A SCOPING EXERCISE TO INVESTIGATE THE POTENTIAL NEED FOR, AND NATURE OF, WATER TRADING IN SOUTH AFRICA

Andrew Pott*, Karen Versfeld*,
Melissa van Rooyen* and Andrew Muir+

Report to the Water Research Commission

by

CPH Water*
Austen Smith Attorneys+

WRC Report No KV 222/09

April 2009

Obtainable from

Water Research Commission
Private Bag X03
Gezina, 0031

The publication of this report emanates from a project entitled “A scoping exercise to investigate the potential need for, and nature of, water trading in South Africa” (WRC Project No. K8/581)

ISBN 978-1-77005-855-2
Printed in the Republic of South Africa

EXECUTIVE SUMMARY

The Need for water trading

Water scarcity lies at the heart of the need for water trading. 10 of South Africa's Water Management Areas are currently deemed to be over-allocated. The demand for water use entitlements will therefore exceed the supply of water use entitlements where scarcity exists, hence the trading of water resources is one avenue through which water users can acquire water use entitlements.

Trading of water use entitlements

Four types of water trading are discerned:

- Permanent intra-sectoral trades
- Permanent inter-sectoral trades
- Temporary intra-sectoral trades and
- Temporary intra-sectoral trades.

Permanent trades require that ownership of entitlements be surrendered (in full or in part), to be used by another party for the same, or different purpose. Temporary trades require that privileges (but not ownership) of entitlements be temporarily surrendered (in full or in part) to another user. Temporary trades are becoming the most popular form of water trading internationally.

The nature of trades expected

Water trading has been practiced for a number of years now, predominately within irrigation boards (which are now transforming to Water User Associations). In a water trading survey undertaken as part of this project, WUAs and Water Service Providers (WSPs) indicated that the trading of water use entitlements is of high importance. Interestingly though, the WSPs cited inter-sectoral trade as being the most important, whereas WUAs indicated intra-sectoral trade as being the most important form of trade.

An assessment of current (2000) and projected (2025) water use by sector (NWRS, 2004), would however suggest that inter-sectoral trading is important, and possibly necessary. Reasons for this assessment include: (i) the proportional water use by domestic and urban water users is expected to grow, (ii) urban and industrial water users can generally afford to pay more for water than the irrigation sector, and (iii) given the fact that many catchments are over-allocated, this may be one of the more cost effective methods with which industrial and domestic water users can secure water use entitlements.

Externalities

Any form of water use entitlement re-allocation may induce externalities. Water trades will need to be regulated to control the externalities.

Administration

Trading is a powerful, incentive based management option with which water use efficiency can be induced. However, high transaction costs have been cited for one of the main obstacles to trade. It is essential that the regulation and administration of water use entitlements be efficient and affordable.

Conclusions and recommendations

There is a high need for water trading in South Africa. Inter and intra-sectoral temporary trades promise to be the most important types of trade in the future. Very few inter-sectoral trades are happening presently, but will probably take place after the completion of the compulsory licensing process (i.e. the initial allocation of water use entitlements). The key recommendation is for water

administrators to develop affordable and effective systems to support, and regulate, water trades. It is recommended that use is made of GIS-based systems, as these will facilitate the identification of third party effects, as well at the identification of other logistical issues.

Acknowledgement
Water trading is not always viable, and may in certain circumstances not be the most appropriate management instrument. A combination of centrally managed allocation (for equity and sustainability objectives), and water trading (for efficiency purposes) is advocated.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

BMP	Best Management Practice
CMA	Catchment Management Agencies
CMS	Catchment Management Strategy
DWAF	Department of Water Affairs and Forestry
EFR	Ecological Flow Requirements
IA	Institutional Arrangement
IFR	Instream Flow Requirements
ISP	Internal Strategic Perspective
NWA	National Water Act
NWRS	National Water Resources Strategy
WARMS	Wateruse Authorisation Registration Management System
WMAs	Water Management Areas
WCDM	Water Conservation and Demand Management
WRC	Water Research Commission

1. INTRODUCTION

This document is an overview document, prepared for the WRC as part of a consultancy contract. The document reflects the potential need and nature of water trading in South Africa, with details of the types of water trading that are possible.

Steps taken in the course of the project include:

- A review of international and local literature was undertaken,
- The water balances in the NWRS (2004) were reviewed, and mapped in GIS,
- Newly released ISP documents were collated, and read for discussion points related to trade,
- DWAF officials were visited, and details of the project were discussed,
- A survey of water trading was compiled and distributed to members of Water User Associations (10), and Water Service Providers (5). The results of the survey were then collated in this document, and
- A multi-criteria decision analysis framework was applied to ISP data in order to generate maps identifying areas where inter-sectoral trade may be required. These maps have not been included in this document, as there are uncertainties about the ISP, and the manner in which it can be used. Furthermore, not all ISP documents were available by the date this report was completed.

The document is laid out as follows:

Chapter 2 provides a background of the water availability in South Africa, with an assessment of the various management actions available to water resource managers to deal with situations of water scarcity.

Chapter 3 provides an independent legal assessment of water trading.

Chapter 4 provides an assessment of the potential extent, and nature, of water trading in South Africa. Consideration is given to water balance information published in the NWRS (2004), literature and the results from a water trading survey undertaken as part of this project.

Chapter 5 provides a review of externalities associated with water trading.

Chapter 6 provides a review of the administration required to support water trading.

Chapter 7 details the conclusions and recommendations of the project.

2. THE NEED AND POTENTIAL SCOPE FOR WATER TRADING

South Africa has a relatively new Water Act (Act 36 of 1998). The 1998 Act differs quite significantly from the previous (now repealed) act (Act 54 of 1956) which has a bearing on the potential need for water trading in South Africa. The previous act was based on the Riparian Rights Doctrine, whereby water rights were linked to riparian land rights. No water rights were formally issued to the ecological environment, nor to the basic water needs of humans. Furthermore, no formal register of water use activities was kept, with the implication that the Department of Water Affairs and forestry did not have accurate details of all water users and their water uses in the country. With the new Act, water rights have been unbundled from land rights (as the Riparian Rights Doctrine no longer applies). Furthermore, the only water users with a Right to use water are the ecological environment, and humans for their basic needs. All other water users have to register their water use activities and may have to apply for a water use license (of which there are 11 types), unless exempted by the Act. Details of the registrations and licenses are kept in a register, known as WARMS (Water-use Authorisation Management System).

When assessing the water situation of the respective Water Management Areas for input into the NWRS, it became apparent that a number of the WMAs (or sub-areas within the WMA) are over-utilised. The implication of a catchment being over-utilised is that the ecological functioning of the system may be compromised, as well as the assurance of supply to water users.

2.1 South Africa's current (2000) and future (2025) water situation

Figure 1 and Table 1 below, derived from data in the NWRS (2004), give an indication of the WMA water availability for various scenarios, including:

- 2000 (current situation),
- 2025 with a base water use scenario, with and without the introduction of water supply options, and
- 2025 with a high water use scenario, with and without the introduction of water supply options.

The water balances also give a sectoral breakdown of water use. The figures offer an insight into where water shortages currently exist, and where they may exist in 2025 (with and without the introduction of supply options).

It is water scarcity, reflected in the scarcity of water use entitlements, which creates the potential and need for the trading of water use entitlements. The presence of water scarcity will require mechanisms to allocate water use entitlements to the "most appropriate" water users. There are two options with which re-allocation of entitlements can be undertaken (discussed in detail below), including the re-allocation of water use entitlements by the water management authority, and/or the re-allocation of water use entitlements via market forces (i.e. via the trade of water use entitlements). The water balances provided give an indication where water scarcity currently exists, and where it may exist (with or without the implementation of water supply options). The potential need for water trading is highly correlated to water scarcity.

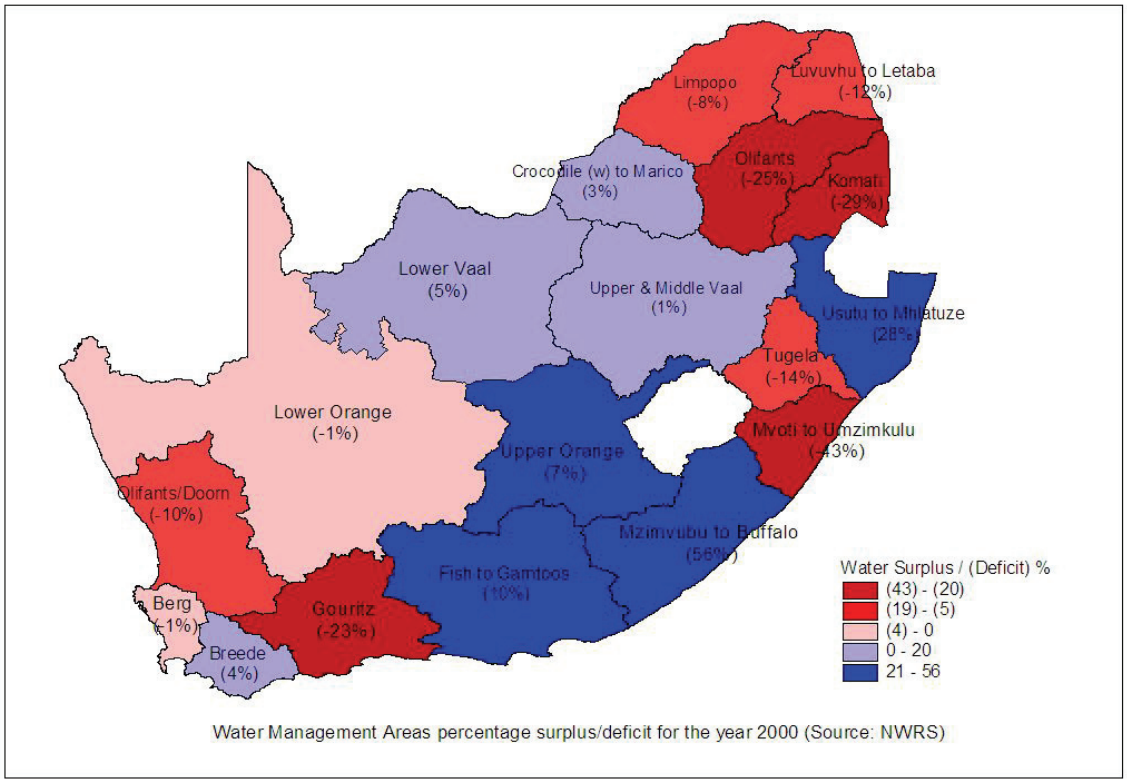

Figure 1 The WMA water balances for 2000 (NWRS)

Table 1 Water availability (expressed as a %) derived from data published in the NWRS, 2004.

Water Management Area	2000 % stress with no development	2025 - Base % stress with no development	2025 - Base % stress with development	2025 - High % stress with no development	2025 - High % stress with development
Limpopo	-8%	-16%	-13%	19%	-16%
Luvhuvu and Letaba	-12%	10%	28%	-10%	28%
Croc. West and Marico	3%	8%	8%	-15%	15%
Olifants	-25%	-29%	0%	32%	-4%
Inkomati	-29%	-19%	-8%	22%	-11%
Usutu to Mhlathuze	28%	27%	33%	-20%	27%
Thukela	-14%	-15%	36%	19%	33%
Upper Vaal	1%	-1%	0%	25%	-23%
Middle Vaal	1%	1%	1%	-1%	1%
Lower Vaal	5%	8%	8%	-9%	9%
Mvoti to Mzimkhulu	-43%	-72%	37%	122%	14%
Mzimvubu Keiskama	56%	53%	83%	-49%	81%
Upper Orange	7%	2%	18%	1%	15%
Lower Orange	-1%	-1%	11%	1%	11%
Fish to Tsitsikama	10%	7%	14%	-5%	12%
Gouritz	-23%	-27%	9%	55%	-12%
Olifants / Doorn	-10%	-9%	29%	12%	28%
Breede	4%	4%	16%	0%	12%
Berg	-1%	-9%	7%	64%	-41%

Notes:

- Surplus / (deficit) is calculated as (water supply – water demand) / water supply * 100.
- What the table does not show is the cost per cubic meter of the augmented water, and the affordability of water users to pay for the water. Although it may appear that the deficit is removed, many water users may in fact not be able to afford the water.
- The figures are derived from the NWRS (2004).
- The NWRS will need to be consulted to explain some of the apparently anomalous trends (e.g. the 2025 High water use scenario for the Mvoti to Mzimkhulu WMA results in a water surplus, as opposed to increasing the deficit)

2.2. Options with which to deal with water scarcity

The following are possible options with which to deal with water scarcity, many of which are mentioned in the NWRS (2004):

- Increase the supply of water (a supply side solution), and/or
- Increase the efficiency with which water is used (a demand side solution), and/or
- Allocate the limited water use licenses to the "most appropriate" water users.

2.2.1. Addressing Water Scarcity Via Water Augmentation Options

Water augmentation (supply side) options include, amongst others:

- The building of new dams to increase the yield of a catchment,
- The raising of dam wall heights (where this is possible, and if this will in fact increase the yield of a system),
- The construction of transfer schemes from areas where water surplus exists to areas where shortages exist,
- The further development of affordable desalination technologies
- The development of technologies and management practices to better utilise ground water.

Dams

The table above indicates that water scarcity can be addressed for a number of the WMA's via the construction of dams and other augmentation schemes. What the table does not show is the anticipated cost of the augmented water and the affordability of the various water users to pay for the water. Most economically viable dam sites have already been utilised in South Africa. Future augmentation of water supply via the construction of dams may result in "expensive water" (NWRS, 2004), which may not be an ideal solution as many water users will not be able to afford the water, and economic growth may still be retarded even if the dam is built. Furthermore, the construction of dams may carry negative social and environmental impacts, as communities may need to be relocated as a result of the dam, and the dam may result in changes in stream flow characteristics below the dam (with changes to flow patterns, quality, temperature, etc.) which may negatively affect the biota downstream of the dam.

Increasing dam wall heights

Raising dam wall heights may be viable in a few isolated instances. However, increases in yield may not be adequate in many instances, or the cost of the augmented water may be unaffordable to the water users.

Transfer schemes

Transfer schemes may also result in "expensive" water, and unless subsidized by the state (which goes against the "full cost recovery" pricing principles embodied in the National Water Act), may be unaffordable for many water users. Transfer schemes may also carry negative environmental impacts, in that biota found in one system could be transferred to another. Furthermore, the flow

characteristics (quality, quantity and flow patterns) of the system from where, and to transfers take place will be altered, which may also have negative implications.

Desalination of seawater

The desalination of seawater is currently very expensive (NWRS, 2004). Desalination will no doubt be an important management option that will attract future research and development in order to develop economically viable desalination technologies. Currently however, the cost of desalinated water is unaffordable to most water users.

Use of ground water

The use of ground water reserves is one option to address water scarcity in areas where groundwater reserves are available. However, tapping this resource may result in the depletion of these reserves, and may in effect not be a sustainable solution.

2.2.2. Addressing water scarcity via demand side solutions

Demand side solutions are often referred to as Water Conservation and Demand Management (WCDM) initiatives. In contrast to supply side solutions, which are aimed at meeting the demands of water users, demand side solutions are aimed at reducing the demand of water users, ideally WITHOUT changing the level or quality of goods and services being rendered via the water use (NWRS, 2004). The method with which this can be achieved is via the implementation of more water use efficient technologies and/or adoption of improved management practices related to the use and application of water. Demand side options may, however, liberate water at the cost (reduction) of production and/or quality levels. Benefits obtained from the re-allocation of liberated water to new uses may outweigh the costs of reduced quantity and quality levels (from a societal perspective) incurred as a result of the adoption of WCDM initiatives.

Water use efficiency can be induced via the following:

- Wastage reduction
- Water pricing
- The introduction of benchmarks
- Water trading

Wastage reduction

One of the obvious ways to reduce demand, thereby liberating water for use by others, is to reduce wastages. Water pricing, the introduction of benchmarks and water trading are instruments through which reductions in wastage can be achieved. Moral suasion, where the water management authority educates stakeholders as to the importance of water, and appeals to the stakeholders to adopt more efficient technologies is another method with which wastage reduction can be induced. Wastages include, amongst others; toilet cisterns that are oversized, leaking pipes, leaking canals, poorly managed canals (which may result in too much water being released, or too little abstracted timeously with consequent spillages), poor forecasting techniques (which may result in excess water being released from dams when use could have been made of natural flows). It is important to note that it is not economically viable to reduce all wastages.

The clearing of alien vegetation from riparian areas (as part of the working for water campaign) could be considered to be a water wastage reduction initiative. However, it is possible that in certain circumstances indigenous vegetation may re-establish itself in the place of removed alien vegetation, and may also use significant volumes of water. The use of water by the indigenous species will however probably not be regarded as a wastage of water.

Trading of water use entitlements

Unless exempted, all forms of water use require water use licenses in order for the water use to be legal. Trading is one option with which persons may acquire water use entitlements. The mechanics of a trade in water use entitlements is quite simple in that a holder of a water use entitlement willingly surrenders ownership of a water use entitlement, or the privileges attached to the entitlement (in part or in full) to another individual, generally receiving financial compensation for this undertaking. For the purposes of this document, the party surrendering his entitlements is referred to as the trade-out party, whereas the party receiving the entitlements as a result of the trade is referred to as the trade-in party.

The trading of water use entitlements may take the following forms:

- Permanent inter-sectoral (between different sectors) trading,
- Permanent intra-sectoral (within the same sector) trading,
- Temporary[1] inter-sectoral trading, and
- Temporary intra-sectoral trading.

Permanent trades imply that the trade-out party surrenders ownership of a water use entitlement (in full or in part), which is duly recorded in the water use entitlement register (WARMS). Temporary trades imply that that the trade-out party temporarily surrenders the privileges attached to water use entitlements to the trade-in party. Ownership of the entitlement is retained by the trade-out party. The differentiation between inter- and intra-sectoral trade is made for the reason being that different sectors often require different assurances of water supply. They are in effect different types of water use and require differentiation.

The trading of water use entitlements is a demand side intervention in that water users are incentivised to use water more efficiently, thereby liberating (water use entitlements) which can then be traded. The higher the ruling trade price, the greater is the incentive for water users to seek water use efficient technologies and management options.

According to an international study conducted by Zekri & Easter (in press) the most common type of trade is temporary trades, which are in effect leasing arrangements, while the least common are permanent water rights transfers. Each type of trade has its respective advantages and disadvantages and the type of trade that occurs is essentially determined by the seller. On the one hand, permanent trades provide the security of supply for investment purposes (Bjornlund, 2003). On the other, temporary trade allows irrigators to respond to annual variations in commodity prices and water supply (Bjornlund, 2003). Various reasons have been given as to why people and/or organisations would want to trade. Buyers have cited the main reasons for participating in trade was to ensure a supply of water during times of drought and expanding production (Bate, et al., 1999). While the majority of sellers wanted to sell unused water to which they had rights (Bate, et al., 1999).

Water pricing

A distinction needs to be drawn between the *administrative charges* levied on holders of water use entitlements by the water management authority, and the *market price* of water use entitlements (where trading of water use entitlements occurs), as both will have an impact on who uses water and how the water is used. Details of the mechanisms with which the pricing of water induces efficiencies are described below.

- The *administrative charges* are the charges that the holder of a water use entitlement must pay to the water management authority. The charge can include:

[1] Temporary trades are also referred to as leasing arrangements, as the ownership of the entitlement does not change, just details of who may enjoy the privileges attached to the entitlement.

- A water management charge (required to cover administration costs).
  Two methods of imposing this charge are possible, including:
  - Charges can be based on the full water use entitlement of water users. This in effect a flat water use charge, imposed on water users irrespective if they use the water or not, and is the option most widely adopted in South Africa at present, or
  - Charges can be based on the actual water use of users.

  Water use charges result in costs to the holder of water use entitlements. Water use entitlement holders will continually assess if the benefits they attain from the use of the entitlements exceed the cost associated with the entitlement. Small changes in the water use charge may result in a number of water uses becoming unviable, and thus the liberation of water may come at a cost in terms of foregone goods and services associated with such an action.

  The charges are differentiated (NWRS, 2004) in that they can be tailored for different sectors, different types of users, and water users in different geographical locations. This affords water resource managers the opportunity to "engineer" where efficiencies are to be promoted, by increasing the price on the targeted users.

  The advantages of the flat rate administrative charge are (i) This system removes the burden of metering actual water use[2], and (ii) This system provides the water managing authority with an assured source of income, which is not dependent on actual water use that will vary from wet to dry season and/or year. The main disadvantage of the flat rate administrative charge is that the **incentive for water users to be more water use efficient is attenuated**[3], in that water users have to pay for water use irrespective if they use it or not.
- A charge to recover capital, operation and maintenance costs of water related infrastructure if the water user benefits from these. These charges will promote efficiencies, in that water users will attempt to optimise the use of water related infrastructure, and
- A charge referred to as resource charge that could be levied in order that the price of water reflects its scarcity value[4].

- The *market price* of water use entitlements, represents the matched price trade-in parties are prepared to pay in order to secure the privileges of water use entitlements (for the respective types of trades) and the price trade-out parties are willing to accept before surrendering the entitlements (or privileges attached to the entitlements) to the trade-in party. The market price is dynamic, reflecting the temporal and geographical supply of and demand for water.

  The market price resulting from trades of water use entitlements differs from the administrative levy, in that the trade-out party receives a financial payment for the trade (from the trade-in party). This payment not only acts as an incentive for water users to initiate more water use efficient

[2] It may be argued that monitoring will be required in any event to audit (compliance monitor) water users. It would seem that as clean water becomes scarcer, the need for monitoring will increase.
[3] One may argue that due to high pumping costs, water users will have an incentive to use their water sparingly in order to keep pumping costs down. However, the fact that water users pay for their full entitlement, as well as the fact that a "**use it or lose it principle**" principle is adopted (whereby water users who don't make full use of their water use entitlement may stand to lose the portion of their water use entitlements that are unused), probably contributes to an over-use of water.
[4] The resource charge has not yet been introduced in South Africa, and may not be for some time (if at all), as the charge is very difficult to determine, and in effect will be determined by the market if water trading is permitted.

technologies and management practices, but it may provide the finance required to fund this undertaking.

Administratively imposed water pricing is a potentially powerful water management instrument with which to induce water use efficiencies. However, in its current form with pricing based on full allocation, it is not ideal. In order to be more effective:

- Pricing should be levied on actual water use. The implication of this is that metering of water use will be required, and
- New **incentive based** Institutional Arrangements (IAs) may need to be introduced (such as water banking), and contra-intuitive arrangements (such as the use-it-or-lose-it principle from large dams in particular), will need to be reviewed.

The metering of actual water use therefore stands to induce efficiencies in two ways. Firstly, water use charges based on actual water use stand to induce more efficient use of water. Secondly, water meters (and associated auditing procedures) will promote the confidence of water users that they will receive delivery of water attached to the water use entitlements. This confidence will result in higher traded prices for water use entitlements, which in turn will further stimulate water conservation and demand management initiatives by water users who wish to benefit from the higher trade prices.

Benchmarks

Benchmarks are in effect Best Management Practices (BMPs) which have been tried and tested, and found to yield favourable returns. A BMP is not some distant idealistic vision, but a generally accepted practice that has every chance of being attained (DWAF, 2000). The benchmarks become the de-facto standard against which similar water use activities are compared in order to evaluate the beneficial use of water uses. The water management authority may from time to time assess the various technologies and management practices related to various water uses in order to identify new benchmarks. Inefficient water users will continually be under pressure to move to newer more efficient technologies such as BMPs, for the following reasons:

- The water licensing authority will issue licenses based on the water use of BMPs. A water use with inefficient systems will probably not be able to receive the same returns as the more efficient water users. In order to survive, a migration towards the adoption of BMPs will be required. However, the water management authority will need to monitor actual water usage (and management practices) in order to ensure that water users are in fact complying with the licenses (which are based on BMPs). The use of benchmarks will be of particular importance in calculating the water availability of catchments as part of the compulsory licensing process.
- The adoption of BMPs (and new technologies and management strategies which may become BMPs) may liberate water, which can either be re-employed by the water user (e.g. irrigate a larger area with less water), or can be traded to other users. The promotion of water trading by the water management authority will induce water saving initiatives by water users, particularly when water is scarce commodity. Monitoring will be required to quantify or verify the water savings induced by the adoption of water efficient technologies (such as BMPs), which can then be traded. This will improve the confidence of buy-in parties who wish to trade in water use entitlements, which in turn will result in higher prices being paid for traded water use entitlements, which in turn will amplify the signal for water users to use water more efficiently.

It is clear from the passages above that there is a strong inter-relatedness between the various WCDM options. Trade features highly in that it carries with it incentives for water users to be more efficient.

2.2.3. Living with water scarcity

It is plausible that irrespective of water supply and water demand interventions, water scarcity may still prevail (see Table 1). The challenge is then to distribute water use entitlements to the "most appropriate" water users in the most effective and efficient manner. Two options exist with through which water use entitlements can be re-allocated, including:

- Via the centrally administered re-allocation of water use entitlements, and
- Via market forces (i.e. the trading of water use entitlements).

South Africa is currently still in a transition period from the repealed act (Act 54 of 1956), to the 1998 Act (Act 36 of 1998). This transition could be deemed to be complete once licenses have been issued to all water uses requiring licenses. There are currently very few water use licenses in circulation, particularly in over-allocated catchments. What currently exists are registrations of "legal water use" (the water being used legally per the old Act (Act 54 of 1956) at the time the new Act was introduced (Act 36 of 1998)), as well as registrations of new water uses that have emerged subsequent to 1998. However, with many of the catchments deemed to be over allocated, a process of compulsory licensing is required, which will be concluded with the *initial allocation* of licenses. The compulsory licensing process is a very administrative process, which amongst other things will verify and validify the truthfulness and lawfulness of registrations, and will be used to give consideration to water required for equity and sustainability.

The compulsory licensing process is very important in that it affords the water management authority the opportunity to address equity and sustainability issues up-front during the initial allotment of licenses. The re-allocation of licenses thereafter should be a relatively simpler task to undertake.

Trading of water use entitlements is only plausible after the compulsory licensing process is complete, and the *initial allocation* of entitlements has taken place.

.

Centrally administered re-allocation of water use entitlements

Water resource managers, guided by the mandate of the NWRS and CMS, may have the authority to re-allocate water use entitlements. The mechanism with which this re-allocation is possible relates to temporary nature of the water use entitlements. Water use entitlements are reviewed every 5 years. The water management authority can give notice to a water use entitlement holder that the water use license will not be renewed (in full or in part). Upon such notice being given the water user may continue using the entitlement until it expires. Compensation will need to be paid by the water management authority to party whose water use license is to be discontinued. In certain respects, this option is a form of forced-trade. Third party effects will exist under this re-allocation option, just as they will under a water trading option. It is clear from literature that a centrally managed system will very seldom be as efficient as the market (water trading) (Easter et al, 1998).

Market-based re-allocation of water use entitlements

A market-based re-allocation of water use entitlements requires that a willing and able trade-in party make a payment offer to an existing water use entitlement holder, and that the offer is acceptable to the entitlement holder. The terms of the arrangement may be that the existing water use entitlement holder permanently surrenders (in full or in part) his/her water use entitlement, and/or that the entitlement holder temporarily surrender in part privileges that may be attached to the water use entitlement.

The price of the trade will depend on, amongst other things:

- The opportunity cost of the water use entitlements to both the trade-in and trade-out party,

- The transaction cost and ease with which the deal can be struck,
- The confidence with which water can be attached to the water use entitlement, and
- The costs the trade-in party will bear to take delivery of the water, and make use of it.

Water trading facilitates the meeting of growing water needs without costly new investment in water infrastructure (Rosegrant et al., 1995) and it improves water use efficiency through the transfers of water to users who can earn the highest margin return for its use (Zekri & Easter, in press). In addition, a well-designed water market will make it possible to meet the growing requirements of the urban and industrial sectors, without negatively impacting on the growth in crop production (Easter et al., 1999). The benefits of adopting water markets are that it increases the intrinsic value of water and promotes efficiency, diversification, and flexibility of water users in responding to changing environments and accommodates for the changing nature of the water sector (Rosegrant et al., 1995). Trade will therefore improve the ability of individual users to manage the risk and uncertainty of water supply. Furthermore, trade provides the incentive to adopt water-saving technologies (Bjornlund, 2003) through economic gains in selling, leasing, or otherwise use of surplus and through security of tenure of water (Bruns & Meinzen-Dick, 2003). Trade will also act as a mechanism which directs water to economically more valuable users (Bruns & Meinzen-Dick, 2003) forcing water users to consider the full opportunity costs of their water use and eliminate waste (Rosegrant et al., 1995). A water market can be used as a policy instrument to facilitate the reallocation of scarce and fully committed water resources between competing users (Bjornlund, 2003).

Conclusion

One may argue that with centrally managed re-allocation, water use entitlements may be re-allocated with thought given to a number of considerations. For example, re-allocation may be required to address equity and/or sustainability objectives, which may not be met if only water trading were used as the re-allocation mechanism. However, the counter to this argument may be that equity and sustainability issues are dealt with during the compulsory licensing process (i.e. the initial allocation of water use entitlements), and hence the market based re-allocation system is suitable to ensure that water is allocated to the most efficient water users. However, given our relatively imprecise understanding of all aspects associated with Integrated Water Resource Management (IWRM), water resources will be managed in an adaptive manner for a number of years to come. There will be scope for both re-allocation options. Having said that however, there is growing international consensus, that the sustainable economic development of water depends on treating water as a scarce resource and applying economic principles to manage its allocation (Frederick, 2001).

It is also important to point out that both forms of re-allocation may incur third party effects. Any movement of water away from one user to another could induce third party effects. Centrally managed re-allocation, or re-allocation via the market may differ in the mechanics of how water use entitlements are re-allocated, however the consequences of such re-allocation may be identical.

3. A LEGAL ASSESSMENT OF TRADING

A law firm with experience in water related issues compiled this chapter independently. The request was for the law firm to provide a legal opinion of water trading giving consideration to the pertinent literature guiding water trading in South Africa.

3.1 Property

'Property' has been defined by usage and in a legal sense may refer to 'two distinct legal concepts: the right of ownership in a thing and the thing to which this right relates.' (Silberberg 'Law of Property' Butterworths 1975 at 1). South African law of property therefore relates to both 'rights' and 'things' and more importantly their interconnectedness. The extent of the rights one can hold in respect to a thing is a measure of ownership, when these rights are sufficiently diluted ownership may be lost and instead replaced by some lesser form of control until such time as the rights are completely eroded, alternatively rights may be transferred usually in exchange for new rights to a different thing (which is the basis of a commercial transaction). Ownership may be retained but the usual benefits of ownership may be reduced, e.g. where an owner (lessor) leases property to a tenant the tenant acquires many of the rights of ownership such as use, possession and enjoyment but ownership is reserved to the lessor. The extent of one's rights when compared to those held by another person determine ownership, control and interest in the thing and it is this relationship between persons and their respective rights which is fundamental to ownership, it is not the relationship between a person and a thing which matters in a legal sense.

To complicate matters a 'right' may be a 'thing' in the law and as such may be owned whilst the thing to which it relates may be owned by separate person entirely. For example, one may own the rights to a novel whilst the novel (the physical book) is owned by somebody else.

The nature of and limitation of rights is governed by Common Law, Contract and Legislation. At Common Law the right of ownership is generally regarded as being absolute, subject only to the limitation that in enjoying ownership one may not infringe upon the rights of another. These rights may then be traded or modified in terms of the law of Contract. Government may impose restrictions upon the rights of ownership by means of legislation where the limitation is generally accepted as being reasonable and necessary for social reasons.

For there to be a trade one person, the transferor, must trade certain of his rights to a transferee who acquires these rights and compensates the transferor. It is therefore crucial that the transferor has diminished rights and the transferee has increased rights after the trade. Where rights have not vested in the transferor but are held generally then a trade isn't possible as the transferor's rights don't diminish unless some mechanism exists to restrict his rights after the trade.

3.2 Water as Property

Very briefly and simply, water was regarded as either belonging to the State or to a private individual in our Common Law. Where water belonged to the State it could only be used by way of concession of the State, where it belonged to private individuals it could be freely used subject to certain limitations imposed by the Common Law (for example, refer to *Hough v Van der Merwe* 1874 Buch 148). Essentially the Water Act of 1956 codified these Common Law principles.

3.2.1 Water Act 54 of 1956

The Water Act drew a distinction between public and private water, which was both an artificial one and difficult to use meaningfully being based on the size and nature of the stream (whether surface or subterranean). The distinction is only important for the present discussion in that it was drawn on the basis of land and land ownership[5]. Thus, in terms of the Water Act, water could be owned and the determination of ownership was a function of land ownership. Public Water was owned by the State and Private Water by a landowner. Although the Water Act made provision for various circumstances regarding access to Public Water in essence, water rights were in the form of ownership and tied to ownership of land.

3.2.2 National Water Act 36 of 1998

The NWA represents a departure from the Common Law and Water Act, the fundamental essence of this difference is contained in the preamble to the NWA where it is recorded that water belongs equally to all the people of South Africa and that the Government is the Trustee of water. By law, a Trustee exercises the control elements of ownership on behalf of the beneficiaries who benefit from the use and enjoyment elements of ownership. As Trustees, the government is charged with numerous duties[6] ensuring, as far as possible, 'the equitable allocation of water for beneficial use,'[7] in the public interest. At the outset the important distinction which can be drawn in comparison to the Water Act is that water is owned by all people of South Africa equally, it is not owned by the State (National Government) or any individual. The National Government has the power to regulate its use, as a Trustee. However, it is a general fact of our law that a person (in this case the National Government) cannot transfer greater rights in a thing than those rights which it originally had. Therefore water is incapable of being individually owned but will always be equally owned by every South African. The use and control of water is to be regulated by the National Government. The rights conferred by the National Government therefore amount to rights of use and benefit and not of ownership. Furthermore, benefit has to ultimately confer some benefit on the population as a whole and not simply upon the user.

---

[5]"**private water**" means all water which rises or falls naturally on any land or naturally drains or is lead on to one or more pieces of land which are the subject of separate original grants, but is not capable of common use for irrigation purposes. "**Public stream**" means a natural stream of water which flows in a known and defined channel, whether or not such channel is dry during any period of the year and whether or not its conformation has been changed by artificial means, if the water therein is capable of common use for irrigation on two or more pieces of land riparian thereto which are the subject of separate original grants or on one such piece of land and also on Crown land which is riparian to such stream: Provided that a stream which fulfils the foregoing conditions in part only of its course shall be deemed to be a public stream as regards that part only" **Public water**" means any water flowing or found in or derived from the bed of a public stream, whether visible or not; Riparian land is land held by way of title and which has any direct access to a Public Stream.

[6] Section 3: 'Public trusteeship of nation's water resources'. (1) As the public trustee of the nation's water resources the National Government, acting through the Minister, must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate.

[7]Section 3(2) encapsulates this: 'Without limiting sub-section (1), the Minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values.'

3.2.3 Conclusion

The rights of benefit, use, and enjoyment are key elements of the right of ownership. Once allocated there will be little practical distinction between the rights conferred and actual ownership. However, in the same way as a tenant enjoys these rights in respect of an immovable property leased from a lessor without acquiring ownership, so too ownership of water does not vest in the user. The importance is twofold: Firstly, the rights conferred may be limited or curtailed, i.e. subject to conditions being imposed by the Trustee (the National Government) on behalf of the owners and secondly, there has been no change of ownership. A user can and will never own water; he or she can only own a right to water. It is therefore important to assess what these rights are and whether or not they can be traded.

It must be stressed that the rights created by the NWA do not arise automatically. The NWA makes reference to 'entitlements', which are defined as rights to use water in terms of the NWA.[8] There is no automatic or absolute right to use water but only those rights which arise through the NWA and which in most cases will be the rights created by the provisions of a licence.

3.3 The National Water Act (NWA)

3.3.1 Water rights

The NWA creates the rights of use of water from a water resource in terms of Section 4. These rights are divided into three classes, the first being a general right to use water for domestic purposes, secondly to continue an existing lawful use, and thirdly to be authorised or licensed to use water in terms of the NWA. The existing lawful use class is a transitional entitlement and is intended to be replaced by a licence or general authorisation in terms of the NWA[9].

The broad rights to water are listed as Water Use in Section 21. The exercise of these rights is only permissible in terms of Section 22, which creates two distinguishable categories of right, namely those requiring licensing, either as individual licences or as general authorisations, and those not.

In the latter category there is no vesting of rights, i.e. no ownership of a right of use is created and therefore there can be no trading, swapping or other dealing in these rights. They are therefore of no importance to this discussion.

Where a licence is required then there is a vesting of ownership of the rights, i.e. an individual has acquired a right to use water. There will be terms and conditions imposed in the granting of this right by the National Government (which includes any authority to whom the decision making power may have been delegated).

3.3.1.1 General authorisations

General authorisations are made in terms of Section 39 of the NWA. A general authorisation may apply generally, to a specific water resource, or to a geographical area. But most importantly, such

[8] Section 1: 'Entitlement' means a right to use water in terms of any provision of this Act or in terms of an instrument issued under this Act

[9] See Section 34 in this regard

authorisation will apply to a certain category of person[10]. The NWA makes provision for measures to redress past imbalances and this no doubt creates the potential for a general authorisation to be granted to a racial category. Alternatively, the category may well be based on type of water use, for instance irrigation, watering of stock, etc.

The scenario is thus created where a person falls into the category of authorised persons and also meets the other requirements relating to location and/or water use, but has no need to use his or her allocation in terms of the general authorisation.

Can a right created by a general authorisation be traded? Theoretically, the answer must be yes, whether or not this will ever come about remains to be seen. The requirements for trade would be a general authorisation subject to limitations. If for instance a racial class were granted an authorisation to the exclusion of a second class then there may arise a situation where the person belonging to the first class does not require his right and would rather trade to a member of the second class who requires it. The problems raised by such a scenario are that the authorisation would also be made subject to conditions of use, geography and water resource. If all of these factors remain constant and only race determines use, then such authorisation may well fall foul of provisions of our law relating to non-racism. For this reason, it seems unlikely that a general authorisation based on race will occur. Further objective criteria would need to be considered.

If however the distinction was based on geography, type of water use or water resource then a greater potential for trade would exist. Two scenarios occur, the first is where trade happens within a category of authorised users – it is presumed that where a general authorisation is made there are sufficient water quantities in a particular resource to meet the anticipated needs of the category of users so authorised. If the authorisation was subject to a limitation, (e.g. quantity that may be used) then if one member of the category fails to use his allocation this is wasted. The 'non user' receives no benefit from his allocation and the other users suffer in that there was a surplus of water which they could have used but was wasted.

The second scenario would occur where a general authorisation is made and the water allocated is not required. The potential exists for the surplus rights to be traded to persons falling outside of the general authorisation.

For any such trade of general authorisations there would need to be mechanisms of enforcing the trade, i.e. procedures need to be put in place to ensure the transferor's rights are reduced.

3.3.1.2 Schedule One

Schedule one of the NWA provides for a number of Permissible Water Uses. These are fundamental water uses and everyone is entitled to use water for these purposes and in the manner stated. Generally these uses are limited to reasonable domestic use and emergency uses.

In terms of Section 22(1)(a) no licence is required for a Schedule One water use. However, these rights are limited in that the user needs lawful access to the water resource, as one acquires these rights by reason of factual situation, i.e. physical access to the resource. These rights are lost as soon as access is lost so it is not possible for them to be traded as they cannot be separated from the land. Any attempt between neighbours to trade these rights will also fail as a Schedule One use is defined by quantity and therefore any 'doubling' of rights will mean that the water use no longer qualifies as a

[10] Section 39(1)

Schedule One usage and therefore the right to use the Water terminates. Should this be attempted then the transferee would have to apply for a licence as his use no longer qualifies as a Schedule One use and therefore is no longer exempt from licensing requirements.

3.3.2 Licences

Licences to use water are applied for by an individual under two sets of circumstances. The first is the Voluntary licence where application is made at the instance of the individual. The second is the Compulsory licence.

3.3.2.1 Voluntary Licences

Here the National Government has determined that certain water uses will require licensing to be permissible. Whether or not the use requires licensing may be based on the use or may be based on geography or water resource. Whatever the case may be, an individual obtains a licence to use water subject to such terms and conditions as may be applied by the responsible authority.

3.3.2.2 Compulsory Licences

Where it is deemed to be desirable to licence a water use, or uses from a water resource, or resources in order to achieve a fair allocation of a stressed resource, or where the existing allocation is inequitable, or to promote beneficial use in the public's interest, or to facilitate efficient management of a water resource, or to protect water resource quality,[11] then the responsible authority may call for all users wishing to use water from a resource to apply for a licence to do so. The basis on which Compulsory Licences are to be granted is the Allocation Schedule provided for in Sections 45 to 47. In essence, a quantity of water is determined to be available and is then apportioned amongst all the users who have applied for an allocation. The allocation is made on the basis of the consideration contained in Section 27. After consideration of these points and the total applications received, the applicants may be issued a licence to use water from a particular resource subject to terms and conditions as may be imposed.

3.3.2.3 Content of Licences

Section 28(1) sets six essential requirements of licences, namely, the Water Use or Uses, the property or area for which the licence is granted, the person to whom it is granted, the conditions to which use will be subject, and the licence period and review periods.

3.3.3 The nature of the rights

It must be remembered that what is owned by the User is the licence. By owning a licence he acquires rights to use water. The nature of these rights to use water are limited by a fundamental principle of the NWA, which is that in terms of Section 23 a determination of available water must be made in accordance with the National Water Resource Strategy. The determination is made after certain deductions in actual water for the reserve are made and thereafter the 'surplus' water may be allocated amongst the users. However there is no guarantee of supply of water. South Africa has a highly variable rainfall pattern and Section 31 expressly states that the issue of a licence is not a guarantee of supply. Rather it is a recording of a *spes*. A *spes* is best described as a right to a thing which does not yet exist.

---

[11] Section 43(1)

3.3.4 Summary

The NWA makes provision for three types of rights which it may be traded. These are rights acquired under a General Authorisation, a Voluntary Licence, or a Compulsory Licence. In theory there is no reason why any of these rights could not be traded. Practically speaking it seems unlikely that rights under a General Authorisation will ever be traded as these rights will be of limited value. Only where licensing is required will the rights become of real value as the licensing of the right adds value to the right.

3.4 The Responsible Authority

Three types of responsible authority having relevance to water trading are provided for the in the NWA. These are the National Authority, a Catchment Management Agency (CMA) and a Water User Association (WUA). All three of which are Water Management Institutions[12] for purposes of the NWA.

3.4.1 Administrative provisions

Further discussion will examine the legal mechanisms, provided for in the NWA, which may allow for trading of water rights. Before doing so it may be useful to bear in mind certain existing administrative requirements for the trading of rights generally.

Certain rights are registered. These include trademarks, copyrights, patents and rights to immovable property. When any of these rights are traded some record of the trade is kept by the registering authority (the registrar). So, for instance, where a trademark is licensed the transaction is recorded in an agreement lodged with the registrar who then records that the licensee is entitled to use that trademark. So too where immovable property is sold the registrar records the transaction against the title deed of the property. Where an immovable property is leased for a period of ten years or more then the lease has to be recorded against the title deed by the registrar. A mortgage bond passed over the immovable property is similarly recorded. A lease for a period of less than ten years need not be registered and may, in fact, be an oral lease and therefore not recorded at all. Where a bond is to be passed over movable property then the instrument to be used is a Notarial Bond. The bond document is executed before a notary public (who is not a state official but a private, practicing attorney). The reason for this is that a Notary Public keeps a record of all documents executed before him in a portfolio which is a permanent record of these transactions.

In all of these examples the registrar simply records the transaction. He plays no part in ensuring that transaction conforms to any particular requirements. He is only interested in ensuring that the basic requirements for the legality of the recording of the transaction are met. The method of ensuring compliance is to hold up registration of transfer until such time as the legal requirements are met. The basis of the transaction though is left to the parties themselves.

The general legal effect of any registration of transfer of rights is to make such transfer enforceable against a third party, i.e. a person not party to the transaction. Any person buying land against which a ten-year lease has been registered knows that the lease is in existence and buys the land subject to the lease. This is necessary where there is often no other means of proving the transfer of rights. In

[12] A Water Management Institution is defined as: 'a CMA, a WUA, a body responsible for international water management, or any person who fulfils the functions of a water management institution in terms of this Act'.

the case of trade in water rights there is no actual transfer of water or any physical thing. The trade is in an incorporeal right created by a licence.

Any trade of water rights in terms of the NWA will require Government oversight as a duty of care and control has been given to the Government by the NWA. If an analogy to the transfer of Land is drawn then the following points are raised: firstly can there be 'free trade' of minor rights, i.e. a lease which may or may not be reduced to writing; secondly, will it be possible to draw a distinction based purely on duration of trade, e.g. a ten year lease has to be registered (and therefore has to be in writing); and thirdly, as in a sale, will there be registration of every transaction?

Whilst a lease does not have to be reduced to writing such agreement is usually associated with facts which support the existence of the agreement. Primarily this involves the lessor placing the lessee in control of the property. This cannot happen with a water right trade unless there was a physical thing representing the water right. For instance share certificates used to be used as a thing which could be exchanged to record the change in ownership of the shares. A free market trade would therefore require some physical proof of ownership of the right. In this case the licence itself could be passed from one to the other. This would not allow for Government scrutiny nor would it cope with a partial trade.

Where Government scrutiny would be provided for in a system where the transaction is recorded in writing and submitted to a registrar (for reasons set out below this would most probably be the CMA) who would then authorise the transaction, apply such terms and conditions as may be required to the transfer and then record the transfer of rights. The difficulties associated with this type of transaction (which best conforms to the requirements of the NWA) would be in keeping records of the transfer of rights which may well change considerably between transferor and transferee in the transfer process. This problem is not insurmountable but would need to be addressed in some practical way.

3.4.2 The National Authority

The National Authority is represented by the Minister who has overall responsibility for the NWA and in particular is responsible for the formulation of Regulations.

The principal means by which the Minister exercises control is through the National Water Resource Strategy, which forms the basis for the National policy on water use and creates the water management areas. These water management areas are then to be administered by Catchment Management Agencies.

3.4.3 Catchment Management Agency[13]

The Minister is responsible for constituting a CMA, which is responsible for management of a water resource on a regional or catchment level. The basis for the management will be the Catchment Management Strategy which must not conflict with the National Water Resource Strategy[14] and which must establish a strategy 'for the protection, use, development conservation, management and control of water resources within its water management area'[15]. Additionally, a Catchment Management Agency must 'investigate and advise interested persons on the protection, use, development,

[13] See Chapter 7

[14] Section 9(b)

[15] Section 8(1)

conservation, management and control of the water resources in its water management area'[16] and must 'co-ordinate the related activities of water users and of the water management institutions within its water management area.'[17]

3.4.4 Water User Association[18]

WUAs operate at a restricted local level and are, in effect, co-operative associations of individual users undertaking water-related activities for their mutual benefit. As such they have limited management functions. The WUA is created by the Minister on application to him by the users concerned. Their regulation is based on a constitution which must be approved by the Minister. They will eventually replace the existing boards created under the previous Water Act.

Where several users form a WUA and thereafter acquire their water from the infrastructure of the WUA as opposed to from a Water Resource they cease to be users in terms of the NWA. Instead the WUA becomes the user. Trading could therefore take place on two levels, either between WUA and other users or amongst the members of the WUA. The members' rights are created, not by the licence, but by the constitution of the WUA. The WUA would itself have to apply for a licence to use water from a water resource.

Any Trading between members would have to be in terms of the constitution of the WUA and as such would be removed from the direct provisions of the NWA.

3.5 Trading of Rights in Terms of the NWA

The NWA makes both express and implicit provision for the trading of rights. These will be dealt with in turn.

3.5.1 Explicit provisions

3.5.1.1 Section 25(1)

Section 25 of the NWA deals with the transfer of water use authorisations. In terms of Section 25(1) where a person is authorised to use water for irrigation, a Water Management Institution may allow the person to use water for a different purpose or on different land within the same vicinity. It is therefore an implied provision that a licence to irrigate will be both limited in terms of permissible use (irrigation) and will be tied to a fixed property. This 'trade' is temporary and may come about where a landowner wishes to irrigate a different piece of land or use water for a different purpose. This Section does not make provision for the right to be transferred to another person. As such it is not a trade of right, rather a temporary deviation from the licence conditions. What is of importance here is that the use by the same person of the same water for the same purpose on different land requires the permission of the Water Management Institution. The rights granted by way of licence are therefore very narrow and specific. A licence will not be an entitlement to use a quantity of water but to use a quantity of water in a certain way and in a certain place.

---

[16] Section 80(a)

[17] Section 80(c)

[18] See Chapter 8

For this type of trade to have any practical benefit the Water Management Institution must have procedures in place to grant permission quickly, as long delays in granting permission will render this provision meaningless.

3.5.1.2 Section 25(2)

This Section provides for the surrender of a right or a part of a right to another person, to allow such other person to apply for a licence in respect of so much of the right as has been surrendered.

There is no requirement for the permission of the Water Management Institution to be first obtained. It would seem that this provision is intended to deal with the situation where there are insufficient allocable resources for a new licence application. The applicant therefore acquires rights which have already been allocated to somebody else.

As there is no requirement for permission to be obtained, the nature of the transaction between the right holder and the applicant, need not be scrutinised by the Water Management Institution. Any trade here would therefore not need to be regulated. The regulation comes from whether or not the new licence is granted. The trade would be a direct transaction between the parties but will only have effect once the new licence is granted. Presumably a revised licence will be granted to the existing holder to reflect any changes.

3.5.2 Implicit provisions

It is a fundamental principle of the NWA that water is used efficiently and to the benefit of all people in South Africa. Section 3(2) explicitly calls for water to be equitably allocated and beneficially used, whilst Section 27(1)(c) calls for the efficient and beneficial use of water. There are two, potentially mutually exclusive, requirements created by these provisions. Firstly that allocation of water be equitable and secondly, that water use be efficient and beneficial.

Equitable allocation will not necessarily guarantee efficient or beneficial use. To guarantee the latter the allocation needs to favour the most efficient users whose use of the resource will best benefit the public. One way to overcome this dichotomy would be to allow inefficient users to trade their allocations with the efficient/beneficial users. Thus both objectives are met. The benefit to the inefficient user is the compensation paid by the efficient user. The benefit is thus doubled, in that water is used more efficiently/beneficially and that less efficient users are compensated for their ‘loss’ of water rights.

The concern that must be raised is the extent to which the concept of equitable allocation is taken. It is clear from reading the NWA that ‘allocation’ refers to allocation of water to persons wishing to use water as provided for in Section 21 which in turn implies that the applicant has access to the water resource. Thus the trade will not be between the general public who have applied for and been granted allocations. Trade would be between *bona fide* water users, some of whom are naturally more efficient than others or whose use is of greater general benefit.

The trade envisaged here will most likely be a permanent trade where an initial, equitable, allocation is made and thereafter market forces skew this allocation towards efficient and beneficial use. A temporary trade could also be accommodated. Seasonal variations of available water, crop rotations, market forces, exchange rates, etc. may all impact on the efficiency of a water use or whether or not it is beneficial. Where any of these, or other factors, render an otherwise efficient beneficial use less so then it may be worthwhile for the licence holder to temporarily trade his allocation to another user.

Irrespective of questions of efficiency and benefit of use, once a right has been allocated to a user it becomes property. In this case the property is the licence. There are many factors which may prompt a property owner to transfer his property to another. South African law generally makes provisions for this and licences should be no exception.

It is clear that any trade in licences will have to be regulated by a Water Management Institution. Whether or not this is desirable from a free market trade perspective is irrelevant. The NWA is clear that there is a duty on the National Government to retain control of all matters relating to water and to its use. In order to properly monitor water use the National Government will act through Water Management Institutions.

In terms of the trading made possible by Section 25(2), a CMA would be the logical regulatory body, as this is the body responsible for management of its area. Similarly, the implicit trade contemplated above would only be feasible within a single catchment. It would not make sense for a user in one catchment to trade his rights with a user in another catchment as there would be no means to give effect to this trade without moving water from one catchment to the other.

Where the trade is permanent then the urgency will be less than where a temporary trade occurs. A temporary trade may occur as a result of market forces or water scarcity. The rights acquired in terms of the licence are a *spes* and only once the water has been collected and the available surplus quantified can any decision regarding the trading of licences be made. This requirement of urgency means that the regulatory function must necessarily be diminished. A possible means to achieve both would be to have two classes of licence, one freely tradable the other subject to restrictions. The former could relate to the same uses in similar areas, the latter where the use or the area changes significantly therefore requiring greater regulatory scrutiny and consideration.

A licence is not absolute: it has a limited period not exceeding forty years and will be reviewed periodically[19]. The conditions of the licence may be varied after review in terms of Section 49. This means that any mechanism of trade will need to ensure that the current version of the licence is traded. Additionally the regulatory authority may amend the conditions pursuant to a trade, where for instance the use or area changes, with the result that any trade will be subject to possible variation.

The NWA makes a number of references to the trading of rights and ancillary matters which are implied rather than explicit. These are contained in Section 26(1). In so far as regulation of trading is concerned, a water use is to be registered with a responsible authority[20] and the Minister has the power to make regulations 'regulating or prohibiting any activity in order to protect a water resource'[21]. This Section also authorises the Minister to make regulations 'relating to transactions in respect of authorisations to use water, including but not limited to (i) the circumstances under which a transaction may be permitted; (ii) the conditions subject to which a transaction may take place; and (iii) the procedure to deal with a transaction'[22].

If the Minister makes any of the regulations provided for above, the trading of rights (i.e. transactions) will be regulated by a responsible authority. It seems that the responsible authority in such a case

---

[19] Section 28(1)(e) & (f)

[20] Section 26(1)(c)

[21] Section 26(1)(g)

[22] Section 26(1)(l)

would most probably be the CMA as there is little sense in regulation occurring at a higher level when the ultimate subject of the trade (water) is confined to a catchment.

However in addition to the regulations which the minister may formulate to facilitate trading, the NWA arguably makes provision in Section 29(2) for informal trading. Where parties agree that the licensed user will compensate any other person for the use of the water, this obligation may be made a condition of a licence. It might well be that an informal trade could be sanctioned and approved by the licensing authority. The licence would then serve as a record of the trade. However such trade would not affect the rights of the transferor, unless there is a record of a reduction of his rights or his allocation. The rights traded would only be enforceable between the traders. An example of such a trade is where the first neighbour sells his rights under a general authorisation to a second neighbour. The Sate would not be a party to this trade and would simply record that the second neighbour is to compensate the first. Should the first actually continue to use his entitlement it would not be illegal, but the second neighbour could prevent him from doing so. However, since this continued use by the fist neighbour is not strictly illegal, the State would not be a party to enforcing the second neighbour's rights. This should be seen as a lease of rights rather than a trade. Only if the transferor's diminished rights are recorded would the State become a party to the enforcement of these reduced rights.

Where a formal trade occurs and rights are transferred then any attempt by the trader to exercise his pre-trade rights will be illegal and punishable at law.

The discussion so far has dealt with the trading of rights within a catchment area. The argument based on beneficial and efficient use could equally apply to trades between catchments. The infrastructure though needs to be significantly greater to give effect to such trades. There seems to be no reason why a catchment with an unusable surplus of water should not be able to trade this surplus to a neighbouring catchment less adequately provided for. The compensation received could then be passed on to the users within the catchment rather than inefficiently using the water with limited benefit to the public. Such a trade would require considerable scrutiny, as the infrastructure requirements will preclude the likelihood of short-term trades.

3.5.3 Summary

The NWA makes explicit provision for trading only in very limited circumstances. For the rest it is largely silent on the issue of trading of rights. However the principles at the heart of the legislation together with certain implied provisions, provides an arguable basis for the trading of rights.

Unless the NWA is amended the concept of trading will have to develop in terms of the common law and the regulations published from time to time. With the exception of Section 25, no specific reference to trading is made and accordingly the concept will have to develop in the common law, the forum being the Water Tribunal. The Minister may make regulations concerning trading but there is presently no statutory provision to allow trading.

The trading of rights may occur on three levels, between members of a WUA, between Users within a CMA or between Catchment Areas. Trades may be permanent or temporary.

3.6 Loss of Rights

The National Water Resource Strategy contemplates two types of reduction in rights of Water Use namely where the State is liable to pay compensation and where no compensation is payable[23]. Compensation is dealt with in Section 22(6) to (10) of the NWA. No compensation is payable where rights are diminished as a result of the need to provide for the Reserve, an over-allocation of water, or to rectify unfair or disproportionate water use. It is submitted that the rectification of an over-allocation (an under-provision of Reserve) is simply a redressing of an administrative error in calculating the Reserve and/or the surplus water available to be allocated. As such, this is a provision designed to allow mistakes to be rectified without imposing costs on the State. The last example though is the most worrying, as it potentially allows the State to determine that a water use is unfair and therefore, in the interests of equitable use and allocation, to reduce a User's rights without compensation. The grounds for determining unfairness or disproportionate allocation are not formulated and any such deprivation of rights will most likely be challenged. The Water Tribunal has the authority to hear disputes and compensation claims and may well have to adjudicate in such a scenario.

Any other deprivation of rights will have to be compensated for and the Water Tribunal is the adjudicator of the compensation payable.

An alternative to the deprivation of rights by the state would be the fair-trading of rights by users. This, if directed by the State, could achieve the State's purpose without requiring compensation from the State and would no doubt be a faster and more efficient way to achieve a redistribution of rights.

This Section makes reference to the scenario where an existing lawful use is converted to a licensed use in terms of the NWA. As such, the deprivation of rights should therefore be a once off occurrence where the system is correcting itself. However Section 49(4) imports these provisions into a review of a licence. Whether or not the exceptions to the payment of compensation will apply to a review of a licence is arguable. Where rights are granted by an authority and are then removed compensation will be payable. Section 25 of the Constitution (Constitution of the Republic of South Africa, Act 108 of 1996) prevents the arbitrary deprivation of property and makes compensation payable for any expropriation of rights. An attempt to expropriate rights (the NWA makes a deprivation of rights the equivalent of an expropriation – Section 22(7)(a)) without paying compensation will be subject to intense scrutiny and to argue that this is necessary where the rights were granted by way of licence seems untenable. The provisions for the deprivation of rights without compensation would therefore seem to apply only to the transitional phase where existing lawful uses are converted into licensed uses.

3.7 Conclusion

Before any formal trading of licences can occur it will be necessary for there to be a means by which control on licences can be retained (necessary in terms of the obligations imposed on the State by the NWA), yet allowing changes to the land and user and possibly the use can be made efficiently. Permanent trades across use and/or area will require greater scrutiny than trades (permanent or

---

[23] **NWRS, Chapter 3 Part 2 Page 70**
'Where a user considers that a reduction in existing lawful use, the refusal to grant a licence during compulsory licensing, or an amendment to her or his water use on review will severely prejudice the economic viability of the water use activity, a claim for compensation of financial loss may be made to the Water Tribunal. The amount of compensation must be determined in accordance with Section 25(3) of the Constitution. However, no compensation will be paid where changes in water use are necessary to provide for the requirements of the Reserve, to rectify an over-allocation of water from the resource, or to rectify an unfair or disproportionate water use (Section 22(7)).'

temporary) within an area and without change of use. Provisions should be made to facilitate these two types of trade. Any model for trading will have to take into consideration the legal requirements as well as the policies contained in the National Water Research Strategy.

There are few legal requirements stipulated for trading in the NWA and as a result any model proposed need only deal with the policies contained in the Strategy. The model should however make provision for the three levels of trade contemplated by the legislation although the principal area of focus should be the formal trade within a Catchment Management Area.

Any motivation for a trading system should be based on the need for beneficial and efficient use of water and the fact that trading is one means of improving both the benefit to the public and the efficiency of the use.

Additionally, any motivation will need to address the manner in which such trade is regulated. As the legislation presently stands, it is most likely that trade will develop in the common law which will then face the problem of a loss of control by the State. Assuming that there needs to be regulation of trading then a formal mechanism must be created. Failing the creation of any such mechanism, trading, instead of promoting efficient and beneficial use, will result in many problems of enforcement and compliance with licence conditions and may result in a significant loss of control until such point as the licence becomes meaningless. Alternatively the regulation forms a stumbling block and renders the trade meaningless as it sits outside of the trading process. The regulatory mechanism for water use and the control of trading must be integrated so as to maximise efficiency.

The alternative is to prevent trading except in terms of Section 25. This would be contrary to international trends and systems and may arguably be contrary to the trusteeship placed on the State by the NWA. As such this alternative seems untenable.

4. THE LOCATION AND NATURE OF TRADES

The objective of this chapter is to discuss:

- Where has water trading taken place in South Africa up to now, and what types of trade predominated, and
- Where will water trade probably take place, and what type of trade is anticipated to dominate.

Information related to *historical trades* was obtained from two sources. The first source was a review of literature in which water trading has been explored in South Africa. Most examples cited relate to intra-sectoral trades. The second source includes the results from a survey related to water trading undertaken for this project. Information related to *potential future water trades* was obtained from (i) the water trading survey mentioned above, and (ii) a review of the water availability and of the ISP documents (those available) to identify where trade is mentioned as being viable.

The chapter is laid out in the following format.

- Details of the current and projected water use trends are explored. This information provides insights into the potential need for water trading, and indicates that inter-sectoral temporary trade will become increasingly important in South Africa.
- Details of pertinent literature related to water trading examples in South Africa is discussed.
- Details of the water trading survey are given.

4.1 Current and Projected Future Water Use Trends in South Africa

The objective of this section is to explore the current and projected water use trends in South Africa. Figure 4.1. illustrates the proportional water use by the various water use sectors. The pie chart clearly shows that irrigation (62%) is currently the dominant water user in the country (which is consistent with international water use trends), followed by urban water use (22%).

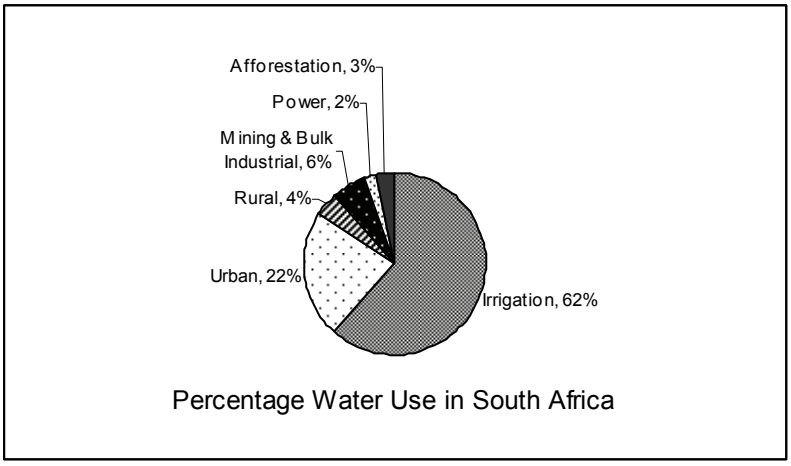

Figure 4.1 Breakdown of water use in South Africa for the year 2000.

If one looks ahead to 2025 however, the proportional use of water change by the various sectors changes, as is shown in Table 4.1 and Figure 4.2 below. For both the base, and high water use scenarios, the proportional use of water by the irrigation sector declines while the relative water use by the urban sector increases. Although these proportions can be influenced in a number of ways, what is clear from the NWRS water use data (NWRS, 2004), is that the demand for water by the urban and industrial sector is growing, while the demand for water by the irrigation sector is anticipated to remain

fairly constant. Given the fact that both urban and industrial sectors are generally more water use efficient than the irrigation sector, it is plausible that the demand for water by the urban and industrial sectors may be met via water use trading. However, the trading survey (discussed below) indicates that most of the questionnaire respondents felt that intra-sectoral water trading was the most important form of trade.

Table 4.1 The sectoral distribution of water use in South Africa (Derived from ISP documents)

Year	Irrigation	Urban	Rural	Mining & Bulk Industrial	Power	Afforestation
2000	62%	22%	4%	6%	2%	3%
2025 (base)	57%	28%	4%	6%	3%	3%
2025 (high)	48%	39%	3%	5%	2%	3%

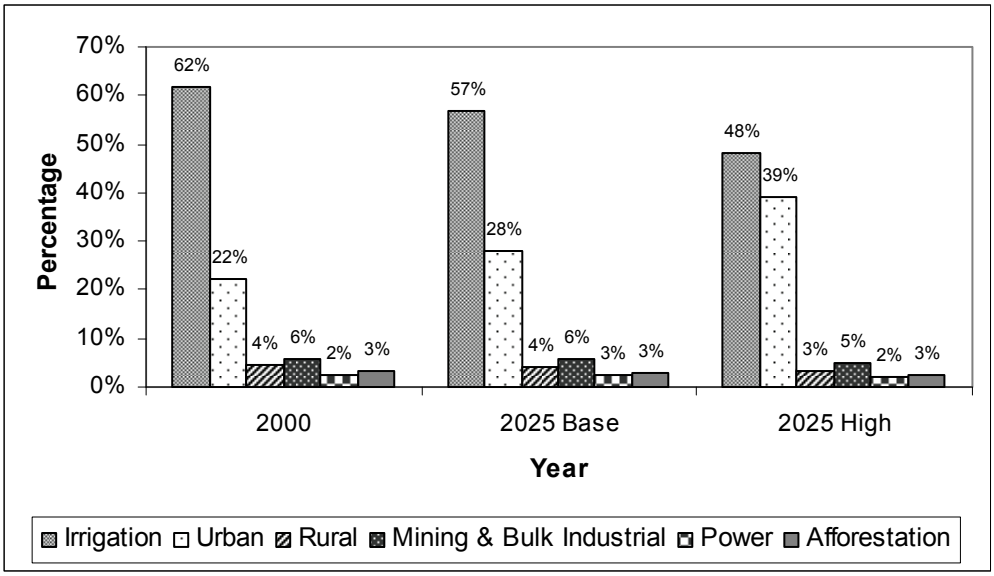

Figure 4.2 Sectoral break down of water use for 2000, 2025 (base) and 2025 (high) scenarios.

4.2 Pertinent South African Literature

A few research papers are available which indicate where water trading has taken place in South Africa, and the nature of the trades.

Bate et al (1999)

Intra-sectoral trading between *irrigators* has occurred in the Crocodile River Catchment since 1994 (Bate et al, 1999). It was found in this study that trading has lead to an increase in efficiency, with little change in externalities. The authors found that the majority of trade-in parties traded in order to ensure a steady flow in times of drought. The other two reasons for trade are to insure against drought (i.e. increase supply assurance) and to expand production. The traded water was mostly unused water.

The research by Bate et al (1999) indicates that all the trades researched were intra-sectoral, with 23 permanent and 46 temporary trades recorded.

Bate et al (1999) also cite an example of a permanent inter-sectoral trade whereby De Beers bought farms in order to secure the water use entitlements held by the farms. There were externalities associated with this trade. Farmer interviews undertaken as part of the research by Bate indicated that farmers believed that water should be traded primarily for agricultural purposes (i.e. intra-sectoral trade within the agricultural sector), with some farmers being unwilling to sell water to non-agricultural users.

Conningarth Economists (2004)

The Conningarth (2004) research indicates that 323 permanent intra-sectoral trades were recorded for 1999, 272 for 2000, 203 for 2001, 223 for 2002, and 90 by August 2003. The largest number of transactions over the period 1999 to 2003 occurred in the Lower Sundays River, Lower Orange River, Middle Orange River, Orange River (Namaqualand) and Orange River (Vanderkloof).

Armitage (1999)

Armitage (1999) reported on irrigation water rights transfers in the Lower Orange River and the Mhlathuze River. The research focussed on intra-sectoral trade between irrigators. It was found in the study that most of the water users in the Lower Orange Region believed that the then proposed new Water Act had created widespread uncertainty about water trading and this would lead to fewer water market transactions and hence reduced incentives to invest in irrigation technology. In both study areas, most water users believed that any trading would negatively influence the success of their re-registration for water use rights.

In the Lower Orange Region, there were nine trade-in parties and twenty-one trade out parties. Buyers generally had larger farms with more irrigated land and proportionally more arable land to be developed for irrigation purposes. The buyers' dominant motivations for trading were (i) to irrigate crops on previously unscheduled land and (ii) to secure a higher assurance of water supply for dry periods. Sellers sold their water because of terrain conditions such as poor soil and steep slopes, sufficient water conditions therefore allowing surplus to be traded, expensive development costs of land and losing unused water rights under the new water law.

4.3 Survey Related to Water Trading

One of the best ways of assessing where trades are viable, and the associated nature of the trades is to ask relevant persons. This was done by means of a water-trading questionnaire which was distributed to Irrigation Boards (IBs) and or Water User Associations (WUAs), and Water Boards, now referred to as Water Service Providers (WSP). An example of the questionnaire is included in the Appendix of this report. The questionnaire was structured to find out if the survey participants had traded in the past (and if so what the nature of the trades were), and if they planned to trade in the future (and what the nature of the trades was anticipated to be).

A total of 14 candidates (5 WSPs and 9 IBs/WUAs) were contacted telephonically and sent a questionnaire via email or fax. A total of 10 replies were received (8 from the IBs/WUAs and 2 from the WSPs). Due the small sample size and limited response to the survey a statistical analysis of the results could not be performed.

The users were asked whether they believe that trade is important and to score the importance of trade (see Table 4.1 below). A scale of 1 to 10 was used, with 1 being low importance and 10 being high importance.

- All users agreed that trading is important and gave a high score.
- 3 users (all IBs/WUAs) gave the maximum score of 10.
- The average score of the IBs/WUAs was 8.
- The average score of the WSPs was 7.

Users were also asked to rank the importance of the respective types of trade. A scale of 1 to 4 was used, with 1 being most important and 4 being least important. Table 4.1 shows the results of the ranking exercise.

- The results show that the WSPs believe that inter-sectoral trade is important. There were however mixed signals regarding the nature of the inter-sectoral trade, in that the one WSP indicated that permanent inter-sectoral trade was important, while the other WSP indicated that temporary inter-sectoral trade was important.
- The IBs/WUAs placed a higher importance on intra-sectoral trade (particularly temporary intra-sectoral trades).

Table 4.1 WSP and IB/WUAs response concerning the importance of the need for trade

Organisation	Score reflecting importance 1= low 10 = high		Permanent inter-sectoral trade	Temporary inter-sectoral trade	Permanent intra-sectoral trade	Temporary intra-sectoral trade
WSP						
WSP1	8		1	2	3	4
WSP1	6		4	1	3	2
IB/WUA						
IB1	7		4	3	2	1
IB2	6		4	4	2	1
IB3	7		4	2	3	1
IB4	10		4	2	1	1
IB5	7		4	3	1	2
IB6	10		4	4	2	1
IB7	8		4	3	2	1
IB8	10		3	1	4	2

Candidates participating in the survey were asked if they or their organisation had previously been involved in trade, or if they would probably be involved in water trading. If an affirmative response was given, users were asked to provide details regarding the types of trade. Of the two water service providers who responded, both had previously not been involved in trade, and one indicated that they would probably be involved in the future. 6 out of the 8 IB/WUA respondents said that they have been involved in both temporary and permanent intra-sectoral trade for periods ranging from 3 to 20 years. 2 out of the 8 IB/WUA respondents have been involved in temporary inter-sectoral trade for 4 and 10 years respectively.

Users were asked if they believed that there might be a need for trade in the future. If a positive response was given, users were asked to identify which type of trade they would consider and why they would consider this type of trade. All users said that they believed that there would be a need for trade in the future. Table 4.4 gives the number of responses of for the types of trade.

Table 4.4 The number of respondents that may part-take in the respective trade types in the future.

Type of trade	Number of Respondents who said yes (out of 10)
Permanent trading between sectors	3
Permanent trading within sectors	9
Temporary trading between sectors	5
Temporary trading within sectors	7

In response to the question on why they would consider the different types of trade, the water service providers said it would be necessary mainly to reduce the cost of water for all sectors and types of trade. It was found that this question was slightly misinterpreted, and most of the responses were better suited to the question on the benefits of trading outlined below. One IB did however say that they would not consider permanent inter-sectoral trades because of the risk of decreasing water allocations to the agricultural sector.

Four more questions were asked, and due to the nature of the answers to the questions, the WSPs and the IB/WUAs' responses will be detailed separately. When interpreting the responses of the IB/WUAs one needs to consider that the respondents to the questionnaire considered intra-sectoral trade the more viable option than inter-sectoral trade.

Users were asked to identify benefits that may be attained through trading.

The WSPs noted that affordable water supply options were becoming scarce and that water trading will need to be explored as an option to provide the WSPs with water in the future.

IB/WUA responses

- Trading can be used to secure water for projects (trade-in), or to be recompensed fairly for releasing water to projects of higher value (trade-out). Trading should facilitate this with minimal administrative burden, for example a willing buyer, willing seller situation would be better than going to court to claim compensation.
- With trading stressed areas could get relief.
- It is believed that trading will be beneficial produce a steady income to IB/WUAs thus promoting the economical sustainability of the IB/WUA. (Perhaps the WUAs are referring to a transaction cost levied on the trades that accrues to the WUA).
- Via trading, irrigators can augment their quota and therefore sustain a larger irrigation enterprise (trade-in).
- Via trading, irrigators can have some of the financial burden removed for water not used.
- Water trading promotes the effective use of available water, thus allowing more crops to be produced.
- Water trading could liberate water for equity purposes.

Users were asked to identify negative implications associated with trade.

WSP response

- If not carefully controlled and managed, permanent trades can lead to reallocations which are detrimental to downstream users and/or the long term best interests of the development in the region
- Exploitation for personal/financial growth is possible if not carefully managed
- If water is traded between irrigated agriculture, the perception may be negative in that food security may be placed in jeopardy.

IB/WUA responses[24]

- Externalities would need to be assessed and there is the danger that the administrative burden could be excessive and costly. It would be debilitating if trading overheads reached the level of property transfer duties, etc., but given the need to assess externalities, this could become an issue.
- Useful land may become unused if water is traded
- Overuse of groundwater may occur
- Permanent inter-sectoral trade may result in a smaller income out of water sales
- Only if not controlled, persons involved need to have a good understanding of what is involved

Users were asked (1) to discuss challenges/obstacles which may impede trade and (2) how these could be overcome.

WSP response

-Challenges

- A comprehensive understanding of water availability and conduit properties (e.g. capacities) is required for numerous points along rivers.
- Balanced consideration needs to be given to the long term development requirements of a region, looking beyond personal interests
- Record keeping and information systems
- Legislation, perception and policies

-Solutions for overcoming challenges

- Development of clear and comprehensive procedures and guidelines for implementation
- Development and standardisation of hydrological models to meet information requirements
- Comprehensive management of the process
- Setting up a working group to establish the ground rules and guiding principles

IB/WUA response

-Challenges

- Defining the water license and monitoring/auditing
- Carrying capacity problems in the supply system infrastructure of the trade-in parties[25]
- Land claim issues provide a challenge because a land claim certificate may be required before permission is given to trade permanently
- Authorisation process is laborious and time consuming
- Compliance to the ecological needs of a system (EFRs)

[24] Only one IB/WUA said they believed there were no negative implications associated with trade.
[25] A number of IB/WUAs mentioned this as a challenge/obstacle that may impede water trading.

-Solutions for overcoming challenges

- More appropriate institutional arrangements, for example, fractional water allocation and capacity sharing/water banking
- Transfer of authority to the board to administer the trades within existing scheduling lists
- The maximum amount able to be transferred to a system should be determined before allowing transfers and transfers should be reduced once the maximum quantity has been reached, i.e. strict adherence to the resource capacity
- Acceptance by traders of the limitation of trades
- Sensible negotiations between traders

Conclusion

Clearly there is a need for water trading. The NWRS indicate that there will be pressures to re-allocate water. Literature suggests that water trading has happened (particularly in WUAs). The water trading survey clearly indicates that all respondents felt trade was important.

The challenge it seems is in the facilitation and implementation of water trading.

5. EXTERNALITIES

Externalities are defined as "an activity that affects others for better or worse, without those others paying or being compensated for the activity. Externalities exist when private costs or benefits do not equal social costs or benefits. The two major species are external diseconomies and external economies (Samuelson and Nordhaus, 1989). Externalities are often referred to as third party effects.

External diseconomies occur when a firm's actions impose uncompensated costs on other parties. The example given is where factories that emit smoke may harm local property and public health, yet the injured parties are not paid for the damages.

External economies occur if a firm's operations yield positive benefits to others without those others paying for the benefits. An example given is where a firm hires security guard services, which scares thieves from the protected area which may benefit other persons, who do not pay for the security services, yet benefit from them.

The re-allocation of water use entitlements from one user to another may induce third party effects (externalities), largely due to the interconnectedness of water use. Any changes to where water is used, how it is used and when it is used may result in changes to flows to downstream users (which could be positive or negative). Externalities may relate not only to the change in the flow characteristics associated with a re-allocation of water use entitlements, but also to socio-economic considerations linked to the use of water. For example, if water is traded permanently from one use sector to another, there may be significant direct impacts on jobs, as well as knock-on effects on the economic viability of other linked concerns.

All potential management actions to address water scarcity (i.e. water supply, water demand and re-allocation strategies) may induce externalities. The point to be made is that the water management authority will need to devise systems and process to adequately and efficiently identify the potential nature and magnitude of externalities (for all management options that could be employed to address the water scarcity or distribution of entitlements). Furthermore, the water management authority should have a good understanding of how license conditions could be used to mitigate third party effects. Compliance monitoring (auditing) will be required to ensure that the license conditions are adhered to.

A few general points related to externalities include:

- The various options with which to deal with water scarcity may all induce externalities specific to each option.
- Regulations designed to protect third parties tend to interfere with the functioning of markets (as they induce transaction costs). Care should be taken that rules and regulations are not overzealous (Conningarth, 2004). This viewpoint is supported by Easter, et al (1998) who argues that structuring markets so that they reflect and accommodate externalities is arguably the most critical factor in institutional design. The authors are of the opinion that in order to assess externalities, water rights need to specify not only where water may be used, but also from where the water entitlements accrue. Knowing where water entitlements accrue from and where the water is used will allow water users and managers to better understand the water trades (or re-allocations) that are physically possible, as well as the identification of possible third party effects. A Fractional Water Allocation and Capacity Sharing system is recommended (Lecler, 2003)

- The nature and magnitude of externalities will vary dependent on the nature of water trading being undertaken, with water leases (temporary water trades) resulting in lower magnitude externalities than permanent trades (Productivity Commission, 2003).
- Paradoxically, improved water use efficiency by irrigators in particular, who apply the same amount of water over larger land areas, may result in externalities to downstream users, in that return flows from the less-efficient practices are reduced (Grové, 1997). Clarity will need to be sought if the licenses in South Africa are to be based on consumptive use (in which case irrigators would have to ensure that specified return flows are met), or if licenses are to be based on diverted use, in which case water resource planners must assume that there are no return flows when undertaking their water resource planning exercises to quantify the availability of water resources.

Externalities resulting from changes relating to (i) where the water is used, (ii) what the water is used for, and (iii) when the water is used include, amongst others:

- The quality of the water may be altered, which could be negative (and/or positive)
- The timing and pattern of flows may be altered
- The financial burden faced by certain water users may be increased (for example where a group of farmers jointly covers the fixed costs associated with delivery systems (e.g. canals and pumps). If one user permanently sells his water use entitlements, the financial burden of the delivery systems will need to be borne by the remaining members of the scheme).
- Jobs may be lost where the water is traded from. Although one may argue that jobs may be created at the as a result of the trade, it may be the location of the jobs lost which may be a social concern, or the nature of the people who lose their jobs. For example, water traded permanently from the irrigation sector to the industrial sector may result in unskilled farm labourers losing their jobs, without the farm labours having the skills required (or being located in the right place) to be employable by the industrial user.
- The change in economic activity by the trade-out party may have knock-on effects to other individuals or business that previously did business with the trade-out party.
- If water is diverted from one location to another (as is the case with inter-basin transfers), alien biota may be introduced into the receiving catchment, which may negatively impact on indigenous species, and may influence the quality of water to humans.

6. ADMINISTERING WATER USE ENTITLEMENTS

The 1998 Water Act (Act 36 of 1998) has been described as an administrative act, in that there are eleven water uses requiring licenses, which give details of who can use water, from where and under what conditions. Any changes to the licenses will need to captured, otherwise compliance monitoring initiatives will be in vain. The management of water use entitlements, and the conditions attached to the entitlements is a very administratively demanding responsibility.

The administration of water rights includes; (i) the issuing of new rights (which is possible in water abundant catchments), and (ii) the modification of existing rights (where a permanent or temporary adjustment is made to the water use entitlements). The processes associated with these functions, as adopted in Australia, are:

- Consultation – giving public notice of applications and advertising for submissions,
- Assessment – consideration of the application, any submissions received and any administrative guidelines or rules in place. It also includes the collection of any further information required for the assessment,
- Decision notification – making the decision and announcing it to all relevant parties,
- Hearing appeals – hearing and determining the outcome of any appeals made regarding an administrative decision, and
- Registration – maintaining the register and any other administrative records, including updating records of any approval made (Productivity Commission, 2003).

In South Africa, the process of compulsory licensing may see amendments to the Australian process, in that consideration needs to be given to equity and sustainability. However, the re-allocation of entitlements will probably include the same processes listed above.

Use is made of the Wateruse Authorisation Registration Management System (WARMS) to administer water use entitlements. The WARMS system was initially designed for billing purposes; however, it is now being recognised as a vitally important source of information required for a number of administrative functions. For example, compliance monitoring will require that the records in WARMS are accurate, accessible and continually updated.

Of relevance to the trading of water use entitlements (and/or the administrative re-allocation of water use entitlements) is the fact that information needs to be accessible regarding the issued entitlements, i.e. what water use the entitlements are for, where the water use entitlements are for, and any pertinent conditions attached to the licenses. This information will be required to consider re-allocation options. In Australia, use is made of web sites in certain area, on which details, with a map, are given of water use entitlements in circulation. If potential trade-in parties and the water management authority do not know what entitlements are in circulation, and where the entitlements are for, re-allocation decisions will be compromised.

7. CONCLUSIONS AND RECOMMENDATIONS

A few sources of information were sought to gauge the potential need and nature of water trading, including:

- The legality of water trading was reviewed. The act and NWRS make allowance for water trading. However, the policy related to trade will require refinements.
- The water situation within WMAs (now and for 2025) was reviewed. Water scarcity is a pre-requisite for water trading. The NWRS (2004) suggest that as many as 10 of the 19 WMAs are currently over-allocated, and even if water supply options are introduced, water scarcity may still prevail. It is plausible that water trading is viable in a number of these WMAs.
- Consideration was given to the impact of not allowing trade to occur. Trade is a market-based method with which reallocation of water use entitlements can occur (via a willing buyer willing seller arrangement). In the absence of trading, the only other option with which to facilitate re-allocation of entitlements would be for this to be done administratively. Although the water management authority may be able to make decisions related to equity and sustainability, it is doubtful if they are in a position to make re-allocation decisions for efficiency purposes as effectively as the use of the market.
- Literature was researched, and it is clear that water trading has been taking place for a number of years already (mainly within the irrigation sector in the form of intra-sectoral trade). The literature also suggests that inter-sectoral trade may not take place until such time as the initial allocation of licenses (as part of the compulsory licensing process) has taken place.
- Members in the DWAF were interviewed, and they acknowledged that trade was important, however cautioned that the trade would need to be regulated to minimise negative third party effects.
- The water trading survey revealed that both WUAs and WSPs feel that water trading is very important. The survey did however also reveal that there are a number of intricacies involved in trade, and administration and associated transactions would need to be kept efficient and affordable.

All indicators considered suggest that water trading is an important future water resource management option. The WSPs interviewed felt that inter-sectoral trade was going to be important, whereas the WUAs felt that intra-sectoral trade was the more important of the trade options. An assessment of the NWRS water balances, and projected water use by sectors would indicate that the potential for inter-sectoral trading is high. The view point of WUAs is understandable, as (i) they have been participating in intra-sectoral trades (with few examples of inter-sectoral trades given), and (ii) until the compulsory licensing process is complete, inter-sectoral trading of water use entitlements is not really viable. It will be useful to conduct a similar survey in a few years time.

Third party effects are important. Furthermore the logistics of changing where, how and who uses water is often daunting. Consideration needs to be given not only to possible third party effects, but also to the practicalities associated with the trade. All of this would indicate that improved management systems are required. The recommendation given by the authors is that use is made of GIS where possible, as this could help facilitate an understanding of third party effects, and logistical issues. The point needs to be stressed that the same tools and techniques will be required for re-allocation directly by the water management authority.

Monitoring promises to be a ‘have-to-have’, and not just a ‘nice-to-have’. Monitoring could allow water pricing to be more effective (if charges are levied on actual water use), and furthermore monitoring and auditing systems will promote confidence attached to water use entitlements, and

prices paid for trades will increase, which in turn will induce more users to seek more water use efficient technologies.

8. REFERENCES

ARMITAGE, R.M. 1999. An economic analysis of surface irrigation water rights transfers in selected areas of South Africa. WRC Report No. 870/1/99

BATE, R., TREN, R., AND MOONEY, L. 1999. An econometric and institutional economic analysis of water use in the Crocodile River catchment, Mpumalanga Province, South Africa. WRC Report No. 855/1/99.

BJORNLUND, H. 2003. Farmer participation in markets for temporary and permanent water in southeastern Australia. *Agricultural Water Management*, 63: 57 – 76.

BRUNS, B. AND MEINZEN-DICK, R. 2003. Frameworks for water rights: An overview of institutional options. *International Working Conference on Water Rights: Institutional options for improving water allocation*.

CONNINGARTH ECONOMISTS. 2004. The facilitation of trade in water use entitlements by the National Water Act in South Africa. WRC Report No. 1297/1/94.

DWAF, 1998. National Water Act no. 36. Department of Water Affairs and Forestry, Pretoria.

DWAF, 2000. Implementation Guidelines for Water Conservation and Demand Management in Agriculture: Development of Irrigation Water Management Plans.

DWAF, 2004. National Water Resources Strategy. Department of Water Affairs and Forestry, Pretoria.

EASTER, K.W. ROSEGRANT, M.W., AND DINAR, A. 1999. Formal and informal markets for water: Institutions, performance, and constraints. *The World Bank Research Observer*, 14(1): 99 – 116.

FREDERICK, K.D. 2001. Water markets: Obstacles and opportunities. *Forum for Applied Research and Public Policy*, 54 – 62.

GROVÈ, B. 1997. Modellering van die ekonomiese effekte van wisselvallige waterbeskikbaarheid vir besproeiingsboere in die Wintertongebied met inagneming van minimum binnestroomvloeivoorsiening. M.SC Agric Dissertation, University of the Free State.

LECLER, N. 2003. Fractional Water Allocation and Capacity Sharing / Water Banking. Presented to the SASTA. South Africa

PRODUCTIVITY COMMISSION, 2003. Water Rights Arrangements in Australia and Overseas, Commission Research Paper, Productivity Commission, Melbourne.

ROSEGRANT, M.W., SCHLEYER, R.G., AND YADAV, S.N. 1995. Water policy for efficient agricultural diversification: Market-based approaches. *Food Policy*, 20 (3): 203 – 223.

SAMUELSON, P.A. and NORDHAUS, W.D. 1989. Economics. Thirteenth edition. McGraw-Hill Book Co. Singapore.

ZEKRI, S. AND EASTER, W. in press. Estimating the potential from water markets: A case study from Tunisia. *Agricultural Water Management*.

APPENDIX 1

A USER NEEDS SURVEY FOR WATER TRADING IN SOUTH AFRICA

PREPARED BY CPH WATER

AS PART OF A WRC FUNDED PROJECT (K8/581) ENTITLED "A SCOPING EXERCISE TO INVESTIGATE THE POTENTIAL NEED FOR AND NATURE OF WATER TRADING IN SOUTH AFRICA.

January 2005

Background

CPH Water is currently undertaking a desktop level research project, funded by the WRC, to research the water-trading environment in South Africa in order to better understand the potential number, nature and location of water trades in South Africa.

Many catchments have approached a state of being fully allocated, with 10 of the 19 Water Management Areas (WMAs) deemed to be fully allocated according to the preliminary National Water Resources Strategy (NWRS). A significant implication of a catchment reaching a state of being fully allocated is that new water use licenses[26] (e.g. for new water users or existing water users requiring more water) cannot be issued unless:

- existing users surrender part of their existing water use entitlements, and/or
- water conservation and demand management (WCDM) initiatives liberate water, and/or
- the yield of a system is augmented via supply side solutions (e.g. the construction of dams or inter-basin transfers).

Although WCDM initiatives will liberate water, the volume of liberated water may not meet the ever-growing demands for water. The construction of augmentation schemes is generally very expensive and consequently often unviable. Water trading may in certain circumstances be a solution to the water allocation problem.

A key implication of the Water Act of 1998 is that water rights (termed water user entitlements) have been separated from land rights. In the previous dispensation, the water right was included in riparian land rights. The implication is that from a trading point of view, water entitlements can be traded separately from land rights.

Water Trading

Water trading is the permanent or temporary transfer of a water entitlement from one water user to another. A permanent trade includes the permanent reallocation of a water entitlement from one user to another. This permanent transfer can be within the same sector (intra-sector trade), or between sectors (inter-sectoral trade). For example, if a mine buys the water entitlement from an irrigator permanently, this will be a form of permanent, inter-sectoral trade.

[26] South Africa has moved away from a Riparian Rights water management system, to a water licensing framework, where water users have to apply for water use entitlements (of which there are 11 types). The entitlements outline who is entitled to use the water and for what and where the water is to be used as well as the volume and level of assurance. Other conditions may be attached to the license.

A temporary trade is in effect a lease arrangement, whereby the entitlement is held by the original owner, although the entitlement is temporarily ceded to another user. Again inter- and intra-sectoral temporary trades are possible. It will however need to be monitored.

Within a trading transaction, the trade-in party is a term used to define the party that is receiving the water use entitlement via the trade (be it permanent or temporary). The trade-out party is the party who either sells or leases out his entitlement. As the trading of water use entitlements may have third party effects (called externalities), water use trades need to be regulated by the water management authority (referred to as the trade administrator).

Objective

The primary goal of this questionnaire is to understand the water trading needs of potential water trading parties. The results of this questionnaire will be used to make recommendations regarding the needs of water users.

We would be most grateful if you could complete the questionnaire,
the results of which will be captured in the report.

QUESTIONNAIRE

1. Do you believe that water trading is an important issue in South Africa?

   ❒ Yes
   ❒ No

   If yes, out of a rating of 1 to 10 (1 = very low, 10 = very high), how would you rate the importance of trade?

   _____

   If yes, please could you rank (from 1 to 4 (1 = highest importance rating) which you believe to be the most important to the least important forms of trade.

Permanent trading between sectors	
Permanent trading within sectors	
Temporary trading between sectors	
Temporary trading within sectors	

2. Have you (or your organisation) been involved in, or will you plausibly be involved in any form of water trading?

   ❒ Yes
   ❒ No

If yes, please tick more than one box if appropriate:

➔ I have been involved in trade, as a:
- ❒ Trade-in party
- ❒ Trade-out party
- ❒ Trade administrator
- ❒ Influenced stakeholder

➔ I will/may be involved in trade, as a:
- ❒ Trade-in party
- ❒ Trade-out party
- ❒ Trade administrator
- ❒ Influenced stakeholder

If you have been involved in water trading, can you give a few details with regards to the type of trades (permanent *vs.* temporary, inter- *vs.* intra-sectoral) you have been undertaking as well as the number of years that you have been trading.

3. Do you believe there may be a need for you to trade in the future?

- ❑ Yes
- ❑ No

If yes, which type of water trade would you consider?

- ❑ Permanent trading between sectors
- ❑ Permanent trading within sectors
- ❑ Temporary trading between sectors
- ❑ Temporary trading within sectors

And, why would you consider this type of water trade viable?

If no, why would you not consider water trading?

4. What are the benefits to yourself/organisation or to your WMA that may be induced by water trading (if any)?

5. Are there negative implications associated with trades?

6. What challenges/obstacles impede water trading?

7. How do you think these challenges/obstacles identified above could be overcome?

Thank you kindly for your participation.