

What kind of a market for what kind of water? Geographical perspectives on Murray-Darling water reform

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Abstract

The overarching premise of Murray-Darling water reform is that the creation of tradable entitlements will enable water to flow to its most valued use. This assertion however represents a simplistic metaphor for a far more complex reality. The use values of Murray-Darling water are not fungible across space. Traded water can be applied to land for productive purposes only in the context of a thick institutional landscape of regulatory requirements and land asset capabilities. This paper argues that these frictions have not been given adequate consideration in the prevailing research and policy discourse about water reform. A geographical perspective, emphasising the constructed nature of space and scale within markets, remedies these shortcomings.

Keywords: water reform, Murray-Darling Basin, environmental goods, market-based instruments, geographies of water.

1 Introduction

According to the Murray-Darling Basin Authority in the 2010 *Guide to the proposed Basin Plan* “A central tenet of water reform in Australia over recent years has been the use of water markets to facilitate the movement of water to its most productive use” [1]. Framed as a statement of principle, this is difficult to quibble with. The use of market-based instruments to provide a set of incentive structures for environmental goods is now a well developed and broadly accepted policy *modus operandi*, despite criticism from some branches of social science [2]. However, the translation of this principle into an operating regime remains highly problematic. There is wide divergence across societal segments on the question of what rules should apply for water trading in the Murray-



Darling Basin (MDB). Contention surrounds the volumetric limits that should be allowable to trade, the extent to which water should be permitted to be traded across catchments and bioregions, and whether market participants should be allowed to stockpile and speculate on water.

The politics of these debates reflect the fact that the trade of Murray-Darling water occurs within a *constructed* market. Transactional dynamics and processes of price formation are inseparable from the rules-based system from which they derive. The system has been brought to life through political decisions to use a market-based instrument for the allocation of water among potential users, and so it should be no surprise that the rules of this market remain the subject of political contestation.

This context weighs heavy on interpretation of the water trading in the MDB. As this market has matured, it has become a more efficient tool for the management of water resources [3]. Yet at the same time, acceptance of arguments about market maturation should not blind researchers to the very real complexities and contradictions which still define its existence. The contention of this paper is that an accurate picture of the market for water in the MDB emerges only from expansive conceptualisations of the system, in which trading processes are situated within their contextual social and environmental worlds. Conceptualising these issues within such a 'structured markets' perspective gives room to consider how participant action by water buyers and sellers fits within evolved arrangements characterised by complex interactivity. It emphasises the operation of water markets within agent-structure feedback loops involving temporal and spatial mismatches of aspirations. In other words, assumptions that 'the market' facilitates the flow of water to its most highly valued use need to be understood as the skeleton of a generic narrative which in a broad sense holds merit, but at a detailed level, is riddled with caveats and contradictions.

In making these points, our intention is not to argue against the meta-policy logic of creating a tradable water regime in the Basin. There is obvious logic in the use of market processes as a tool for allocating scarce resources. The history of the MDB attests to the failings of previous regimes based around command and control decision-making articulated through bureaucratic fiat. What motivates this paper is a desire to destabilise taken-for-granted assumptions about the processes by which market mechanisms generate social and economic outcomes in the MDB.

This being the case, we set out six arguments about how the wider institutional environment of the Murray-Darling water system shapes the manifestations of water trading. In setting out arguments in this format, the intention is to establish a roll call of reasons for treading cautiously about assertions of market rationality in the Murray-Darling water trade. In turn, this provides an analytical basis for tempered expectations about the social, environmental and economic outcomes from market-based regulation, and it makes a case for the need for policy-relevant research to rely on widely-framed and empirically grounded *real-world* understandings of water as a tradable commodity, rather than abstracted conceptualisation of these processes.

2 Geography and the Basin

The physical geography the Murray-Darling system provides the first (and arguably most obvious) limiting factor that shapes market behaviour in the Basin. Recent debate on water in the Murray-Darling is replete with images and discourse of the Basin which constructs it as a geographical ‘whole’. Often it is represented cartographically as a blanket covering a large swathe of south eastern Australia. The MDBA as an institutional entity defined in legislation owes its very existence to the notion that the existence of a single Basin requires in turn a single management authority, with legislative powers to enact a single ‘Basin Plan’.

At one level, there is an obvious reality to these arguments. To the east, a series of watersheds in the Great Dividing Range lead to water flowing towards the interior of the continent. In the west, the boundary is less clear, due to the flat topography and minimal levels of runoff. Nevertheless, it remains possible to draw a boundary delimiting the area in which rainfall (if collecting on the surface of the land) flows eventually towards the Murray and Darling Rivers.

Yet as with the process of map-making more generally, creation of one bounded space potentially obscures other spaces. In the case at hand, the idea of the Murray-Darling as a spatially homogenous water Basin pays simplifying regard to internal surface and underground flows through which it is composed. These elements of the Basin are not always connected and (especially in terms of underground and surface water) can relate to one another in complex ways. Water flows in complex and discontinuous ways within the Basin.

On top of these biophysical factors, the MDB is fragmented and segmented by social and political action. At its most elemental level, this is reflected in its trans-boundary character, covering four states and one territory. As elaborated below, jurisdictional differences in Basin administration have been a frustration to efficient outcomes in the water sector. Moreover, existence of the Basin as a composite of sub-regions is underlined by specification of 12 trading zones in the Southern MDB and 6 in the Northern MDB with their own, internal, hydrological connections [4, p. 10]. Traditionally, regulatory restrictions have existed on the trade of water entitlements out of individual zones. These existed in NSW and SA until 2010–11, when they were phased out. Victoria still applies a limit of 4% of entitlements which can be traded out of irrigation districts in any one year, although various exemptions are allowable for water attached to sub-economic holdings and those not included in modernisation programs [5]. Hence, from a biophysical or trading perspective, the Basin exists in its parts, not as a whole.

3 Navigating regulations

The construction of a tradable water regime in the MDB derives ultimately from the cap placed on water use in the Basin in 1997. By prohibiting water use beyond 1993/94 levels and then adjusting seasonal allocations so that the cap was met, socially-induced scarcity was established in the Murray-Darling



system, and water was transformed into an economic good with a price. The tradability of water was then embodied into two parallel but linked markets: the trade in entitlements (the purchase and sale of permanent rights to annual water allocations) and the trade in allocations (annual rights to extract water from the system). Currently, the majority of traded water takes place in the allocations market. In the key region of the Southern MDB in 2010–11, 3,126 gigalitres of water allocations were traded compared to just 773 gigalitres of entitlements [4, p. 72]. These relative sizes at the current time reflect the present stage of market evolution in the context of climatic conditions. In high rainfall years (such as 2010–11) the allocations trade tends to take off (because there is more water that is potentially tradable), whilst in the final period of drought, the volume of entitlements trades can increase on account of distress sales. Obviously, also, the trade in allocations corresponds to shorter-term horizons (needing water for seasonal production) whereas the purchase of entitlements is generally suggestive of longer-term strategic priorities. Thus, prices in the allocations market have tended historically to be more volatile than those in the entitlements market.

Of crucial importance for this paper, participant behaviour in these parallel but inter-related markets is strongly characterised by strategies based around the navigation and pre-emption of government decisions. These design characteristics encourage a level of uncertainty which mitigates the efficient functioning of markets as signallers of water's use values. Price behaviour and trading volumes are given enhanced volatility by imperatives of participants to base their purchase/sale decisions on a second guessing of government decisions.

In the allocations market, the irrigation season (which commences in July) progresses by way of an initial announcement and then monthly revisions depending on climate and storage conditions. This entire process creates considerable uncertainty for water users. Farmers needing to secure a given volume of water to support their production activities do not fully know the volumes of water releases. Farmers can buy allocations out-of-season, or intra-season (early, middle or late), however there researchers have an incomplete understanding of how and why farmers decide on any of these timings [6, p. 47].

Moreover, when considered from a whole-of-Basin perspective, the picture is complicated further by the fact that farmers in different State jurisdictions are often the recipients of quite different allocation practices. In part, this reflects divergent legacies in terms of how different State Governments have set global allocation levels in different catchments and irrigation districts [7].

Further complicating these dynamics is a set of uncertainties about the status of carryovers. This is the principle which enables entitlement holders to carry over unused allocations between years. In the absence of these arrangements, allocations would usually expire at the end of the year. In 2010–11, rules of carryover changed. As the National Water Commission has observed, more generous carryover rules in Victoria led some irrigators (particularly in border districts of South Australia) to trade allocations into Victoria in 2010 with the view that they would then be allowed to access these in the ensuing year (such provisions being more restrictive in South Australia) [4, p. xi]. At the same time,

carryover rights are contingent on farms having appropriate dam storage capacity between seasons [6, p. 45].

In brief, the regulatory decisions of governments – especially in the allocations market – provide defining signposts that shape market behaviour. Price signalling in terms of supply/demand balances occurs within these structural frames. Conceptions of market efficiency in this sector need to be premised firstly by explicit recognition of how government actions construct and bind the conditions under which trading takes place.

4 What is water?

The 1994 Communiqué of the Council of Australian Governments (CoAG) which established the basis for water trading in the MDB stated that: “Water entitlements should be separate from the property rights in land and associated with clear specifications regarding ownership, transferability, reliability and, where appropriate, quality” [8]. These aspirations, however, remain not entirely met. The formal separation of water entitlements from the property rights vested in land has opened up a series of related issues pertaining to the specification and management of water entitlements as an asset.

Evidently, the modern form of tradable property rights over water is a relatively recent innovation. It derives from reforms involving the separation of titles over land and water, this being the most recent incarnation in a series of shifts over the years in the way water rights have been deemed to exist. Two relevant implications however arise from the advent of this regime.

The first of these connects to the legacy effects of land and water being historically linked titles. In the previous ‘bundled’ system of land and water titling, access to annual allocations presumed permission to use the allocated water onto the land titles on in which it was linked. Unbundling, however, creates disjuncture in this connection. Clearly, for traded water to have economic value, it needs to be applied to the parcels of land possessed or leased by the new owner. Governments however mediate these processes because of their legitimate interests in managing land and environment for the broader public good. The usual way this occurs is through the issuance of use licences (in New South Wales, known as Water Access Licences, or WALs). Inevitably, this introduces another arm of government into the regulatory process, and has been suggested: “These complex arrangements complicate administrative processes and increase the transaction costs associated with water trading, which therefore is impeded” [9, p. 235]. Therefore, as an economic resource, water has value only in combination with an attached contingent permission, ratified through a licence, to apply the water to particular parcels of land.

The second set of issues concern the legal attributes of water as an asset class. This is a complex area of finance and law that is not wholly resolved [10]. At issue is the question of ‘what kind of an asset’ water is? In a purist sense, an entitlement is a right to be allocated water, not a physical asset (like land is, under Torrens Title arrangements, for instance). As discussed elsewhere in this paper, indeterminacy and uncertainty over how Government deploys its powers



to make annual allocations of water raises considerable problems of how it should be valued, within farm balance sheets. This has major implications, no less, for the way that financial institutions choose to deal with this issue. Although financial institutions are still working through these issues, it seems the mortgagability of water entitlements seems to take a different turn to that of land and other capital assets. Adding to these financial complexities, the tax treatment of water also begs consideration. Taxation authorities treat the purchase of allocations as an operating cost (making this deductible for the farmer) whilst entitlement purchases are non-depreciable capital investments potentially subject to capital gains tax [11]. Furthermore, corporate entities trading water as part of ongoing financial management activities have their transactions treated differently in terms of tax deductibility compared with farmers [7, p. 10]. Therefore, although the analytic device of thinking about water trading in the MDB as a market essentially little different to that of other physical commodities, its asset characteristics make it quite different, in key ways.

5 Farmers and rational behaviour

The efficient markets hypothesis in Murray-Darling water policy tends to treat farmer decision-making somewhat as a black box. The implied assumption is that farm businesses are profit maximising entities in possession of clear strategic objectives on how to manage their assemblages of assets and resources. On this basis, farmers are assumed to make decisions about their water needs in coherent and consistent pursuit of profit-making optimality.

Contemporary research on farmer behaviour sheds uncertainty on the extent of these assumptions. It needs to be recognised that farmers are not a homogenous social category, but differ across a range of socio-cultural, demographic and economic fronts. This diversity casts considerable variety into the question of how farmers manage their businesses. Firstly, there is substantial evidence that farmers tend to subsume profit goals within a broader framework of utility-maximisation [12]. As demonstrated in Australia as far back as 1982, farmers operate their farms with multiple objectives in mind. These include income, lifestyle, family, environment, succession arrangements and reputation within the community [13]. For family-based farming establishments, the convoluted navigation of farm and family aspirations within the ebb and flow of life cycle considerations clearly plays a vital role in structuring farmer behaviour. Secondly, even if farmers construct their aspirations around profit-maximising goals, there is extreme uncertainty with regards to how to arbitrate the temporal scales of profitability. In farming, there are difficult-to-compute trade-offs concerning short-, medium- and long-term strategy setting. Within farming communities, these are frequently managed through what sociologists would label ‘conventions’ (activities which are considered acceptable within a community) [14]. Accepted wisdoms of what entails ‘being a good farmer’ [15] shape the ways in which farmers structure their desires to meet goals within different time-frames. Again, these can be mediated strongly by life cycle factors – decisions to forgo higher profit to ‘keep the land in better shape’ may be

circumscribed by the intricacies of inter-generational and succession issues within individual farm families.

These factors are important for the case at hand, because they underline the shortcomings of simple conflation between farmer behaviour, efficiency and market signals. Farmers with water rights in the Murray-Darling deploy these assets in highly nuanced, multidimensional and individually-specific ways. As a result, it is problematic to assume that farmers respond to price signals for water in the terms of standard (profit-maximising) models of economic rationality.

6 Non-market use values of water

A distinctive attribute of the market for water – both in the Murray-Darling and elsewhere – is the diversity of values attributable to this commodity. As Bjornlund has argued, “water should not be allocated by market prices determined by financial values alone, but rather by prices that reflect economic, social and environmental values as well” [8, p. 582]. Incorporation of these principles into the constructed market for water in the MDB, however, has been politically, economically and environmentally contentious.

In recent years the depth of the entitlements market has been influenced strongly by the activities of the Australian Government in buying back entitlements. A highly active phase in this process commenced in 2008, with the Commonwealth Government’s *Water for the Future* program, which specified the purchase of 1,500 gegalitres for the environment. As suggested by Bjornlund and Rossini, this scale is daunting as it would equate to the Government purchasing the equivalent of 100% of the entitlement trades of recent years, extended into the future for 14 years [7, p. 8].

Regardless of whether and when this aspiration is met, it remains the case that the entry of the Commonwealth Government into the MDB water market is a major destabilising force. As Wheeler *et al.* have suggested, the level of government involvement in environmental water purchases: “may well disrupt their intended function of redistributing water between competing private irrigators, and such disruptions might result to slow down the ability of existing irrigators to restructure their farm business to be viable in today’s economic and political climate” [3]. At the time of writing, the Commonwealth Government holds approximately 11% of water entitlements in the MDB, with an expectation that this could increase to around 20% in line with current Government policies [16].

The destabilising effect of the scale of environmental water purchases is aggravating by the opaqueness that surrounds when and where purchases are made. The Commonwealth Environmental Water Holder (CEWH) is charged with managing these purchases and allocations. Notwithstanding actions by the CEWH to add transparency to its operations [17], the entirety of environmental water purchases is an inherently vague process. For other market participants, it is not necessarily clear what patterns or assumptions the CEWH operates within. At another level, moreover, a considerable volume of research has questioned the credentials of the current purchase regime on environmental efficiency

grounds [3]. Further, Wheeler *et al.* [18] highlight incompatibilities between measuring the impacts of environmental purchases when assessed according to efficiency, effectiveness or equity grounds.

7 Institutional mismatching

Finally, idealised conceptualisations of the trade of water tend to assume relatively frictionless capacities of market actors to take positions. However, there is considerable diversity in the range of actors participating in the MDB water market, and their aims and capacities do not always match one another.

These facets of the system are apparent in consideration of the profiles of water sellers and buyers. Thus, a survey of 700 market participants in the Southern Basin in 2005 found that many used their ability to sell their annual water allocations as a strategy “to remain on their property and avoid leaving the community and their rural lifestyle” [8, p. 588]. Comparable survey data from Victoria’s Goulburn-Murray Irrigation District (GMID) indicates a substantial proportion of sellers either had no irrigation or had holdings less than 50ha. In these contexts, the sale of water entitlements reflected a release of an unused or underused asset [7, p. 9]. Considered in these terms, the water trading regime could be considered as an efficient mechanism to shift this scarce resource from owners with little use values.

But the situation regarding buyers can be very different. A buyer’s capacity to use water is shaped by the relationship between economics and hydrology: the trade in water entitlements and farm irrigation investment. This is a two-way process of coordination. On the one hand, for entitlement buyers, the application of increased water volumes onto properties requires matching on-farm infrastructure (canals and pumps, etc, within an appropriate paddock layout) [9, p. 230]. On the other hand, the sale of water entitlements on particular properties (with their presumed conversion to dry land farming) can disrupt the network economies associated with regional irrigation systems. This so-called ‘stranded asset’ problem speaks to a tension between the enactment of water entitlements as individualised, tradable rights, and their physical presence embedded within district-wise infrastructures.

At a conceptual level, these arguments apply perspectives from the fields of institutional economics and evolutionary economic geography (EEG) to the analysis of Murray-Darling water trading. The institutional economics tradition expressed in the work of scholars such as Douglass North [19] takes as its starting point that economic activity takes place within human-devised constraints which can be formal (laws, rules, etc) or informal (conventions, ‘ways of doing’), and which are connected to enforcement mechanisms of varying kinds. For the purposes of this paper, this broad perspective is relevant inasmuch as it generates a view of markets emphasising the often substantial role of transaction costs, the complexity and uncertainty of information, and the ‘QWERTY’ principle [20] – that the sunk costs of previous investment rounds provides stochastic limitations on actor behaviour. Conceptualisation of market behaviour along these lines contrasts with the assumptions of rationality and

frictionless resource flows which are at the core of neoclassical economic models. The field of EEG builds on the framework of institutional economics through a focus on the ways that pre-existing spatial constellations of economic assets create act as a template for current and future behaviour. As MacKinnon observes: ‘choices made in the past become embodied in specific bodies of equipment, firm assets and competences and labour skills as well as the organisational habits that shape economic action’ [21]. This approach understands economic action in path-dependence frames, potentially involving processes of institutional lock-in (where past arrangements heavily circumscribe present options), hysteresis (where lagged institutional arrangements ‘catch-up’ to co-evolve with actor-behaviour) and punctuated equilibrium (where exogenous shocks generate rapid changes to co-evolved institutional arrangements) [22].

8 Conclusion

The purpose of this paper has been to present an interpretative framework for water governance in the MDB in which there is elevated conceptual concern for the limitations, complexities and contradictions of the market regime. We do not suggest the use of market-based approaches is a ‘wrong pathway’ for governing this resource. The point we make, rather, is a more subtle one. We question analytical tendencies to slip easily from generalised accounts of the efficiency-generating properties of markets *per se*, and the practical realities of the constructed market for water in the MDB. In brief, we call for caution in assumed relationships between the operation of market-based water governance, and the meeting of social, economic and environmental goals.

In making this argument, we fully recognise that others have made similar observations previously. As Tian Shi commented in 2006:

“[Water] markets may not maximise the overall outcome in terms of social equity, ecological sustainability and economic efficiency. Market decisions, by their very nature, involve atomistic individuals making choices in their own best interest and they do not readily accommodate collective preferences. Transfer of water entitlements causes third party effects. Since water is characterised by interdependent and jointly produced values, it is impossible to completely internalise externalities using property rights alone” [9, p. 237].

Furthermore, we note that the introduction of water markets in the Basin has necessarily been incremental, meaning that sub-optimal and contradictory outcomes have been part-and-parcel of the regime to date. As noted in the work of Wheeler, Bjornlund and their associates, the current ‘mature market’ phase of water trading in the MDB is very different to conditions in the early stage of market reforms. A number of the contradictory and efficiency limiting attributes of the early 2000s are being ironed out (a good example being the liberalisation of volumetric restrictions in out of district entitlements trading). But as some



factors abate, others rise. Firstly, market linkage mechanisms in the trade are currently in a considerable state of restructuring. There is a polymorphous aspect to the trade, whereby single actors can play multiple roles as traders, asset holders, brokers and agents. It is unclear how the industry structure of the water trading sector will evolve over future years. Secondly, should the Federal Government continue in its course of environmental water buybacks, the water market in the MDB will continue to be crucially defined by the actions of Government.

In conclusion, the arguments raised in this paper give relevance to a particular mode of research praxis for understanding water governance in the MDB. They support grounded research involving the direct collection of quantitative and (particularly) qualitative data, over and above approaches which are dependent on theoretical abstraction through models. The multifaceted and institutionally configured relationship between markets and efficiency in this sector demands a highly textured and nuanced approach to this issue, in which trans-disciplinarity, conceptualism pluralism, and multi-method approaches take centre stage. Only through these approaches will more complete understandings of the water systems of the MDB emerge.

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