Water Trading within NSW Irrigation Industry: An Empirical Evaluation of Scale, Reasons and Attitudes

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ABSTRACT

The paper discusses the level of water trading within the NSW Irrigation Industry along with water prices, reasons, attitudes and knowledge of both permanent and temporary water trading. It is based on the results of a survey of 1,115 irrigators representing over 10% of the total irrigators' population within NSW Water Sharing Plans that commenced during 2004 and various secondary data sources covering water trading. Temporary water trading in Murray and Lower Murray Darling and Lachlan catchments has expanded since the commencement of the Water Sharing Plans in NSW. Nearly 7% and 40% of the irrigators surveyed participated in the permanent and temporary water markets respectively. Fifty six percent of the irrigators believed that temporary trading was good for their area, whereas only 28% had similar views regarding permanent trading.

Key Words: Water, Market, Irrigation Industry, Social and Economic Reasons, Scale of Trading, Water Sharing Plans and Attitudes

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1. Introduction

Water trading is an equitable way of achieving structural adjustment in irrigation regions. Trading exposes the opportunity cost of water, which is its value in alternative uses, whether or not water is traded. It enables marginal producers who hold significant water entitlements to realise an asset that was previously valueless unless used or sold with the land.

The market signals encourage users to value the water resource appropriately, use it more efficiently, and direct it to its most productive use. A properly functioning market for water entitlements allows each farmer to decide whether to use, sell or buy water at the market price. The price of water fluctuates according to supply and demand conditions, just like that of other commodities, driven sometimes by demand and sometimes by the supply.

New South Wales' (NSW) rainfall is highly variable, which in addition to changing crop rotation is leading to increasing demand for irrigation water. This means that there is a need to be able to adapt quickly by reallocating water in response to changes in:

- markets for farm enterprises and other water dependent industries
- environmental water requirements
- the size of cities and towns, and
- availability of water caused by climate change and other factors.

Water trading helps to achieve this by enabling users to reallocate water voluntarily. Water trading is either permanent or temporary. Permanent trade refers to the sale of the water licence, while temporary trading refers to the sale of annual allocation water.

The Water Sharing Plans (WSP) in NSW define rules that help the establishment of water markets in a fair and open way, providing certainty for the water industry and for the environment, and helping to create a stable and more attractive business environment. NSW Department of Water and Energy (DWE) has established Water Trading Registers, where permanent and temporary trades in the WSP areas are recorded. In spite of these changes there still exist some gaps in knowledge regarding volume and price of water traded, reasons why irrigators' trade water and their attitude and knowledge of water trading.

This paper provides empirical evidences of the level of water trading within the NSW Irrigation Industry along with water prices, reasons, attitudes and knowledge of both permanent and temporary water trading. Specifically the objectives of this paper are to study:

- the trends in volume and prices for both permanent and temporary water traded within irrigation industry of NSW,
- reasons why irrigators trade water, and
- irrigators' attitudes towards water trading

2. Scope of the Paper

The next section of the paper provides the historical perspective of water trading in NSW including key features of water entitlement held under Water Act (1912) and Water Management (WM) Act (2000). Sections 4 and 5 provide trends regarding the volume of water trading within various water management regions covering pre and post WSP periods. Section 6 provides a comparative analysis of trends in water trading pre and post WSP. This is followed by the results of the Survey of Irrigators 2005-06 in Sections 7 to 12. The conclusions of the paper are presented in Section 13.

3. History of Water Trading in NSW

Water trading is a key element of the National Water Initiative agreed by the Australian, state and territory governments in 2004. The Initiative aims to drive water reform at the national level, by promoting a sustainable and efficient irrigation industry while ensuring that our rivers stay healthy. The Department of the Prime Minister and Cabinet (2006) has presented a design for an effective water market, having regard to lessons from other sectors and taking into account the particular characteristics of the water sector.

The opening up of water trading is a key objective of the Water Management Act which was passed by the NSW Government in 2000. Prior to this water was administered under the NSW Water Act (1912). In NSW water licences are converted to water access licences and approvals under the Water Management Act once they are subject to a water sharing plan.

Table 1 provides key features of a Water Licence under the Water Act (1912) and WM Act (2000). Under the Water Act (1912) the land occupiers (owners and lessee) who have access to a water source could apply for a 5 year water licence. A water licence under the Water Act (1912) was tied to a parcel of land and incorporated what is currently known as an access licence, extraction works approval, a use approval and land occupation. The value of a Water Act (1912) water licence is incorporated into the value of the land title or lease. There are some limited avenues to move these water licences permanently between irrigators constrained by land occupation and access to the same water source. Temporary movement of a Water Act (1912) water licence is effected by moving water into and out of a licence holders' water account.

In regulated rivers temporary and permanent water licence trading is constrained by delivery capacity, extraction works approval, use approval and land occupation. Temporary water licence trading is not allowed in unregulated streams, while permanent trading is permitted though constrained by environmental impact, extraction works approval, use approval and land occupation. For groundwater permanent and temporary trading is permitted in declared transfer areas only subject to environmental impact, extraction works approval, use approval and land occupation.

The NSW WM Act (2000) provided for the separation of a water access licence from the extraction works approval, use approval and land occupation. In 2004, 31 WSPs were commenced in 7 regulated water sources, 19 unregulated surface water sources and 5 groundwater water sources (Appendix Table 1). Approximately 80%

of the states irrigation water use is subject to these WSPs. Since then a further 7 water sharing plans have commenced and a number of other WSPs will begin in the near future.

A WSP is a legal document prepared under the WM Act (2000). It establishes rules for sharing water between the environmental needs of the river or aquifer and water users, and also between different types of water users such as town supply, rural domestic supply, stock watering, industry and irrigation. In addition, water sharing plans set rules for water trading, that is, the buying and selling of water licences and also annual water allocations. For most new commercial purposes, water trading remains the only way that water can now be obtained because in most areas of the state the available water is fully allocated.

Both permanent and temporary water licence trading is possible under WM Act (2000). Water licences are no longer tied to the land. This has made it easier to trade in water access licences and has opened up the market to non landowner investors.

However, the use of water for irrigation under WM Act (2000) requires the irrigator to hold a water access licence as well as a separate extraction works approval and use approval. The extraction works approval and the use approval is, however, constrained by land title ownership, supply constraints and environmental impact.

Table 1: Features of Water licence under Water Act (1912) and WM Act 2000

Feature of water licence	**Water Act (1912)**	**WM Act 2000**
Unit	ML	Share
Term	5 Years	Perpetual
Applicant	Occupier of land with access to water source	Anyone
Works & Use approval	Not applicable	Occupier of land with access to source
Usage	Licence holder	Holder of works & use approval
Value of Licence	Incorporated in land value	Has a title and value of its own, and can be used as a loan security
Trading	Between occupier of land with access to source	Transfer of water title to anyone

4. Water Trading: Pre Water Sharing Plans (2003-04)

Table 2 presents the volume of permanent and temporary water trading within regulated rivers during the year 2003-04, representing pre WSP period. The data has been accessed from the DWE's Licence Administration System (LAS). The information from various licensing regions has been aggregated to present closest possible fit to the current WSP regions.

Over six percent of licence entitlements were traded on a permanent basis in the Hunter region. However, in all other licensing regions the volume of permanent water trading was less than 1% of the total entitlements.

In the Murray and Lower Murray Darling regions 13% of the licence entitlement was traded on temporary basis followed by 12.6% in the Barwon region. The temporary water trading was also significant in the Macquarie (5.3%) and Murrumbidgee (5.2%) regions.

Table 2: Regulated River Licence Trading under Water Act (1912), 2003-04

DWE licensing region	Licence Entitlement	Permanent trade			Temporary trade		
	(ML)	Number of Transactions	Volume (ML)	%	Number of Transactions	Volume (ML)	%
Hunter	159,905	67	10,021	6.3	45	5,205	3.3
Murrumbidgee	2,341,453	7	2,817	0.1	499	122,268	5.2
Murray & Lower Murray Darling	2,189,806	31	3,883	0.2	932	283,595	13.0
Lachlan	637,485	16	2,890	0.5	120	8,210	1.3
Macquarie	651,847	25	6,030	0.9	330	34,860	5.3
Barwon	1,082,246	22	4,429	0.4	503	136,513	12.6

SOURCE: DWE Licence Administration System

5. Water Trading: Post Water Sharing Plans (2004-05 to 2006-07)

There are provisions under the WSPs that allow trading of water entitlements within and between water sources subject to local conditions. NSW DWE manages Licence & Trading Statistics under a Water Management Register, where transactions involving temporary and permanent transfer of water share/ entitlement within the areas of WSPs are recorded. In addition, Water Exchanges have also been established to facilitate trading. Information regarding the volume of water traded on a temporary and permanent basis within water sources was taken from these sources covering post WSP period of 2004-05 to 2006-07. In the areas where WSPs have not started, the water trading is still happening under the Water Act (1912).

Temporary Water Trading

Trends in the volume of temporary water traded within various water sources is presented in Table 3. The number of sales increased significantly from 2004-05 to 2006-07 in all water sources. The volume of water traded increased consistently for all water sources except Hunter, Murray and Lower Murray Darling water sources. Volume of temporary water traded is also presented in Figure 1. Temporary water trading data for the year 2007-08 is presented up to 5 Dec 2007. Therefore, the water trading statistics for 2007-08 should not be compared with other years.

As a result of continuing drought, the demand for water during the later part of 2006-07 and early part of 2007-08 increased substantially. This resulted in significant increases in the price of water particularly in Lachlan, Murray, Murrumbidgee, Lower Murray Darling and Hunter water sources. Water has been traded in these water sources, with prices reaching $1600/ML in Hunter during 2006-07, $1220/ML in Murrumbidgee during 2007-08 and $1200/ML in Murray and Lower Murray catchments during 2007-08. The average price of water traded on the temporary water market in Hunter increased from just $17/ML during 2004-05 to a staggering amount of $ 664/ML during 2006-07. The average price at which temporary water entitlements have been traded within various water sources is spatially presented in Figure 2.

Table 3: Level of temporary water trading in NSW

	Number of Sales	Volume(ML)	Per cent of Total Water Entitlement (%)	Average Price ($/ML)	Max Price ($/ML)
Central West					
2004-05	160	10,221	1%	186	1,500
2005-06	268	49,210	7%	111	200
2006-07	314	45,222	6%	146	200
2007-08*	50	6,007	1%	128	500
Border River - Gwydir					
2004-05	29	29,957	4%	250	250
2005-06	97	45,326	6%	202	300
2006-07	205	72,984	10%	112	315
2007-08*	61	15,705	2%	99	300
Hunter					
2004-05	54	6,075	3%	17	30
2005-06	157	17,009	8%	24	43
2006-07	224	8,967	4%	664	1,600
2007-08*	47	846	0%	935	1,000
Lachlan					
2004-05	128	4,531	1%	303	500
2005-06	328	35,838	6%	62	350
2006-07	473	60,301	10%	125	350
2007-08*	97	3,905	1%	522	787
Namoi					
2004-05	33	8,051	2%	84	350
2005-06	112	24,278	6%	111	200
2006-07	170	31,266	8%	111	250
2007-08*	34	8,401	2%	105	400
Murrumbidgee					
2004-05	482	94,932	4%	80	140
2005-06	607	135,957	5%	37	80
2006-07	1358	193,850	8%	170	540
2007-08*	1,275	71,946	3%	907	1,220
Murray and Lower Murray Darling					
2004-05	1913	440,810	18%	58	250
2005-06	2323	515,930	22%	42	180
2006-07	3753	353,540	15%	187	1,000
2007-08*	1627	101,388	4%	922	1,200

Source: (http://www.wma.dnr.nsw.gov.au/wma/index.jsp, http://www.murrumbidgeewater.com.au/), and http://www.murrayirrigation.com.au/watexch/

* Note: 2007-08 part year data only up to 5 Dec 2007

Figure 1: Temporary Water Trading Volume in NSW (2004-05 to 2006-07)

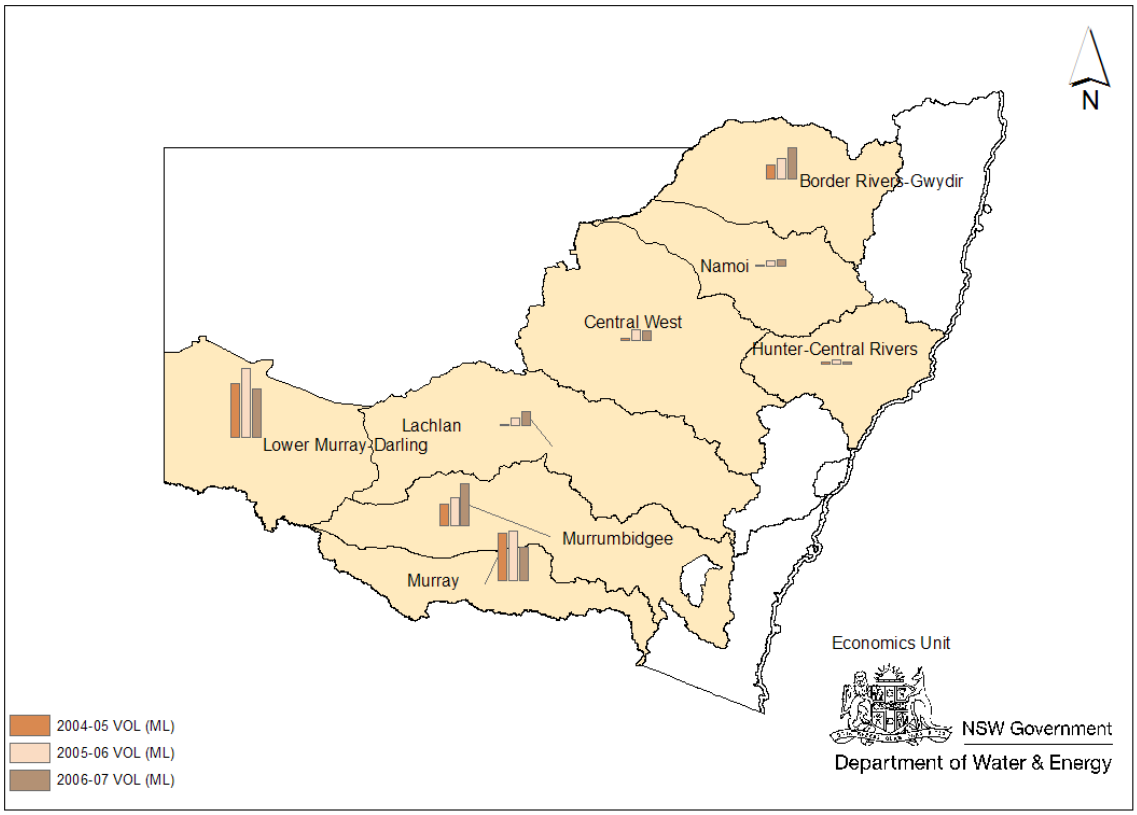
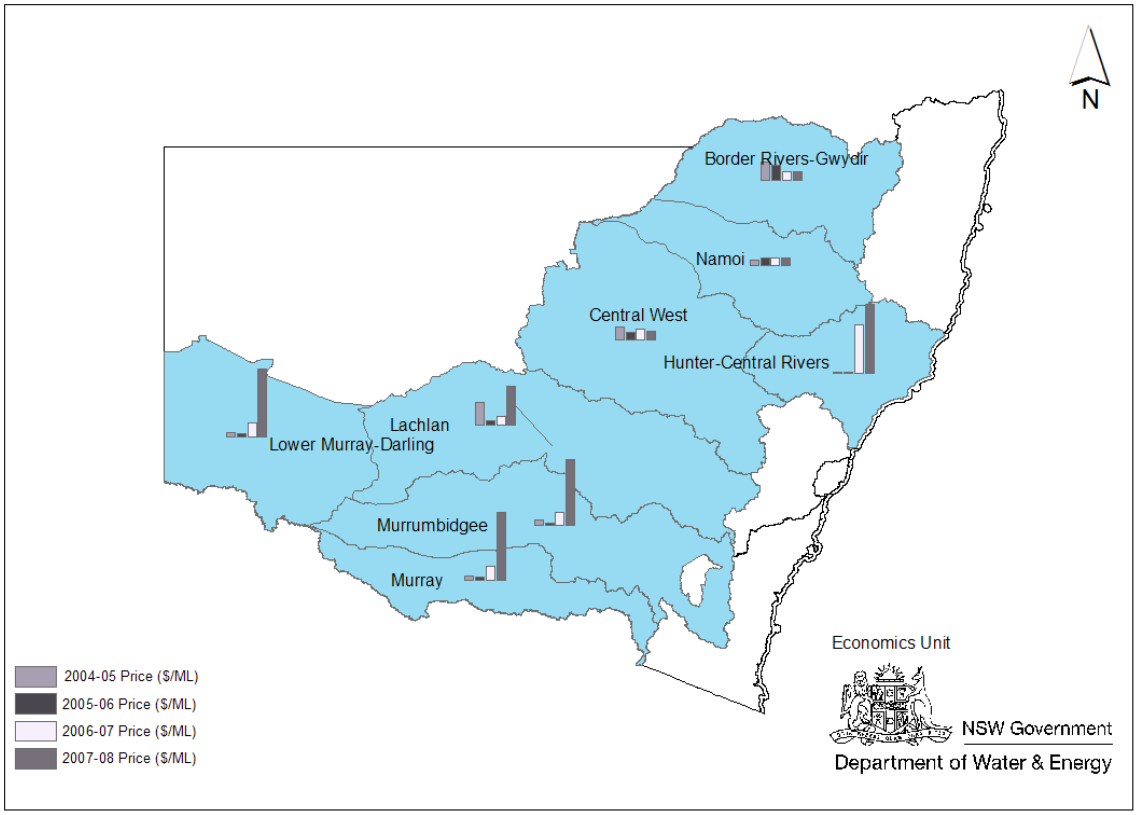


Figure 2: Temporary Water Trading Price in NSW (2004-05 to 2007-08)



Permanent Water Trading

Table 4 presents the volume of water traded on a permanent basis within the areas of the NSW WSPs that commenced during 2004 in NSW. The volume of water entitlements traded on a permanent basis increased from 12.7 GL during 2004-05 to 50 GL during 2006-07 reaching a peak of 57 GL during 2005-06. The median price of permanently traded water increased from $1000 per ML to $1200 per ML during 2006-07 and then to $2300 per ML during 2007-08. The significant increase in the price of permanent water is because of the drought and resulting increasing demand for the available water.

Table 4: Permanent Water Trading in NSW under WM Act (2000)*

	Number of Sales	Volume (ML)	Percent of Total Water Entitlement	Median Price ($/ML)	Max Price ($/ML)
2004-05	40	12,713	0.15%	$1,000	$2,315
2005-06	287	57,131	0.67%	$800	$3,000
2006-07	119	49,966	0.58%	$1,200	$4,571
2007-08 (up to 5Dec 2007)	32	11,095	0.13%	$2,333	$3,700

* Note: Permanent water trading under Water Act (1912) is not covered. Nearly 20% of NSW is not covered by WSP. Information on the permanent transfer of water rights that could have happened along with the sale of land is unavailable.

6. Comparison of Pre and Post WSP Water Trading Trends

Water trading began in the 1980s with the expectation that trade would redistribute water to more efficient uses, and the market is still evolving with experience. As described in Section 3 there were opportunities available to trade water both on a permanent and temporary basis prior to the start of WSPs in NSW. The WSPs prepared under the WM Act (2000) have provided a framework for extending trading of water within and between water sources.

A comparison of pre and post WSP water trading in NSW is presented in Table **5**. The changes in temporary water trading are driven by the demand for irrigation water arising from continuing changes in climatic conditions (including drought), other economic variables and the crops grown within the regional economy. However, in general it is evident that temporary water trading in the catchments of Murray and Lower Murray Darling and Lachlan have expanded substantially since the commencement of WSPs. It is not possible to draw such a conclusion for other catchments.

On an overall basis, temporary water trading has increased from 8.2% during 2002-03 to over 10% in the more recent years. Although it is difficult to attribute these changes to the WSPs it can safely be concluded that the separation of water right and other rules as provided in WSPs have acted as a catalyst to promote the level of water trading.

The overall permanent water trading has remained unchanged since the commencement of the WSPs.

Table 5: Comparison of Pre and Post WSP Water Trading in NSW

	Pre WSP		Post WSP		
Item	2002-03	2003-04	2004-05	2005-06	2006-07
Temporary Trading by Catchment					
Hunter	6.4%	3.3%	2.8%	7.8%	4.1%
Murrumbidgee	8.5%	5.2%	3.8%	5.4%	7.7%
Murray & Lower Murray / Darling	7.1%	13.0%	18.4%	21.5%	14.8%
Lachlan	2.9%	1.3%	0.7%	5.8%	9.8%
Central West (Macquarie)	0.6%	5.3%	1.5%	7.0%	6.4%
Overall Temporary Water Trading	8.2%	8.4%	7.8%	10.9%	10.1%
Overall Permanent Water Trading	0.7%	0.4%	0.1%	0.7%	0.6%

7. Survey of Irrigators

Sections 4 to 6 have provided information on the volume of both permanent and temporary water trading, along with the changes in water prices over time. However, this information does not provide an understanding of the relationship between size of entitlement and volume of water trading, the reasons why people trade water, their attitudes and their level of knowledge of water trading. Availability of this information is likely to improve our future decisions regarding water management and planning.

With a view to filling some of the gaps in such information, a telephone survey of irrigators within the areas of the 31 WSPs that commenced during 2004 was undertaken. This survey was conducted from November 2006 to January 2007 and covered a total of 1,115 irrigators representing 10% of all irrigators in these WSPs. This survey was undertaken as a part NSW DWE's bigger project which aims to monitor key economic and social indicators in the irrigation industry within these WSPs areas. This project is based on close cooperation, financial support and input from the key stakeholders including the irrigators' representatives and the Primary Industries and Economic Development Standing Committee of the NSW Natural Resources Advisory Council (NRAC).

The results on water trading from the survey are presented on the basis of major catchments in NSW.

8. Size of Entitlement and Water Trading: Survey of Irrigators

Table 6 summarises the volume of water sold and purchased on the permanent and temporary water market within the sample irrigators. The sample irrigators within the areas of WSPs covered by the survey traded 21,285ML (1.9%) and 145,339ML (12.8%) of water on the permanent and temporary water markets respectively. Seven and 40% of the irrigators surveyed respectively traded water on permanent and temporary basis.

The highest volume of water traded on both permanent and temporary water markets occurred amongst those irrigators with large (>973MLs) water entitlements holders. The small entitlement holders (<55MLs) traded approximately 50% of their water entitlement on the permanent water market. They were observed to be highly active

in the temporary water market trading over 230% of their total entitlements. This is most likely due to irrigators with very small entitlements needing to purchase larger volumes of water to support their farm business. This may be due to having to access larger entitlements with low Available Water Determinations so as to enable access to sufficient volumes to sustain their enterprises such as permanent plantings. Furthermore, water trading on the permanent market can be affected by climatic conditions as a result of farm foreclosures during extended drought periods, as experienced around the time of this survey

Table 6: Water Trading in NSW, Survey of Irrigators 2005-06

Water Entitlement (MLs)	Total Entitlement (ML)	Sample Irrigators (No)	Permanent Water Traded			Temporary Water Traded		
			Volume (ML)	% of Entitlement	% of Irrigators	Volume (ML)	% of Entitlement	% of Irrigators
1 – 55	5,996	259	2,963	49.4%	2.7%	13,974	233.1%	11.4%
56 – 243	35,612	268	468	1.3%	5.3%	5,736	16.1%	35.3%
244 – 972	143,402	260	2,967	2.1%	8.2%	24,319	17.0%	51.8%
973 +	951,973	298	14,887	1.6%	11.7%	101,300	10.6%	68.5%
Table Total *(weighted)*	1,136,983	1,085	21,285	1.9%	7.0%	145,339	12.8%	39.8%

9. Distribution of Water Traded by Volume: Survey of Irrigators

The results of the survey covering distribution of volume of permanent water traded during 2005-06 by respondents are presented in Table 7. Only 29 irrigators (2.6%) sold water and 46 irrigators (4.1%) purchased water on the permanent water market. Over 50% of the irrigators that purchased water on the permanent water market purchased less than 100ML of water. The median volume of water purchased was observed to be 125ML. Similarly, 47% of the irrigators that sold water on the permanent water market sold less than 100ML of water and the median volume of water purchased was 120ML. There were 13% and 16% of the irrigators who respectively sold and purchased over 500ML of water during the year 2005-06.

Table 7: Distribution of Permanent Water Traded by Volume in NSW: Survey of Irrigators 2005-06

Volume of Water Traded (MLs)	Water Sold		Water Purchased	
	Responses (No)	Percent	Responses (No)	Percent
1-100	13	47.0%	23	50.2%
101-200	3	10.3%	6	12.8%
201-300	6	20.4%	4	8.1%
301-400	1	3.7%	4	8.2%
401-500	2	6.5%	2	4.6%
500+	4	12.6%	8	16.0%
Total	29	100.0%	46	100.0%
Median Volume (MLs)	120		125	

Table 8 summarises the survey results regarding the distribution of water traded during 2005-06 on the temporary market by respondents. The surveyed irrigators

were relatively more active in the temporary market with 216 (19.3%) selling and 218 (19.5%) purchasing water on the temporary water market. Nearly 80% of the irrigators that sold water on the temporary water market sold less than 200ML of water, with the median volume of water sold being 80ML. Over 51% of the irrigators that purchased water on temporary water market purchased less than 200ML. However, nearly 24% of the irrigators purchased 500ML or more during the year 2005-06.

Table 8: Distribution of Temporary Water Traded by Volume in NSW, Survey of Irrigators 2005-06

	Water Sold		Water Purchased	
Volume of Water Traded (MLs)	Responses (No)	Percent	Responses (No)	Percent
1-100	132	61.3%	78	36.0%
101-200	39	18.3%	34	15.5%
201-300	17	8.0%	29	13.3%
301-400	12	5.1%	16	7.1%
401-500	4	2.0%	13	5.7%
500 and above	11	5.3%	52	23.8%
Total	216	100.0%	218	100.0%
Median Volume (MLs)	80		200	

10. Reasons for Trading Water: Survey of Irrigators

The irrigators were asked to identify the reason why they bought and sold water on both permanent and temporary water markets during 2005-06. A total of 26 irrigators identified reasons for selling water on the permanent market and 191 on the temporary market (Table 9). The three most common reasons given for selling water on both permanent and temporary water markets were making additional income, reducing debt and selling their surplus water.

Table 9: Reasons for selling irrigation water, NSW Irrigators' Survey 2005-06

Reasons	Permanent	Temporary
Number of Irrigators selling water	**26**	**191**
Make additional income	36.1%	41.3%
Reduce debt	33.8%	10.4%
Water was surplus to my needs	26.0%	57.8%
No longer farming	8.3%	3.5%
Commodity prices too low	8.3%	2.9%
Retirement	4.1%	0.0%

Table 10 summarises the reasons why irrigators purchased water during 2005-06. A total of 46 and 218 irrigators identified their reasons for purchasing water on the permanent and temporary water markets respectively.

The four most common reasons for purchasing water on the permanent water market were:

- Purchasing water as an investment
- Substituting for low allocation
- Meeting existing crop or pasture needs and
- Reducing future risk of low water availability.

Table 10: Reasons for purchasing irrigation water, NSW Irrigators' Survey 2005-06

Reasons	Permanent	Temporary
Number of irrigators purchasing water	**46**	**218**
As an investment	28.5%	3.7%
Substitute for low allocations	27.7%	40.1%
Meet existing crop or pasture needs	23.0%	31.3%
Reduce future risk of low water availability	22.4%	13.5%
Expand areas under crops or pastures	13.6%	8.9%
Start or plant new crops or pastures	8.1%	4.6%
Finish off a crop	7.6%	27.3%
Other reasons	19.8%	9.2%

Only a small proportion of those who purchased water on a temporary basis identified purchasing water as an investment as one of the major reasons. However, over 27% identified finishing off a crop as one of the main reason for purchasing water on the temporary water market. The four main reasons for purchasing water on the temporary water market include:

- Substituting for low allocation
- Meeting existing crop or pasture needs
- Finishing off a crop and
- Reducing future risk of low water availability.

11. Attitude towards Water Trading: Survey of Irrigators

Table 11 shows that 56% of irrigators believed temporary water trading was 'good for their area'. In contrast, only 10% of irrigators believed it was 'bad for their area', while 35% believed it to be 'both good and bad'. These proportions are expected to be affected by climatic conditions for example when water is scarce temporary water trading might becomes much more favourably considered.

Table 11: Attitude towards Water Trading; Survey of Irrigators 2005-06

I think water trading has been	Temporary Water Trading		Permanent Water Trading	
	Responses	Percent	Responses	Percent
Good for my area	566	55.7	244	27.5
Bad for my area	99	9.7	221	25.0
Both good and bad for my area	352	34.6	420	47.5

Figure 3 shows the distribution of irrigators' attitudes towards temporary water trading by the major catchment areas managed by the Catchment Management Authorities (CMA) and by different sizes of water entitlement. There was no significant difference in attitudes across irrigators with different sizes of water entitlements, although irrigators in the Northern Rivers catchment were less likely to believe temporary water trading was 'good for their area' in comparison to irrigators from other catchments.

Figure 3: Attitudes towards Temporary Water Trading, Survey of Irrigators 2005-06

(Percentage agreement: "I think temporary water trading has been good / bad for my area")

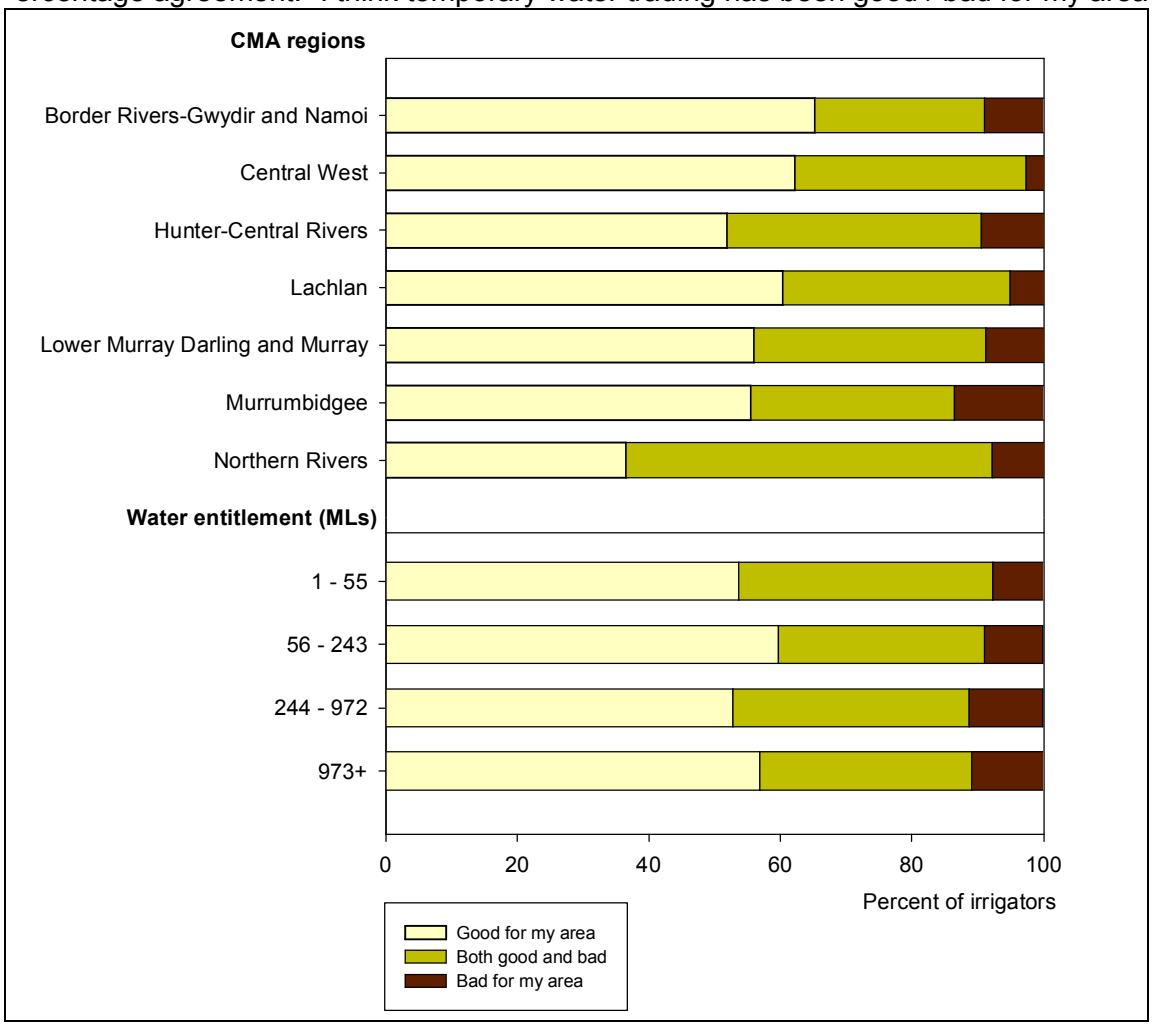
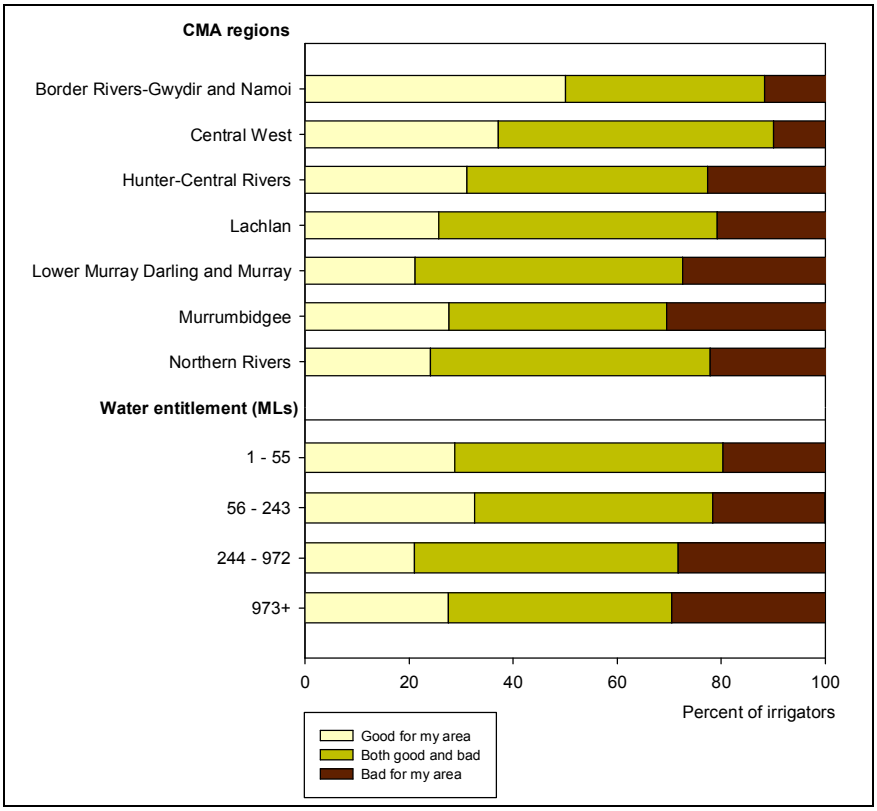


Table 11 also shows that 28% of irrigators believed permanent water trading were 'good for their area'; 25% believed it to be 'bad for their area'; while 48% believed it to be 'both good and bad'.

There was no significant difference in attitudes toward permanent trading across irrigators with different sizes of water entitlements, although irrigators in the Border Rivers-Gwydir and Namoi CMAs were most likely to believe it was 'good for their area' (Figure 4). In contrast, those irrigators in the Lower Murray Darling and Murray, and Murrumbidgee were more likely to believe it was 'bad for their area'

Figure 4: Attitudes towards Permanent Water Trading: Survey of Irrigators 2005-06

(Percentage agreement: "I think permanent water trading has been good / bad for my area")

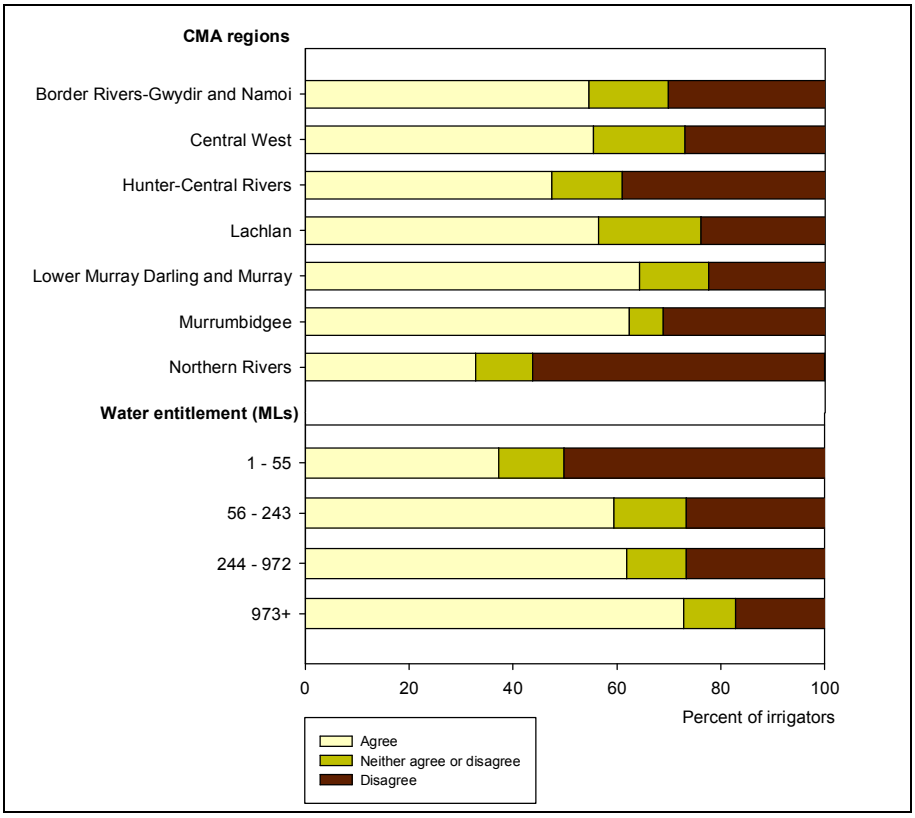


12. *Knowledge of Water Markets: Survey of Irrigators*

Majority of the irrigators agreed with the statement that their "knowledge of the water market is very good", while around 30% disagreed with this statement. Figure 5 provides the distribution of the level of water market knowledge amongst the irrigators by different catchments and by entitlement size. Knowledge of the water market was highest amongst irrigators in the Lower Murray Darling and Murray catchments and lowest in the Northern Rivers catchment. There was also a linear relationship between size of water entitlement and knowledge of water trading, with small entitlement holders having the least knowledge and large entitlement holders having the highest knowledge.

Figure 5: Knowledge of Water Market

(Percentage agreement: "I would say my knowledge of the water market is very good")



13. Conclusions

The success of current water reforms is reliant on trading being effective to achieve outcomes that optimise economic, social and environmental benefits. The separation of water licences from land ownership under the WM Act (2000) has made it easier to trade water in both permanent and temporary water markets. The trends in the volume of water traded on the temporary market in the Murray and Lower Murray Darling and the Lachlan catchments suggest that the level of trading has increased in the post WSP period. It is not possible to draw such a conclusion for other catchments. On an overall basis, temporary water trading has increased from 8.2% during 2002-03 to over 10 % in more recent years. Although it is difficult to attribute these changes to the WSPs it can be concluded that the separation of water right and other rules as provided in WSPs have acted as a catalyst to promote the level of water trading. The level of permanent water trading has remained unchanged during both the pre and post WSP periods.

Significant increases in the price of water traded on temporary markets have been observed during recent years, which have happened mainly due to continuing drought leading to a very high demand for water. These increases were most visible in the Lachlan, Murrumbidgee, Murray and Lower Murray Darling and Hunter water sources. Temporary water has been traded in these water sources with prices reaching $1600/ML in Hunter during 2006-07, $1220/ML in Murrumbidgee during 2007-08 and $1200/ML in Murray and Lower Murray during 2007-08. Similarly the price of water traded on the permanent markets was observed to have increased significantly, which is consistent with the findings of Bjornlund and Rossini (2007). They have suggested that the price relationship between allocation and entitlement prices now follow the same economic fundamentals as in property markets where rental levels determine property values.

The sample irrigators covered by the survey traded 21,285ML and 145,339ML representing 1.9% and 12.8% of their total entitlements on the permanent and temporary water markets respectively. The large entitlement holders were found to trade higher volume of water. However, as a percentage of their entitlement the small entitlement holders were highly active trading over 49% and 230% on the permanent and temporary water markets. The most likely reason is that irrigators with very small entitlements need to purchase larger volumes of water to support their farm business. This may be due to reason that the low Available Water Determinations compelled farmers to purchase larger entitlements to sustain enterprises such as permanent plantings.

Nearly 7% of the surveyed irrigators participated in permanent water market and 40% in temporary water market. The majority of those who traded on the permanent water market purchased or sold less than 100 ML. Nearly 80% sold less than 200ML on temporary water market. The three most common reasons for selling water were identified as making additional income, reducing debt and selling surplus water. Purchasing water as an investment was the most likely reason for buying on the permanent water market. The other major reasons for buying water were substituting for low allocations and meeting existing crop demand. In addition, the irrigators are also likely to buy water on the temporary water market to finish off their crops.

The majority of the irrigators believed that temporary water trading is good for their area. The irrigators in the Northern Rivers catchment were less likely to believe temporary water trading was 'good for their area' in comparison to irrigators from other catchments. However, only 28% believed that permanent trading was good for their area. The irrigators in the catchments that have been relatively more active in water trading such as Murray and Lower Murray Darling and Murrumbidgee are more likely to believe that permanent trading is not good for their area. RIRDC, NWC and MDBC (2007) have also found that there is a strong community opposition to the permanent water trading in Victorian Murray catchment. There is a fear that the regional economies can change permanently because of exposure to the rapid shifts facilitated by water trading.

The irrigators in the southern catchments including Murray and Lower Murray Darling and Murrumbidgee are likely to have a higher level of knowledge about the water market, which is consistent with their relatively higher participation in the water trading as compared to irrigators in other areas.

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Appendix Table 1: List of Water Sharing Plans by CMA/ CMA groups commenced at July 2004

Catchment Management Authority (CMA) area	**Regulated WSPs**	**Unregulated WSPs**	**Groundwater WSPs**
Border Rivers-Gwydir and Namoi	Gwydir Regulated River Namoi Regulated River	Rocky Creek etc. Phillips Creek etc Tenterfield Creek	
Central West	Macquarie and Cudgegong Regulated Rivers	Castlereagh River above Binnaway	
Hunter-Central Rivers	Regulated Hunter River	Wybong Creek Jilliby Jilliby Creek	Kulnura Mangrove Mountain GW Tomago Tomaree Stockton GW
Lachlan	Lachlan Regulated River	Mandagery Creek	
Lower Murray Darling and Murray	NSW Murray – Lower Darling Regulated Rivers	Upper Billabong	
Murrumbidgee	Murrumbidgee Regulated River	Adelong Creek Tarcutta Creek	
Northern Rivers		Upper Brunswick River Coopers Creek Dorrigo Plateau Surface Water Apsley River Commissioners Water Toorumbee Creek Karuah River Ourimbah Creek	Alstonville Basalt Plateau GW Source Stuarts Point GW Source Dorrigo Basalt GW Source
Southern Rivers		Wandella Creek Kangaroo River	

Note: Dorrigo Plateau Surface Water and Dorrigo Basalt GW Source are covered by one Water Sharing Plan