



**Thematic Week:** Water Economics and Financing

**Thematic Axis:** Water Markets

**Title:** Water Markets and their Environmental, Social and Economic Impacts in Australia

**Authors:** Tom Rooney

**Abstract:**

In Australia, water trading has been an effective tool for distributing the risk of lower than expected rainfall in such a way as to minimise the negative impact of drought on rural communities. The system of water trading that exists in Australia operates via a framework of Federal and state/provincial government acts which, operating together, allow for water entitlements to be traded along Australia's major river systems.

As the water market in Australia continues to grow it is likely that futures contracts and other derivatives will be developed which will further aid Australian agriculture manage risk.

**Keywords:** Australia, water market, risk, irrigation, water market derivatives.

## **Water Markets and their Environmental, Social and Economic Impacts in Australia**

- *Can the new dimension of water allocation required by the current challenges of water management be considered as a risk allocation issue? Do water markets constitute efficient instruments to allocate risk?*

In Australia, water trading has been an effective tool for distributing the risk of lower than expected rainfall. Within water supply systems the risk of a lack of water resources is experienced through two main dimensions, geographical risk and economic risk.

Geographic risk is the differentiated risk that is faced by water users depending on their location. The classic example of geographic risk is the different risk that is faced by upstream river users compared to downstream river users.

Economic risk refers to the different financial risk which is faced by irrigators depending on the type of agricultural activity that they undertake. Irrigators who have planted horticultural crops, such as citrus or almonds, have invested significant resources in the development of trees which can produce crops. If there is a severe lack of water the trees will die, costing the Irrigator the income from that years crop as well as the time and money invested in establishing the trees.

In Australia water property rights are established through a framework of Federal Government acts and state/provincial government acts, a summary of these are shown in Table 1.

The potential loss from a year of very low water is much greater for Irrigators with permanent plantings than for Irrigators who produce annual crops such as rice, wheat or cotton. If there is a lack of water Irrigators who produce these annual crop types face the risk of losing a year's income, but do not necessarily face any further capital loss.

The water market in Australia has allowed for the distribution of both forms of risk in such a way as to reduce the overall impact on the agricultural sector.

The water market in Australia is based on a system of entitlements and allocations, which are described at further length later in this paper. An entitlement provides its holder with a right over a proportion of the total potential water resources. As water resources become available entitlement holders are granted allocations which are a portion of the available water resources. This system of entitlements and allocations provides a common tradable unit and homogenises the risk faced by irrigators along the river system, meaning that upstream and downstream users face the same risks.

The greatest strength of the Australian water market has been that it allows irrigators to manage their economic risk. During recent seasons that have been cloaked in drought, there has been a consistent movement of water away from annual crops to perennial crops. This has occurred because the perennial crops typically produce higher profit per year than annual crops.

A report conducted by the Australian Productivity Commission found that the benefits of allowing water resources to move to higher value crops through a water market could reduce the impact of the drought by up to 50%<sup>1</sup>.

In recent years, however, the strength of the water market has been in its capacity to transition from a market which allows for the allocation of potential risk to a market which allows for the movement of drought affected water resources.

- *Does the conception of water property rights adopted in the United States and Australia need a legal reform in order to be adjusted to the new dimension of water allocation?*

In Australia water property rights are established through a framework of Federal Government acts and state/provincial government acts, a summary of these are shown in Table 1.

**Table 1 – Principal Acts and Agreements Which Establish Water Property Rights**

	<b>Commonwealth</b>	<b>SA</b>	<b>NSW</b>	<b>VIC</b>	<b>WA</b>
<b>Principal Acts and Agreements</b>	<i>Water Act 2007</i>	<i>Natural Resources management (water resources &amp; other matters) Act 2007</i>	<i>Water Management Act 2000</i>	<i>Water Act 1989</i>	<i>Rights in Water and Irrigation Act 1914</i>
	<i>National Water Initiative 2004</i>		<i>Water Act 1912</i>	<i>Groundwater (Border Agreement) Act 1985</i>	
	<i>Murray-Darling Basin Agreement (June 1992, with additions in July 1999) COAG intergovernmental agreement (June 2004)</i>	<i>Natural Resources Management Act 2004</i>  <i>Groundwater (Border Agreement) Act 1985</i>			
	<b>QLD</b>	<b>TAS</b>	<b>ACT</b>	<b>NT</b>	<b>External Territories *</b>
	<i>Water Act 2000</i> <i>Wild Rivers Act 2005</i> <i>Integrated Planning Act 1997</i>	<i>Water Management Act 1999</i>	<i>Water Resources Act 1998</i>	<i>Water Act 1992</i>	None.

The framework for water licensing which is set out by these Acts is based upon a system of Entitlements and Allocations;

- **Entitlement:** The first step in the development of the legal framework in which water property rights can exist in Australia is the creation of Water Entitlements. An Entitlement gives its holder ownership over a share of Australia’s water resources.

Entitlements can either be granted on the basis of historical water use, purchased from government or freely given out usually to landholders. Once a water system has fully prescribed its entitlements the only way an individual can increase or possess an entitlement is through purchase from another entitlement holder.

An Entitlement is generally expressed in volumetric terms and the volume expressed on the entitlements represents the volume of water that the Entitlement holder can reasonably expect to be able to access in most years.

- Allocation: Throughout an irrigation season (typically 1st July to 30th June) government authorities responsible for the management of Australia's water resources determine, based on water availability, what proportion of water will be delivered to existing Entitlements. These are typically called allocation announcements or available water determinations.

This conception of water property rights in Australia, where ownership of water is expressed as a share of the river's water resources from which the exact volume of water delivered depends on available resources, has allowed for the development of water trading, both of Allocations (temporary transfers) and Entitlements (permanent transfers), and has allowed for the delivery of water to be reduced in line with prevailing drought conditions.

Allocations for Australia's largest river system (the Murray / Darling connected system) for the 2007/2008 Irrigation Season is represented in Table 2. Allocation percentages vary between states and regions because of different water products, accounting measures and localised water availability.

## Water Markets and their Environmental, Social and Economic Impacts in Australia

<b>NSW Murrumbidgee</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
Regulated River General Security	1,986,876	13	258,294
Regulated River High Security	302,369	90	272,132
Supplementary Water	195,765	-	-

<b>NSW Murray</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
Regulated River General Security	1,669,829	-	-
Regulated River High Security	182,270	25	45,568
Supplementary Water	252,363	-	-

<b>NSW Lower Darling</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
Regulated River High Security	7,633	100	7,633
Regulated River General Security	30,300	50	15,150
Supplementary Water	250,000	-	-

<b>VIC Goulburn Regions</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
High Reliability	1,061,683	57	600,433
Low Reliability	492,298	0	0

<b>VIC Victorian Murray</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
High Reliability	1,164,142	43	500,581
Low Reliability	291,954	0	0

<b>South Australia</b>	<b>Total Entitlement</b>	<b>Current Allocation</b>	<b>Current Vol. Allocated</b>
High Reliability	550,000	32	172,000

Property rights for Australian water products are largely protected by state government legislation. While states laws share some broad similarities because of the 2004 national water initiative, the protection of property rights for water holders does differ from state to state because of differences in legislation. The maturity of any legislation to further define water Property rights in Australia is likely to be through building consistency between state legislation. The Federal Government may play a leadership role in this process however is unlikely to implement its own legislation covering property rights as these considered a sovereign risk to state governments in Australia.

In conclusion given the current status of policy developments, the conception of water property rights adopted in Australia is unlikely to need significant legal reform in order to adjust to new dimension of water allocation?

- *Would it be possible to develop new water management instruments based on derivatives to allocate risk? Do the contract options represent a possible way to introduce them?*

There would be significant benefits to the Australian water market if successful water derivatives products were created. The most important of these benefits would be the likely reduction in volatility in the water market. In the 2007/2008 season, for example, prices on the allocation market ranged from \$200 to \$1200 per Megalitre. This volatility caused significant difficulty for many market participants and reduced participant's confidence in the market.

While several organisations in Australia have begun to develop derivative type products based on water assets, there has been little progress made in recent years. A major reason is that while the Australian water market has been strongly developing since reforms in the 1990s, there are still some aspects of the market that are relatively immature. These limit the ability to use the current water market as a basis for derivatives trading.

These issues will likely be resolved in the future with developments such as a uniform unit of trade and a central registry, similar to the Australian Securities Exchange Clearing House Exchange and Settlement System (CHES).

If a derivatives market was developed issues for resolution would include determination of the measure on which derivatives contracts are based such as dam storage levels, temporary or permanent water pricing, rainfall or allocation levels.