the WSP.[62] A firm distrust of politicians, the government and their motives, based on experience is also a major factor in their frustration built on a concern that the Minister could change the plan any time during the ten-year term, however this would trigger compensation.[63] Compensation, in a minor way may offset self sustainability however farmers are not inevitably concerned with reparation as their true concerns are much broader.

Cost of water

This uncertainty and distrust has broadened by recent problems arising from the government's water billing system. The process for drawing up the water charge accounts has been flawed and was not transparent. At times Namoi water users have been advised not to pay their incomprehensible water accounts. The information model supplied to the NSW Independent Pricing and Regulatory Tribunal ('IPART') was inaccurate and when some water users queried their accounts it was revealed that DEECW did not verify the base information used to

[61] Ibid.
[62] Id at 54.
[63] Ibid.

draw up accounts.[64] The implication to be drawn here is that pricing Namoi groundwater remains uncertain in comparison to other water sources, impeding its effective participation in the market.

Greedy farmers?

Environmental and economic objectives of water allocations must balance water use with water saving with regard to competing factors: essential water, agriculture, environmental water, adaptive environmental water.

These objectives affect all who benefit from agricultural production, essentially all Australians. All Australians have profited from the 'free' use of water and will pay realistic prices so to realise the true value of water, a fact which to some extent displaces the profit motive as the an excuse for unsustainable use of resources.

It is not obvious that Australian primary producers are solely motivated by profit. At least two types of agricultural water users have been identified.[65] The group 'farmers' includes "custodians" or "investors". What is important is that these identified groups have different attitudes (at opposite poles) and behaviours regarding the sustainable use of water. Although these categories cannot be viewed in isolation, as these were not strictly divided, the chief difference found was that "investors" are motivated and focused by returns on their investment, whereas the goals of "custodians" are family-centric, focusing on continuity of the farm, pride in

[64] Personal communication with a Namoi irrigator 21 November 2008.
[65] Above n 51 at 226.

farming exemplified by perceiving agricultural production as both a right and a responsibility, considering the future in relation to their accrued knowledge.[66]

Typically, investors are recent entrants to agriculture, who responding to the need to move money to maximise opportunities when necessary, including in response to a changing environment and who view water and land as resources to be bought and sold on their capital or productive value.[67] Risk and debt are necessary to ensure business growth '[m]ore land gives more power and the ability to generate more wealth.'[68] "Custodians" on the other hand are committed for the long term perceiving farming as an occupation and a way of life. Intergenerational equity strongly influences "custodians" decisions regarding ownership of land and water, which are distinguished as both a right and a responsibility.[69]

The outcome of Kuehne and Bjornlund's survey and interviews reveals that "custodian" farmers are highly unlikely to trade water due to their respect for its future usefulness to their business, thus avoiding Turton's third stage. [70] "Custodians" demonstrate a different attitude to land and water. They value length of tenure, and indicate difficulty with adapting to change. Their goals are broader than profit and include a desire to care for the land, use water cautiously, and contribute to the community for the sake of the community. On the other hand "Investors" are more focused on using their land and their water as a resource to

[66] Above n 51 at 228 – 229.
[67] Ibid at 229 Table 2.
[68] Ibid.
[69] Ibid.
[70] Ibid .

generate income and to grow their business. It appears as though their concern for the community is seen in terms of what it can offer them.[71]

Trenchant public aggression towards "greedy farmers"[72] is misplaced in this context. The two groups have contrasting views regarding water trade. Unfortunately the mechanisms introduced by the government to ensure sustainable water use, reflect and respond to the needs and attitudes of "investors" and fail to accommodate "custodian" farmers who envisage using or saving water for purposes other than immediate profit.

The attitudes of "custodian" farmers closely reflect ESD principles representing a vital human resource in tune with and ultimately concerned to preserve the environment. Water is not a separate contingency in their business (as characterised by the legislative regime) but an integral part of efficient and socially acceptable farming practice. It is time for this special human resource to be recognised as a driving force to be harnessed to achieve sustainability.

Sustainable water use equals water use efficiency

Incentives to use water more effectively are proactive mechanisms which invigorate sustainable water use in comparison to government control through allocation devices which maintain the status quo.

[71] Ibid.
[72] Transcript Four Corners 'Buying Back the River' 20th October 2008 http://www.abc.net.au/4corners/content/2008/s2396233.htm

In an average year irrigated agriculture uses 14 000 gigalitres (GL) of water, which is about 70 per cent of all water used in Australia. However, this water is not used as efficiently as it could be as:

- between 10 and 30 per cent of the water diverted from rivers into irrigation systems is lost before it reaches the farm gate
- up to 20 per cent of water delivered to the farm gate may be lost in distribution channels on-farm and around 60 per cent of water used for irrigation on farms is applied using high volume, ineffective gravity irrigation methods
- more than 10 to 15 per cent of water applied to crops is lost through over watering, whereas scheduling tools and observational data could more precisely match water application to crop water requirements
- inaccurate measurement of water diversions from rivers and water use on farms is leading to unintentional and intentional over use.[73]

The reallocation of Australia's water resources might not necessitate pain if sustainable water use was utilised as a legal incentive, transforming in time to become a legal requirement.

Increasing the productivity of water through smart water technologies at the irrigation system level will help to reduce the pressure on already over-taxed water resources and will promote food security and livelihoods of particularly the regional communities. All Australian citizens will benefit from a reduction in environmental degradation of

[73] CSIRO *Science to improve Australia's irrigation systems Overview at* http://www.csiro.au/org/IrrigationResearch.html

agricultural lands and riverine ecosystems.

The necessary science and distribution of that knowledge is quickly playing catch-up. The CSIRO's national irrigation research and development program is addressing a range of issues to improve Australia's water utilisation. Collaborating with irrigators, its research aims to reach s better understanding of innovative water measurement and management technologies to empower primary producers to better utilise both the moisture in their soil and their limited water allocation for irrigation. At the same time this will better inform irrigation authorities and government agencies who regulate and monitor water to include water use efficiency and 'water stress down' to evaluate the sustainability of practices on individual farms.[74]

The CSIRO's national irrigation research and development program is addressing issues with practical measures in relation to: water savings, water allocation, the combined use of surface and ground water systems, groundwater dependent irrigation systems, water reuse, seasonal and long term climate risk management and irrigation system harmonisation to 'deliver the predictive capacity that links practical management actions on-farm with catchment environmental response'.[75]. The CSIRO leads a major national collaborative partnership in the Water for a Healthy Country National Research Flagship. There is no obvious reason why this collaborative scientific capital could not inform a solid foundation for the formulation of WSP's or other regulatory measures.

[74] Ibid
[75] Ibid.

Sustainable irrigation infrastructure

The sustainable use of over allocated water resources requires achieving sustainable allocations for consumptive use. The narrow focus of market rhetoric tends to abandon incentives for agricultural efficiency. The short-sightedness of government reliance on the market once again fails to fully comprehend that irrigation areas are complex biophysical, social, economic and political systems managed by knowledgeable primary producers.

In relation to the responsibility of the Federal Government current specific taxation incentives allow deductions for the establishment costs of grapevines and horticultural plants, both thirsty agricultural products.[76] The taxation system could be utilised to provide strong incentives to increase water use efficiency by creating specific provisions encouraging individual water use efficiency and promoting activities that establish frameworks to implement best practice for sustainable water use. An essential consideration would be an account of actual water saved or available for environmental replenishment. Currently environmental water is not effectively correlated with consumptive use, compromising the fundamental recognised objective of water law reform.

[76] Australian Taxation Office Primary Producers' Essentials at http://www.ato.gov.au/businesses/pathway.asp?pc=001/003/015&mfp=001/003&mnu=35852#001_003_015

The Irrigation Association of Australia ('the IAA') definition of water use efficiency ('WUE') is: WUE = volume of product ÷ unit of water applied[77], which is typically described in terms of tonnage per ML, or bales of crop per ML. This formula represents a combination of the irrigation system and agronomic efficiencies for a crop. Increasing WUE predictably leads to increased production as well as inducing superior control over the quality of product from a certain amount of water.

It is well documented that certain types of irrigation substantially reduce the causes of water waste identified by the CSIRO above. For example centre pivot technology can improve water use efficiency and uniformity of irrigation by allowing a primary producer to apply low rates of water, if required, through scheduling to meet crop demand and anticipated rain events. This technology also reduces labour and crop management as well as wastage from leakage. Primary producers consistently confirm the water efficiency of such infrastructure: 'This system allows me to apply smaller quantities of water and adjust for changes in climate conditions thus taking advantage of rainfall and avoiding over watering.'[78]

Incentives to achieve sustainable water use could easily by accommodated through the Federal taxation system, simple regulation of water use efficiency measurements and by requiring such an outcome as an essential feature of local WSP's. It seems that the tardiness of governments maintaining a 'hands off'

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[77] NSW Agriculture WaterWise on the Farm education program *Introduction to Irrigation Management.* 'Evaluating your surface irrigation system' 2002.

[78] Landholder at Brombin Wauchope NSW cited in *Irrigators – caring for rivers* Department of Primary Industries publication 2006 at 5 http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/195706/Irrigators-caring-for-the-rivers.pdf

approach continues to fail to appropriately address the burning issue of sustainable use of resources, and requires stakeholders to bear the pain of their mistakes.

Conclusion

It is not evident that the water market will be effective in achieving its mandate of sustainable use of water resources in NSW. The mechanism delivered by the WMAct fails to have proper regard for actual water user behaviour, both from the point of view of rectifying over allocation of groundwater resources but also by inducing uncertainty, in particular, the security of water user's investment, by a refusing to definitively assign a certain amount of water allocated according to water entitlements. The tools of water law reform: laws, regulations and plans fail to encourage individual water use efficiency preferring to treat all water users as water over users and in doing so foolishly disregard the potential for encouraging sustainable practices at their source.

Libby Ciesiolka

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