

The Hydrosocial Contract and its Manifestation in Society: A South African Case Study

By

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Introduction

The notion of a hydrosocial contract was first mooted by Turton & Ohlsson (1999) at the 9th Stockholm Water Symposium. It has subsequently been referred to by Warner (2000a; 2000b), in a manner that shows conceptual development. The notion has also been written about in a book entitled the *Social Charter for Water* that was released at the Second World Water Forum (Agence de l'Eau, 2000), but the actual concept was not given a formal name. In addition to this, the World Water Vision has as two of its key elements, a tripartite alliance in the water sector between Government, Civil Society and the Private Sector (World Water Commission, 2000:14), and the notion of "water user parliaments" in order that "all stakeholders have a voice in decision-making" (World Water Commission, 2000:28). These two components of the World Water Vision are nothing other than a manifestation of the existence of a hydrosocial contract. The importance of the concept is such that it encapsulates the normative values present within the hydropolitical environment, and as such it forms the basis on which institutional arrangements are subsequently built. By understanding this concept in a more profound manner, it is anticipated that water resource managers will be better equipped to deal with the issues that are emerging from a rapidly changing water sector. The purpose of this chapter is therefore to develop this concept a little further in such a way as to make it available for further testing in an empirical sense, and for further use by water resource managers and hydropolitical researchers.

Definition of Key Concepts

Discursive Elite. The discursive elite comprises those persons who are in a dominant position within bureaucratic entities and who can determine the nature, form and content of the prevailing discourse, also known as the *sanctioned discourse*. The discursive elite legitimizes or sanctions the prevailing discourse (Turton, 2000a).

First Transition. The first transition refers to that moment in historic time when the prevailing condition of *water scarcity* is encountered by a given social entity. This is usually accompanied by a major event such as a drought. It can also be the result of

the convergence of events such as a period of rapid population growth and unchecked industrialization that is punctuated by a major drought. The first transition can also be accompanied by increased levels of induced scarcity caused by the pollution of existing sources of water as the result of unchecked industrial or mining activities. The *Hobbesian form of hydrosocial contract* is often the result of this series of events.

Hobbesian Form of Hydrosocial Contract. The result of the interaction of hydropolitical dynamics during the *first transition* often results in a bipolar configuration between the government and water-consuming public. This closely resembles the elements of Thomas Hobbes' (1651) philosophical writing.

Hydraulic Mission. The hydraulic mission is the overarching rationale that underpins the state's desire to establish conditions that are conducive to socioeconomic and political stability. As such it can be regarded as a form of ideology in the study of hydropolitics, infusing itself into the dominant or *sanctioned discourse*, serving to legitimize (and thereby sanction) this discourse.

Hydrosocial Contract. The hydrosocial contract is the unwritten contract that exists between the public and the government (Turton & Ohlsson, 1999) that comes into existence when the individual is no longer capable of mobilizing sufficient water for their own personal survival, and that acts as a mandate by which government ultimately takes on and executes this responsibility. This hydrosocial contract thus acts as the basis for institutional development, and also determines what the public deems to be fair and legitimate practice such as the desire for ecological sustainability, to which politicians react (Turton, 2000a). There are two different permutations of the hydrosocial contract, known respectively as the *Hobbesian* and *Lockean form*.

Lockean Form of Hydrosocial Contract. The result of the interaction of hydropolitical dynamics during the *second transition* often results in a triangular configuration between the government, water-consuming public and special interest groups such as NGOs. This closely resembles the elements of John Locke's (1690) philosophical writing.

Resource Capture. Resource capture is a social effect of environmental scarcity where more powerful groups of people manage to monopolize access to a critical resource such as water (Homer-Dixon 1994:11; Homer-Dixon & Percival, 1996; Ohlsson 1998:4; Ohlsson, 1999:38) leading to the ecological marginalization of weaker groups of people. This becomes one of the driving forces in the hydropolitical arena, defining the actions of major role-players.

Second Transition. The second transition occurs when existing supply-sided solutions fall short of water demand and a condition of *water deficit* prevails. At this time the public start to regard future augmentation as being either too costly or environmentally unacceptable. This transition is accompanied by factors such as the

birth of a new form of social conscience, often in the form of environmentalism, and the growth of civil society that embraces this emerging conscience as its fundamental normative foundation. The *Lockean form of hydrosocial contract* is often the result of this series of events.

Sanctioned Discourse. The sanctioned discourse is the prevailing or dominant discourse that has been legitimized by the *discursive elite* within the water sector at any one moment in time. It represents what may be said, who may say it is and how it may be interpreted, thereby leading to the creation of a dominant belief system or paradigm (Turton, 2000a).

Water Deficit. Water deficit refers to the prevailing condition that exists when the use of freshwater within a given social entity exceeds the level of sustainable supply (Turton & Ohlsson, 1999), and the ecological and financial costs of additional supply-sided augmentation schemes become questioned by civil society. This usually coincides with the *second transition*.

Water Scarcity. Water scarcity is the condition that exists when the demographically-induced demand for water exceeds the prevailing level of local supply (Turton & Ohlsson, 1999), meaning that supply-sided augmentation becomes necessary. This usually coincides with the *first transition*.

Water Surplus. Water surplus is the prevailing condition that exists when the locally available supply of fresh water exceeds the local demand for it.

Development of a Theoretical Model

Due to the fact that the hydrosocial contract is dynamic in nature, undergoing a series of fundamental changes over time, it becomes instructive to first dwell on the development of a basic model. Let us assume that in a given geographical entity, at some past moment in time, there was an initial water abundance. A good example to use is the region that was known as "Witwatersrand" in South Africa. The reason for the selection of this geographic entity as a case study is fourfold:

The name "Witwatersrand", when translated directly means "Ridge of White Waters". This name was given to the area because it straddles a significant watershed in central South Africa, so it was the origin of many springs and small streams. Early mining settlers gave the name to the area because it described the cascading waters that fell down this escarpment shortly after emerging at the surface as a series of springs.

The Witwatersrand is the place where gold was first discovered in South Africa. This in turn led to the rapid growth of Johannesburg, along with a conurbation of smaller mining towns that sprawled out along the entire stretch of what later became known as "the Rand", which was a shortened version of "Witwatersrand". In the Afrikaans language "rand" means "ridge". This rapid industrialization and associated

urbanization placed enormous strains on the water resources in a relatively short space of time.

The Witwatersrand, which has subsequently undergone a name change to "Gauteng" (roughly meaning "place of gold"), is now the largest industrial and urban complex in the entire Southern African region. As such it can only survive as the result of massive water transfer schemes similar to those that maintain the city of Los Angeles. These schemes are extremely complex, a problem that is compounded by the fact that the Gauteng area is situated on a watershed at high altitude (some 1,800 metres above sea level). This implies that all water, which is transferred there by these major schemes at great cost, simply flows away again.

South Africa has undergone a major political transformation over the last century, with very distinct periods of history where specific power configurations were present. In other words, as a case study area, it provides a rich source of variables that can be analyzed with the result that interesting conceptual models can be constructed from these variables.

Having noted these points, let us now focus on the development of a basic model. In the latter part of the 19th Century, the Witwatersrand area was relatively water abundant. At that time people were linked in a more intimate way with their water supply. In most cases water was available either from a shallow well or from a nearby stream. Water quality was generally high. From this we can say that there was a period of initial water abundance at that time. Then came the discovery of gold in 1886, which almost immediately triggered a massive influx of people. These people, almost all of who were driven by the desire to get rich quickly, had a fundamentally different set of values when compared with the original indigenous inhabitants. Whereas the previous inhabitants tended to be farmers, living in a way that was more intimately linked with the environment, the newcomers tended to view the landscape as a source of potential mineral-derived wealth. In 1887 the population of the area stood at around 10,000 people. Typhoid became a serious threat because no arrangements for adequate sanitation had been made. The small amount of water on which this unruly population relied for their survival, soon became polluted and unusable for human consumption (Bath, 1999).

Two events of relevance to the development of a hydropolitical model happened at this time. Firstly, mining started in earnest. This meant that the surface gold that had originally been exposed on the northern face of the watershed making up the Witwatersrand, was rapidly depleted. This exposed ore-bearing seam was systematically followed underground, and in the process, mineshafts were sunk. These shafts encountered water, so dewatering became a major component of the mining activities. The one result of this activity was the rapid drop in the water table. Wells and boreholes dried up, as did the natural springs and fountains that had originally been the inspiration for the region's name. Secondly, mining attracted a large number of people, so rapid urbanization was the result.

The net effect of these two variables was the fact that Johannesburg experienced an acute shortage of potable water between 1886 and 1903. This was a significant event because at that point, the initial water abundance gave way to a prevailing condition of water scarcity. This transition is significant in terms of the hydrosocial contract, and will be called the "First Transition" for the purposes of developing a coherent model. The results of this transition to water scarcity were significant for four major reasons.

The individual lost the intimate contact that they previously had with the water resource. By 1895 all significant aquifers in the region were tapped. These were situated around Zuurbekom and the Klip River Valley which were the main sources of supply until 1917 (Bath, 1999). Whereas previously the individual would draw water as needed from a local stream or well over which they had some form of direct control, the transition to water scarcity meant that this relationship¹ between humans and water changed in a fundamental way.

Because the individual was no longer able to supply their own water needs, they looked to government for the creation of a central authority with the sole task and responsibility of supplying clean water and sanitation services. In the Witwatersrand case, this saw the creation of the Rand Water Board (RWB) in 1903 (Bath, 1999). The creation of this public utility (RWB) came about after a severe drought, coupled with financial problems that plagued the fragmented operating companies, most of which were associated directly with a mine. These events saw the desire to find a more permanent solution to the water supply problem of the Witwatersrand (Bath, 1999). The significance of this is that the individual now looked to the state to provide², so water became somebody else's business.

Water became a commodity at this moment in time. This changed the perceptions that people had of water. Instead of being a vital source of life that was provided from the local environment to which people had an intimate linkage, water now became a commodity that flowed from a tap with the origins of that water being somewhere remote and someone else's business to provide.

The state rose to the occasion with some relish, and what has been described by authors such as Reisner (1993) and Swyngedouw (1999), the "hydraulic mission" of the state was born. This is a very significant event in the understanding of the hydrosocial contract, with the hydraulic mission being particularly relevant.

Thus one can say that the first transition from water abundance to a condition of water scarcity, unleashes a number of critically important dynamics in a hydropolitical sense. The most notable of these being the birth of the hydraulic mission of the state which has as its basic *raison d'être* the mobilization of more water. Platt (1999) refers to this as the phase of "heroic engineering". Reisner (1993) refers to this as the era of performing "hydraulic miracles". Swyngedouw (1999) refers to this phase as the "production of nature" or the creation of "hybrids". For purposes of this chapter, we can call this the "Supply-Sided Phase" of water

management that sees engineers become the dominant discursive elites with a clearly defined sanctioned discourse that is centered on the basic paradigm of getting more water, from ever distant sources, to satisfy the thirsty consumers. The work of these engineers becomes extremely important, as in essence, the foundation of stable long-term economic growth and prosperity (along with all of the social and political ramifications associated with this) rests on their shoulders.

Interesting things happen in a hydropolitical context during the Supply-Sided Phase of water management, some of which seem to be universal in the sense that evidence of their existence can be found elsewhere in the world.

The era of the engineer is born with gusto. There is no end to their ingenuity. Starting off with simple dams, pipelines and water treatment plants, their skills develop in direct response to the levels of complexity encountered. There are two important aspects of this that are relevant to an understanding of the hydrosocial contract. (i) With their basic grounding in Newtonian physics, no problem is insoluble. Because all problems are presented in terms of a definite paradigm - how to get more water from increasingly distant sources - typically no alternatives to this type of solution are considered. This gives rise to a strongly articulated sanctioned discourse that is reflected in the institutional settings from which the engineers function. It also reveals itself in the language of the engineer where water conservation becomes the act of taking water from a river and supplying it to an arid or semi-arid area in order that the "desert may bloom". They also refer to "reclaiming" land where nature has allowed it to turn into a desert³. This gives a hint of the second important aspect. (ii) The philosophical base of engineering is solidly cast on the desire to control nature. This is clearly evident in the philosophical writings of Francis Bacon (1620) and his student, René Descartes (1637).

The philosophical basis of modern science, particularly Newtonian physics, is to control nature rather than to understand it. Understanding nature is tolerated insofar as it enables man to ultimately gain control. This is evident in the work of Francis Bacon (1620) who first described new methods of inquiry into the natural sciences. In this context, Bacon said that we can use the "noble discoveries" that will come from the new method of inquiry to "renew and enlarge the power of the human race itself over the Universe" (Kitchen, 1855:129). Bacon's thesis was supported by the subsequent work of René Descartes (1637) where he said, "[I] saw that one may reach conclusions of great usefulness in life, an[d] discover a practical philosophy [i.e., the natural sciences] ... which would show us the energy and action of fire, air, and stars, the heavens, and all other bodies in our environment and [we] could apply them ... *and thus make ourselves masters an[d] owners of nature*" (Anscombe & Geach, 1954:46) (Emphasis added). The control of nature aspect is still relevant today within the natural sciences and is particularly manifest in hydraulic engineering. An example of this can be found in the Royal Charter of the (UK) Institute of Civil Engineers (ICE), which aims at, "promoting the acquisition of that species of knowledge, which constitutes the profession of a Civil Engineer, being the art of directing the great sources of power in Nature for the use and convenience of Man"

(Wright, 2000). This philosophical foundation affects the way that humans construct knowledge, which in turn impacts on the way that humans interpret information (Turton, 1999). This has urged social theorists like Giddens (1984:335) to conclude that there are social barriers to the reception of scientific ideas and provable truths. This strong philosophical basis underpins almost all supply-sided management in the water sector.

Engineers can move water from anywhere to anywhere, provided that two⁴ necessary pre-conditions are met. (i) There must be enough money available to finance these increasingly complex projects, and (ii) there must be sufficient energy available with which to move the water.

The problems of supply-sided management become increasingly complex however. Water supply to the Witwatersrand grew by a steady 5% per annum for 80 years in order to keep pace with the growth of mining and industry in the region. To sustain this growth, RWB, in conjunction with the Department of Water Affairs and Forestry (DWAF), extended its search for water sources over great distances (Bath, 1999). As a consequence, some of these Inter Basin Transfers (IBTs) are the largest in the world (Abrams, 1996:2). In the case of the Witwatersrand, water is moved from a variety of sources into the Vaal Dam. Most of the augmentation comes in the form of IBTs where water from another river basin is harnessed and stored in a dam, then to be transferred through a watershed and discharged into an adjacent basin where it is allowed to flow according to gravity. A glance at Figure 1 is most illuminating in this regard. This map shows the existence of major existing dams and IBTs in South Africa in the late 1990s (Basson *et al.*, 1997). In the case of the Vaal River system, the shortfall is augmented by the Tugela-Vaal, Buffalo-Vaal, Assegai-Vaal and the Usuthu-Vaal transfer schemes (Basson *et al.*, 1997:49). What is missing from this map is the Lesotho Highlands Water Project (LHWP) as this was not completed at the time that the map was drawn. Today what is known as the Vaal River System consists of the above five IBTs augmenting supply to the Vaal, as well as the Vaal-Olifants and Vaal-Crocodile transfers, which are shown on the map. Should these schemes be insufficient for the needs of Gauteng, then three other alternatives are currently under consideration (Basson *et al.*, 1997:50). These are (i) the Thukela Water Project, (ii) additional transfers from the Orange, either in the form of Phase 2 of the LHWP, or via a canal⁵ on South African soil, and (iii) transfer of water from the Mzimvubu River via either the Thukela or Orange, to the Vaal. The elaborate nature of these schemes can be seen in Figure 5.

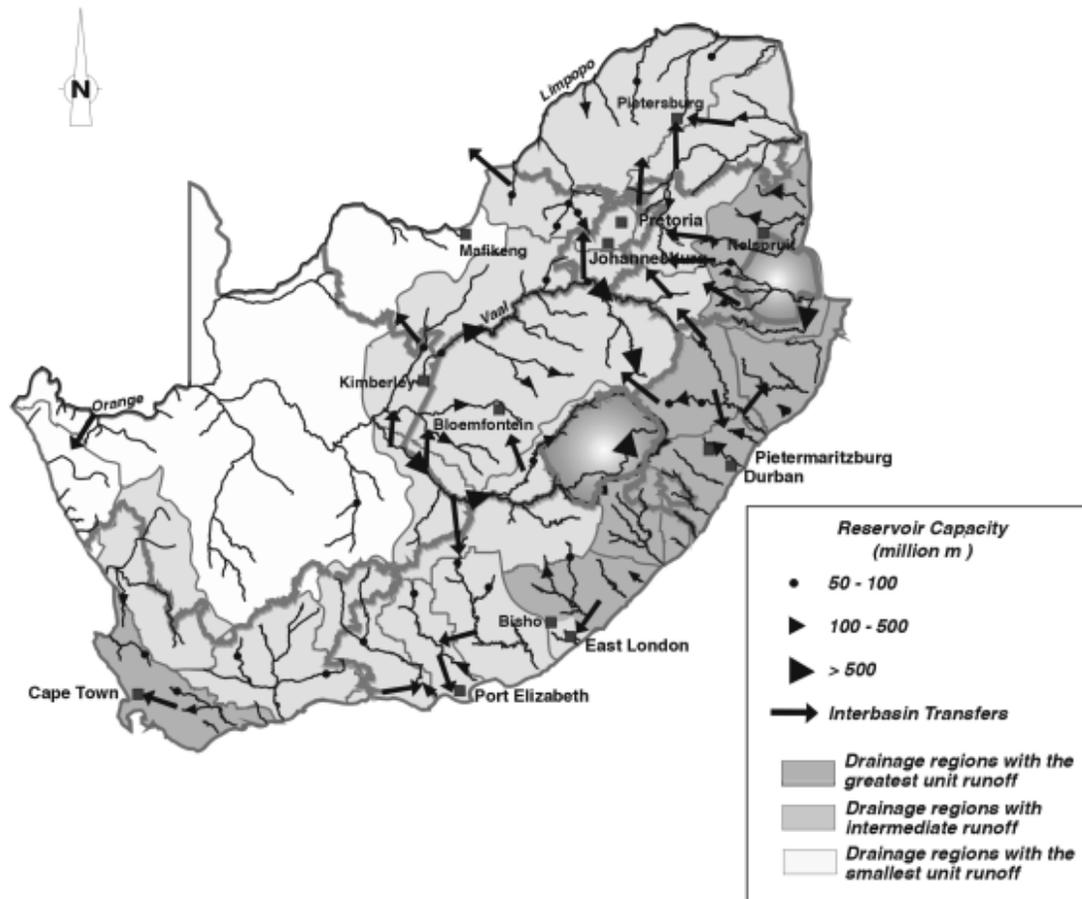


Figure 1. Map of South Africa showing major existing dams and Inter Basin Transfers (Basson *et al.*, 1997:9). The Lesotho Highlands Water Project is not shown, as it was not yet operational when the map was drawn, although Katse Dam is shown.

It is evident from these schemes that the problems of supply for Witwatersrand (Gauteng) are becoming increasingly complex and costly. Cost in this sense is used in terms of both finance and environmental degradation. It is this increased cost that holds the key to understanding the next critical transition in the hydrosocial contract. This occurs when the condition of water scarcity gives way to a prevailing condition of water deficit. This so-called "Second Transition" is important for a number of reasons.

The second transition coincides roughly with the birth of a new social consciousness. This is usually in the form of environmentalism, triggered by the increasing costs in ecological terms of the continued quest to mobilize more water. This certainly happened in the USA where the Sierra Club became one of the early sources of anti-dam lobbying. This subsequently grew into a sophisticated set of Non-Governmental Organizations (NGOs) such as the International Rivers Network (IRN). In the case of South Africa, a plethora of NGOs exists. Some of these derived from human rights activism⁶ during the anti-Apartheid struggle, whereas others are related to environmental issues. Many of these NGOs have a strong international presence. A

non-exhaustive list of NGOs includes the Environmental Justice Network Forum (EJNF), Earth Life Africa (ELA), Southern African Rivers Association (SARA), International Rivers Network (IRN), Group for Environmental Monitoring (GEM), MVULA Trust and the Environmental Monitoring Group (EMG).

This new social conscience is encapsulated in an emerging civil society that starts to act as a strong counter-force to government hegemony over the sanctioned discourse. In short, this civil society begins to challenge the prevailing sanctioned discourse, and starts to suggest that an alternative to supply must be considered. This can be considered to be the birth of the Demand Management Phase of water management, which has as one of its components, the issue of equity⁷.

In the case of South Africa, the second transition coincided with a period of far-reaching political changes. Political conditions in South Africa, during the period before 1994, dictated that water management and supply was done in an inequitable fashion. Agriculture, for instance, received the bulk of the water supply, even in the Witwatersrand area, with farmers paying relatively little for the water abstracted from rivers and aquifers. Significantly, the commercial agricultural sector, consisting mainly of white Afrikaans speaking farmers, was a significant constituency of the National Party (NP) government. At the same time the bulk of South Africa's black population, especially those living in the rural areas, had limited and inadequate access to water resources. This changed dramatically after 1991, when a new political dispensation was negotiated at the Convention for a Democratic South Africa (CODESA), paving the way for the drafting of the new South African Constitution (Esman, 1991:107). The change of government from a white minority controlled oligarchy to majority democratic rule was relatively peacefully transacted as a result of this negotiated transition. This political change transformed many aspects of life in South Africa, with municipal governance being no exception. The new Water Services Act (108/1997) placed the responsibility firmly on municipalities to provide water and sanitation services (Bath, 1999) to all of its citizens. Municipal boundaries were also redrawn to integrate the previously advantaged with the historically disadvantaged communities, some of which lived in close proximity with one another but which were subject to different tax bases and municipal governance, and hence displayed major disparities in service delivery.

The policy basis and resultant functions of DWAF prior to the second transition were focussed jointly on water resource management as well as the aggressive development⁸ of water resources. This included the management of the larger catchments, the administration of government water control areas, the supply of bulk untreated water to utilities such as RWB, water quality management and the administration of the Water Act (54/1956). Significantly, DWAF did not regard itself as being responsible for ensuring that all citizens had a supply of water, and they had no political mandate for that responsibility. This is a manifestation of the institutionalization of resource capture that had occurred over the bulk of the 20th Century. Furthermore, the country had been divided from the 1960s, into nominally independent so-called "homelands" or Bantustans as the consequence of the

Apartheid policies of the minority government, and DWA had no jurisdiction in those areas. These Bantustans were generally located in the more arid and resource-poor portions of the country. Authors such as Homer-Dixon and Percival (1996) interpret this as a manifestation of the ecological marginalization consequence of the long-term and systematic resource capture strategies, which the minority government had institutionalized during the Apartheid era. By 1994, approximately 75% of the population lived on 13% of the land (Abrams, 1996), mostly in the Bantustans. The consequences of this have been far-reaching. Not only are there an estimated 12 - 14 million people without any access to potable water, with a staggering 20 million lacking adequate sanitation services (Rowlston, 2000), but there are also serious environmental effects of poverty which impact on the water resource base of South Africa. These include deforestation, desiccation, widespread diffuse pollution, invasive species of exotic vegetation (Versveld *et al.*, 1998; Rowntree, 1999; van Wilgen *et al.*, 1999; Enright, 1999) and other factors that together result in reduced aquifer recharge, increased siltation of impoundments and the increased risk of periodic flooding⁹ (Abrams, 1996). It was against this socioeconomic setting that the second transition took place in South Africa.

This enables us to now consider the development of a basic model showing the development of the water supply situation for a region such as the Witwatersrand over time. This is presented in Figure 2 and it depicts water consumption over time. Because water consumption is largely demographically-induced, the curve is called the "Demographically-Induced Water Consumption Curve" (DIWCC). This curve grows through three distinct trajectories. During the initial period of water abundance, the DIWCC is relatively flat at first, but then starts to rise as the influx of people cause a rapid increase in water demand. The DIWCC then crosses the first transition from water abundance to water scarcity. In the Witwatersrand region, this occurred between 1886 and 1903. This phase sees a steady increase in demand as the population grows. In the Witwatersrand case, the population grew from approximately 10,000 in 1887, whereas in 1999 the RWB supplied water in the same region to around 10 million people (Bath: 1999). The second transition to water deficit sees a change in trajectory again, with the early post-transition phase displaying a steep growth, followed by a gradual flattening of the curve as water demand management strategies start to impact on consumption patterns. This is not yet evident in the Witwatersrand case so its existence remains purely hypothetical at this time. This is the basic model from which the changing nature of the hydrosocial contract can be analyzed in greater detail.

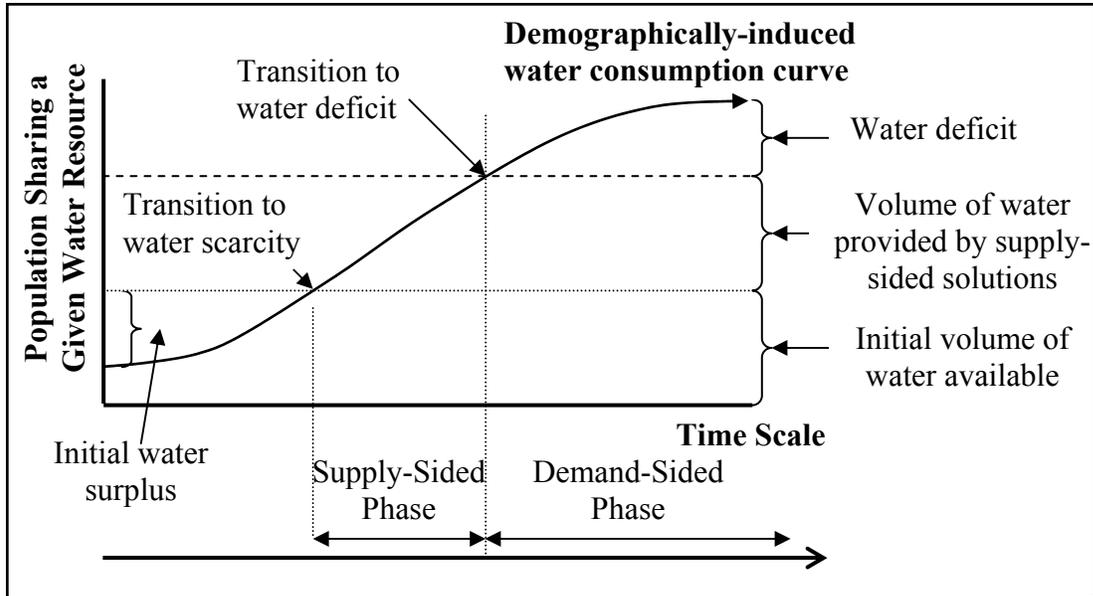


Figure 2. Simplistic model showing transition from Supply-Sided Phase to Demand Management Phase in a political economy (Turton, 1999).

Towards A Deeper Understanding of the Hydrosocial Contract

Armed with the simplistic model presented in Figure 2, attention can now be turned to an analysis of the hydrosocial contract with particular emphasis on the way that it changes over time. When first confronted with this model, the authors were struck by the fact that two distinct phases of the hydrosocial contract seem to be apparent. It is to an analysis of these two phases that our attention now turns.

What has been previously called the "First Transition" seems to centre on five basic issues. (i) At that moment in time, the individual is no longer able to supply their own water needs, so they look to the state. (ii) The state generally responds by creating a structure of sorts with which to meet the needs of the people. In the case of the Witwatersrand, the state responded by creating a statutory body called the Rand Water Board in 1903. This sees the birth of the hydraulic mission of society with its core aim being the mobilization of water and the development of a reliable source of supply. (iii) The individual is alienated from the source of supply, as the responsibility for mobilizing, treating, distributing and protecting water becomes somebody else's problem. The relationship between people and water undergoes a fundamental shift at this moment in time. (iv) The commodification of water sees the emergence of a new sanctioned discourse, dominated by engineers as the discursive elites, united by one overarching paradigm that is based on Newtonian physics and underpinned by Baconian and Cartesian philosophy. This combination of reductionism with the desire to control nature becomes the norm. (v) A process of the de-feminization¹⁰ of water resource management begins at this time.

At the first transition, the supply of water is thus left in the hands of an exclusive group of individuals who are remarkably good at solving problems. This cadre of discursive elites has many common features found elsewhere in the world. For example, the birth of the American hydraulic mission as an official bureaucratic entity can be traced back to the Land Reclamation Act, which was signed by Roosevelt on 17 June 1902 (Reisner, 1993:112). This hydraulic mission sought to have all of the water "conserved" by damming and piping it in order to "make the desert bloom". Reisner (1993:114) notes that "the engineers who staffed the Reclamation Service [at that time] tended to view themselves as a Godlike class performing hydraulic miracles for grateful simpletons who were content to sit in the desert and raise fruit". The Spanish hydraulic mission consisted "mainly of 'restoring' the 'perturbed' equilibrium of the erratic hydrological cycles in Spain", with the Spanish Corps of Engineers being highly elitist, intellectualist, 'high cultured', male dominated, socially homogenous and exclusive (Mateu Belles, 1995 in Swyngedouw, 1999).

This implies that the hydrosocial contract is initially one in which unequal power relations exist. The socio-political setting in which the hydrosocial contract is born thus becomes important, because the power relations that are present within this broader setting are the primary determinants of the outcome of that hydrosocial contract. Two forms of power inequality can be isolated at the first transition, both of which are particularly relevant in the South African case study. (i) The two parties to the hydrosocial contract - the individual and the state - are far from being equal in power and capability. This inequality becomes patently manifest in the functioning of the discursive elite and the emergence of the dominant sanctioned discourse that is focussed on the continued augmentation of supply. (ii) Access to and control over water becomes a key gate-keeping function in society, because the first transition is about mobilizing water under conditions of scarcity (Turton, 2000b).

In South Africa, which at that time had a political system that was based on a rationale that can best be described as Cultural Darwinism, a racially defined political elite gained hegemonic control over the balance of hydropolitical privilege in society. By this the authors mean that the allocation of water in society, became a crucial element in determining the relative economic advantage that an individual or social group could enjoy. One could argue that water allocation was the result of existing financial and political inequality, but evidence shows that water misallocation was also the cause of continued and increasing inequality. When expressed in racial (and gender) terms, this meant that the white minority gained access to the key decision-making structures¹¹, which in hydropolitical terms meant that the balance of privilege in society started to manifest in the form of unequal access to clean water and sanitation services. This is in keeping with the concept of resource capture, and is an excellent example of how resource capture and ecological marginalization functions in the water sector. From this one can hypothesize that under conditions of water scarcity, access to and control over those resources determines wealth and prosperity, and as such can be used as a powerful form of political control as happened in South Africa under Apartheid rule (Turton, 2000b).

In terms of political science theory, the authors were struck by the similarity with the form of hydrosocial contract that occurred during this first transition and the social contract that was proposed by the classic contract theorist, Thomas Hobbes (1651). Hobbesian thinking was based on the assumption that the state of nature was brutish and anarchic, so the need was expressed to create an all-pervasive state via a social contract. This type of social contract would involve people transferring all of their rights, except the right to life, to such a sovereign power (Frost, 1991:249) or government. This "super government" - the Leviathan - had absolute power. As Tuck (1990:106) notes, this sinister image symbolizes a ruthless and all-powerful state. In substance Hobbesian theory amounted to identifying government with force, at least in the sense that force must always be present in the background whether it is applied or not. It is this aspect that promoted the isolation and definition of the "*pouvoir*" and "*puissance*" forms of power that exist in a hydropolitical sense (Turton, 2000b), particularly in relation to the decision to build pipelines to alleviate water scarcity. As Hobbes (1651) noted in Chapter 17 of *Leviathan*, "Covenants, without the sword, are but words, and of no strength to secure man at all. The bonds of words are too weak to bridle men's ambition, avarice, anger, and other passions, without the fear of some coercive power" (Sabine, 1961:468). To this end, Hobbes (1651) retained the ancient device of a contract, though he carefully excluded the implication of a contract binding on the ruler, describing it instead as "a covenant between individuals by which all resign self-help and subject themselves to a sovereign" (Sabine, 1961:468). The essence of this was to presume the existence of two separate contracts. One by which the community itself was produced and binding its members to one another, and one between the community thus formed, and its governing officials (Sabine, 1961:431).

The fact that the Hobbesian contract "excluded the implication of a contract binding on the ruler" is of crucial importance in the water sector, as this hints at the non-existence of any form of alternative authority against which state-initiated actions can be checked or balanced. Because the first transition of the hydrosocial contract is the genesis of the hydraulic mission of society, the technocratic elites at that time do what they do increasingly well - mobilizing water from ever-distant sources - but without taking the changing public opinion into consideration¹². As the supply-sided problems become more complex, and as these technocratic elites gain experience, they become increasingly important to the state. In effect, the state would cease to function and anarchy would prevail if these technocratic elites did not perform "hydraulic miracles", so in effect the stability of the state becomes a function of the ability of these engineers to continually solve problems. As such, two distinct things start to occur with hydraulic engineers after the first transition. (i) They become increasingly protected by the state, and as such start to become instruments of the state by enacting political decisions, either wittingly or unwittingly. (ii) They become increasingly elitist and distant from mainstream society, ultimately losing touch with changing groundswells of grass roots opinion.

These two factors are extremely important to note in terms of an understanding of the hydrosocial contract, because they contain the seeds of the eventual demise of hydraulic engineers as the sole discursive elites in society. In this regard, Gleick (1998:15) provides an interesting insight into what happened in the USA.

"The environmental movement in the United States was ... *stimulated in the 1960s by the apparent unwillingness of the federal dam builders to recognize any environmental values of wild rivers* and their various proposals to build several particularly large and damaging reservoirs. In one of the most astounding proposals of all, the U.S. government announced plans in the 1960s to build a series of massive dams in the Grand Canyon, one of the most important national symbols of America. These dams provoked such an enormous outcry of dismay from environmental groups - and then from the broad American public itself - that the plans were halted: the first time such a major project had been stopped. Many conservationists believe that the successful battle to stop dams, and the Grand Canyon dams in particular, led to the modern conservation movement in the United States" (Gleick, 1998:15) (emphasis added).

The extract above hints at the existence of a technocratic elite, which had for a time enjoyed such hegemonic control of the sanctioned discourse, that they had finally lost touch with the normative basis of a changing society. In other words, the hydrosocial contract of the Hobbesian type, which seemed to exist in the USA as well, was being challenged and the so-called "Second Transition" had begun. Significantly too, the notion of wild and untamed rivers with an intrinsic value in being left unregulated starts to enter into the discourse at this time. This runs contrary to the sanctioned discourse that is informed by the Baconian/Descartean philosophical principles of controlling nature. As such, the existence of this component to the changing hydropolitical discourse provides a valuable indicator to the analyst.

The start of the demise of the Supply-Sided Phase in the USA was heralded by the birth of the ecology movement in the 1960s. David Brower, the Executive Director of the Sierra Club, succeeded in denying funds to build Echo Park Dam, even though they were forced to compromise at the time. In order to save Echo Park from inundation, the Sierra Club had to agree to leave the Glen Canyon Dam project unchallenged (Reisner, 1993:284). This unleashed a powerful response as history has subsequently revealed. Brower, in his foreword to the Sierra Club book entitled *The Place no one Knew*, wrote that "Glen Canyon died in 1963, and I was partly responsible for its needless death. So were you. Neither you, nor I, nor anyone else, knew it well enough to insist that at all costs it should endure" (Reisner, 1993:285). This mobilized considerable public support and so the American social conscience was officially born and the hegemonic control over the sanctioned discourse by the engineering discursive elite was challenged for the first time (Turton, 1999). Here the notion of wild and untamed rivers as a central rallying point for public opinion is clearly evident.

This suggests that the second transition needs some form of trigger event to set it in motion. In the case of South Africa, this trigger event¹³ took the form of the first democratic elections that occurred in 1994. Prior to that event, the state had total control of every facet of South African life. In the South African water sector, this meant that the balance of hydropolitical privilege was grossly skewed in favour of the white minority over time. In fact, at the time of the democratic transition, there were no less than 109 different water-related laws. Of those laws, at least 26 dealt directly with irrigation, with 25 of them being promulgated between 1914 - 1965. Most irrigation projects were for the exclusive benefit of white, and in particular Afrikaner, commercial farmers. Only one purely irrigation-related act was passed after 1965, the Irrigation Districts Adjustment Amendment Act (34/78). The reason for this situation was that white hegemony had been established by the mid-1960s and almost all of the irrigation land that could be appropriated had been appropriated by that date. In short, resource capture, first of land, and then of water, had been institutionalized by that date, so all subsequent legislation was merely to tie up the loose ends. This institutionalized resource capture became one of the cornerstones of the Apartheid strategy, but oddly enough is seldom written about by political scientists and analysts.

Central to this second transition of the hydrosocial contract in South Africa, was the democratic transformation, with the Constitution (Act 108/96) becoming the foundation of all future legislation. The Constitution contains a Bill of Rights that contains two paragraphs of importance to an understanding of the changing nature of the hydrosocial contract in South Africa. Paragraph 24 of Chapter 2 states that everyone has the right to an environment that is not harmful to their health or wellbeing. Furthermore, everyone has the right to have the environment protected for the wellbeing of present and future generations through reasonable legislative measures that prevent pollution, ecological degradation, promote conservation, and secure ecologically sustainable development while promoting justifiable socioeconomic development (Constitution, 1996:11). Paragraph 27¹⁴ of Chapter 2 states clearly that everyone has the right to have access to sufficient food and water, with the state being given the legislative responsibility for achieving the progressive realization of these rights (Constitution, 1996:13). This is very relevant against the background that in South Africa the highest priority of rural citizens, who constitute approximately half of the total population of the country, is water (Abrams, 1996). In fact, government can be sued for non-delivery in terms of the Constitutional requirements noted above, so this issue is being taken very seriously indeed. The legacy of resource capture and its resultant ecological marginalization, thus impacts heavily on the water sector, leaving it a highly politicized environment.

The early legal development of the National Water Act (36/98) was done through the White Paper on National Water Policy that was launched in April 1997. This White Paper was the result of wide public participation¹⁵ that had been launched a year or two previously. In order to facilitate the public participation process, a discussion document entitled *Water Law Principles* was made available to the public and all interested role-players (DWAF, 1996). This document introduced a number of basic principles that subsequently became enshrined in the National Water Act (36/98) in

some form or other. This was a unique process for two fundamental reasons. (i) The process was all-inclusive and deliberately sought to incorporate all South Africans in the act of drafting a law that would alter the balance of hydropolitical privilege in society forever, and in a peaceful way. (ii) These basic principles developed a conceptual framework that structured the public debate. These principles were far-reaching and were also designed to alter the balance of hydropolitical privilege in society in a fundamental and irreversible way.

Arguably the most important of these new principles were the following: (i) All water, irrespective of where it occurred in the hydrological cycle, was regarded as a common resource, the use of which should be subject to national control. This did away with the principle of riparian rights and the notion of ownership of water by virtue of existing land rights. In this regard it must be remembered that after years of Apartheid rule, the white minority owned the majority of the land, and with this land ownership, there were also water ownership rights. As such, water rights were divorced from land ownership rights for the first time in modern South African history, and the notion of water rights was abolished. (ii) The only water that was protected by legally enforceable right was that which came to be known as the "Reserve"¹⁶. This "Reserve" consists of two distinct sub-components. (a) The volume of water needed to maintain basic aquatic ecosystem functioning was referred to as the "Resource Base". This meant that for the first time in South African history, the aquatic ecosystem was legally entitled to the use of its own water, and this was protected by right. (b) The volume of water that consists of "Basic Human Needs", which is calculated at 25 litres/person/day where no other forms of piped water are available.

After a lengthy public debate on the White Paper, the National Water Act (36/98) was signed into law, repealing 108 existing laws in totality, and one partially. The partially repealed legislation was the Forest Act (122/1984) of which sections 7-9 were repealed. The National Water Act (36/98) was based on the legal concept of *res publica* that was taken to embrace three key principles - equity of access, sustainability of use, and optimal utilization. As such, the concept of *res publica* requires the state to discharge six key functions in the water sector with the view to promoting sustainability and equity for the benefit of all:

- Protection of the resource base from all forms of threat.
- Ensuring the equitable use of the resource in an optimal way in keeping with the public good.
- That the resource be developed in an equitable and sustainable manner.
- That the resource be managed effectively and in a way that reduces conflict.
- That the resource be conserved wherever possible.
- That the use of the resource be controlled.

With respect to allocative mechanisms, the National Water Act (36/98) provides for three forms. (i) Schedule 1 Authorizations, using the *de minimus* principle, are allocated nation-wide. (ii) General Authorizations¹⁷ are also made on a nation-wide

basis but in terms of geographic differentiation. Significantly, this covers the use of borehole water, which is a major change when compared to the old pre-democratic legislation. In this regard, assuming that the infrastructure is installed and operated by the user, there will be no infrastructure charges {NWA s56(2)(b), but there will be a water management charge {NWA s56(2)(a)}(Rowlston, 2000). (iii) Licenses are issued based on individual application¹⁸. These are derived from deliberative criteria including social, equity and ecological issues, and are valid for a limited period only (40 years), but are subject to review every 5 years. All similar users will be treated similarly. Furthermore there is the distinction between two separate pieces of water-related legislation. The National Water Act (36/98) provides for the full hydrological cycle including first tier tariff structures, whereas the Water Services Act (108/97) governs the direct service delivery under water boards¹⁹, including the second and third tier government tariff structures. The basic purpose of the Water Services Act (36/98) is to set national standards and norms for water services and tariffs; to ensure that water services are properly planned; to clarify the institutional framework for water service provision; and to promote effective water resource management and conservation (DWAF, 1997:3).

Regarding the two pieces of post-Apartheid water legislation in South Africa - the National Water Act (36/98) and the Water Services Act (108/97) - two issues are of great importance to an understanding of the second transition of the hydrosocial contract that occurred in South Africa. (i) The National Water Act (36/98) is consensus-based, with the Minister being legally unable to make unilateral decisions without involving all role-players. (ii) What power is placed in the hands of the Minister and his Department, is still subject to a counter-balance in the form of parliamentary review²⁰. This is enshrined in Chapter 11, Sections 71 and 75 of the Water Services Act (DWAF, 1997:4).

Significantly, there is a lot of involvement by civil society in contemporary South Africa. One of the NGOs, Mvula Trust, has become a major vehicle of service delivery, particularly in rural and previously marginalized areas. Other NGOs are actively agitating for the implementation of Water Demand Management (WDM) strategies as an alternative to continued augmentation of supply²¹. It is anticipated that the debate in this regard will centre on the impending decision to either proceed with Phase II of the LHWP, or alternatively to implement the Thukela Water Project (TWP). Analysis of these hydropolitical interactions will enable an understanding of the hydrosocial contract to be developed further. Furthermore SARA, an NGO that is particularly active in the TWP case, is calling for the promulgation of a National Wild and Scenic Rivers Act (Turton & Meissner, 2000) in a bid to counter the uncontrolled expansion of large IBTs.

Having noted these fundamental changes to the way that hydropolitical privilege is determined in the post-Apartheid democratic South Africa, the authors have been struck by the similarities with the Lockean form of contract theory. John Locke (1690), paid a lot of attention to the contract theory that was emerging at that time, and in particular provided a critique of the Hobbesian form of philosophy. In his

work *Two Treatises of Civil Government*, Locke (1690) articulated the idea that political power exists and is only exercised for the public good. The basis of government, according to Locke (1690), is consent, and the powers which are wielded by government officials are founded in the nature of a trust (Dunn, 1990:115) between government and those being governed, therefore being under the liability of forfeiture if conditions of this trust are not fulfilled (Carpenter, 1970:v). As such, what Locke (1690) proposed was a government by consent, where the individual retained what was defined as "natural rights". Significantly, it is these "natural rights" that are retained by the individual²² which form a balance against the so-called "just power" of the government (Carpenter, 1970:xiii). As such, the rulers are merely the trustees of the people²³ who have delegated their individual powers to government.

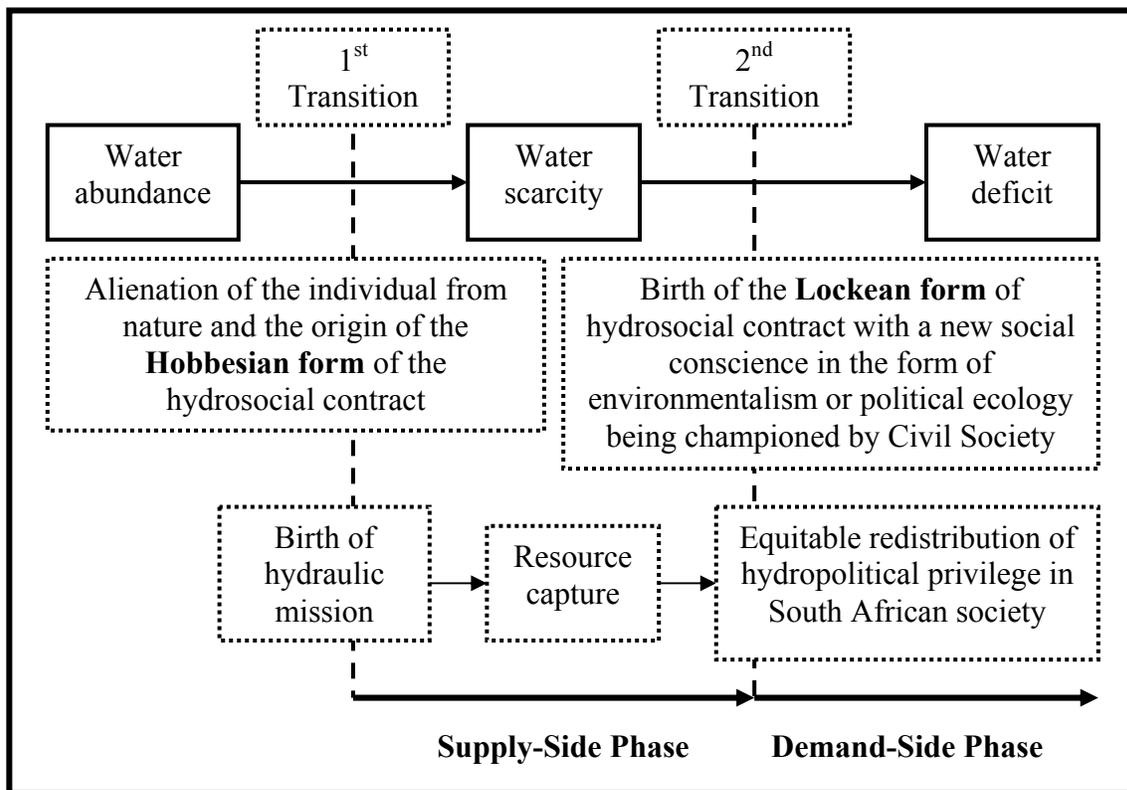


Figure 3. Schematic representation of the two transition periods that are relevant to the development of the hydrosocial contract.

The notion that the inalienable rights of the individual forms the basis of all rightful government is fundamental to Lockean thinking (Carpenter, 1970:xiv). Thus Locke (1690) conceives of democracy as a spirit rather than as a form of government, being compatible with a variety of institutions, so long as it is recognized that the rulers are merely the trustees of the people who have individually delegated their power to them. In essence, what the *Two Treatises of Government* attempts to do is to explain what government power is for, how far it may legitimately be extend, and who may do what to check it if government arbitrarily chooses to extend this power further

(Dunn, 1990:113). This ultimately became the philosophical basis of all written democratic constitutions (Carpenter, 1970:xv), including that of the USA. Within the context of the hydrosocial contract however, the most significant component of Lockean thinking is the notion of a civil society as a fundamental component of the checks and balances needed to counter the absolutism, which resulted from the Hobbesian form of hydrosocial contract.

This enables one to develop the notion of the hydrosocial contract a little further. Figure 3 shows a schematic rendition of the two transitions. Initial water abundance gives way to water scarcity as the result of some form of trigger event. In the case of South Africa it was the discovery of gold on the Witwatersrand. This meant that the individual looked to government to provide for their basic needs such as water supply and sanitation, so the government responded accordingly.

This first transition, which in South Africa occurred between 1886 and 1903, saw the creation of a Hobbesian form of hydrosocial contract, where more government was seen to be better. Under such circumstances, the hydraulic mission was born. Central to this mission was getting more water, hence the historic origin of the supply-sided phase of water management. Hydraulic engineers became the discursive elites and controlled the sanctioned discourse in a rather hegemonic way in keeping with the Hobbesian model. Superimposed onto this was the dominant political thinking of the time, which was based on some form of Cultural Darwinism that introduced notions of superiority and inferiority into the hydropolitical equation. This split occurred along racial lines, with whites²⁴ being given the overwhelming balance of hydropolitical privilege over time. This saw the institutionalization of resource capture that in turn became the genesis of social instability. Political activism resulted with a loose correlation between the degree of activism and the extent of resource capture. One element of this political activism was the birth of civil society, initially to champion the cause of the oppressed.

The second transition occurred when oligarchic rule gave way to democracy in 1994. With this historic event, the balance of hydropolitical privilege within South African society was redistributed albeit via a negotiated instrument. Significantly, Locke (1690) stated that it was through an elected assembly that each new generation can alter the laws that it has inherited, thereby renewing public consent to the laws which it chooses to retain (Dunn, 1990:115). The rejection of all of the old South African water laws should be seen in this light. The Lockean form of hydrosocial contract arose, with the new water legislation reflecting fundamental characteristics of that philosophical rationale. The discursive elite changed with economists, environmentalists and social scientists all challenging the hegemonic status of engineers, thus leading to a new form of discourse and ending the purely supply-sided phase of water resource management. Government shrank, and less became better. In order to fill the vacuum left by shrinking government, a bifurcation occurred. On the one hand, civil society in the form of NGOs became a permanent part of the hydropolitical landscape, whereas on the other hand privatization of water utilities

was considered as a viable option (but with consequences beyond the scope of this chapter).

The Impact of the Second Transition on South African Water Consumption

Figure 3 makes reference to the equitable redistribution of hydropolitical privilege in South African society as a form of counterbalance to the long-term effects of institutionalized resource capture. Equity is a contested issue however, and it is no different in this case. Because it would have been too politically damaging to reduce water allocations to the historically advantaged South Africans, a tacit decision was made to extend that same level of privilege to the historically disadvantaged community. In other words, rather than reduce the slice of the pie that the hydropolitically privileged would enjoy and give that away, the redistributive process seems to have been developed on a rationale akin to making the pie larger instead²⁵. This means that the historically privileged will not have to face the consequences of reduced water availability, at least in the short-term. It is an erroneous assumption of course, as water resources are unfortunately finite, and as the data set shows, rapidly approaching the point of full mobilization. This is not unique to South Africa however. In this regard Allan (2000) notes that,

"Politicians faced with the challenge of reallocating limited water resources always construct the idea that there is more water than there actually is. This is because it is easier to get people to believe that there is more water than to get them to give up water. The case studies confirming this are numerous in the Middle East North Africa (MENA) region, and now it is manifest in South Africa too. It also has an international dimension when riparians are in contention. Although in the international case the upstream riparian may be tempted to conjure a lower volume for availability in that this means there will be a smaller share allocated downstream".

From this one can deduce that an almost universal element of hydropolitics is the construction of knowledge, particularly regarding numbers or volumes, almost always leading to the fact that data becomes contested. It therefore becomes illuminating to see what impact this has had on water consumption patterns. Figure 4 is a graph that shows the rather dramatic effects of this redistribution.

The highest water use estimate is the result of the reversal of Apartheid-induced resource capture. By redistributing the balance of hydropolitical privilege in South African society in a more equitable way, a dramatic increase in water demand is occurring. As such, should the high water use trajectory be maintained, then all surface water resources will be appropriated by around 2003, with the total known surface and groundwater resources being fully harnessed by around 2017²⁶. The democratically elected government is thus sitting on the proverbial horns of a dilemma. If government meets public aspirations in the short-term, the risk of environmental collapse is thus a very real one, despite the legal protection of aquatic ecosystems by means of the "Reserve". This is relevant in light of the fact that the

highest priority for almost all rural citizens, constituting half of the total population, is water supply and sanitation (Abrams, 1996). If government choose instead to avoid the consequences of environmental collapse, they stand the risk of alienating voter support in the medium-term.

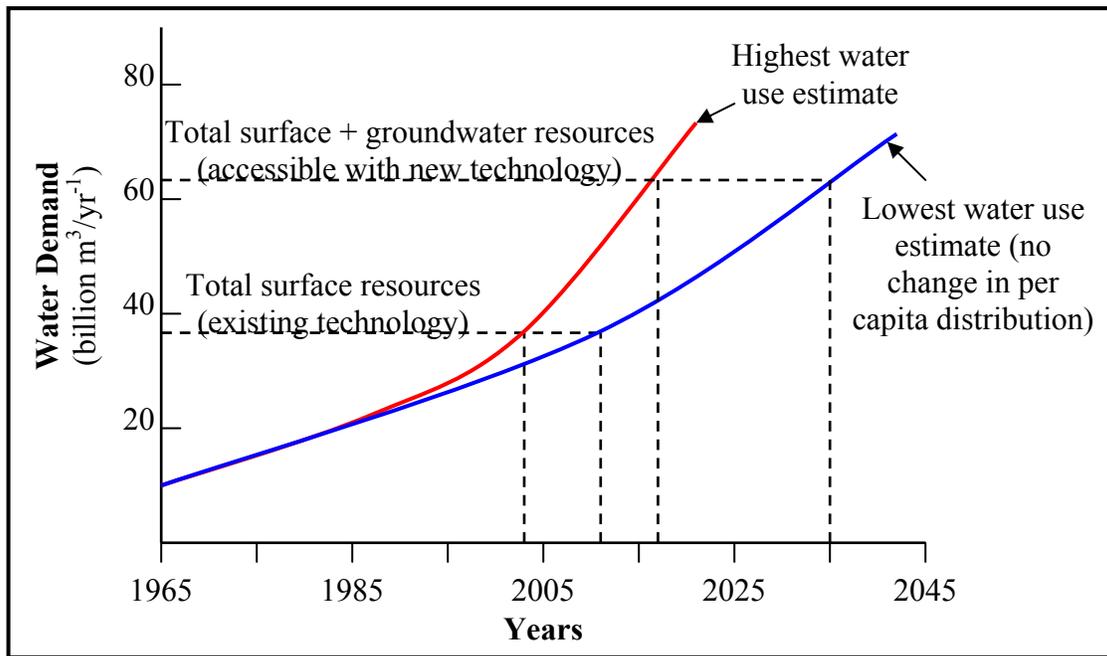


Figure 4. The water supply dilemma in South Africa (after Ashton, 2000).

Planning for DWAF that was concluded in 1996/7 supports this rather alarming data set. Figure 5 is a reproduction of one of the possible DWAF scenarios for future South African surface water use in 2030. This planning is currently under consideration with the development of a new National Water Resource Strategy (NWRS) as required by the National Water Act (36/98) (DWAF, 2000), so the official view may change, but it certainly presents a picture worthy of concern nonetheless.

Attention is drawn to the existence of major IBTs in this scenario, the vast majority of which focus on augmenting water supply to the Witwatersrand (Gauteng) area, and from there on to the drier northern reaches of South Africa. The reader should also note that seven of the important hubs, ranging from Cape Town in the South through to Gauteng and Pietersburg in the North, are designated as having future water utilization being beyond locally available supply (refer back to Figure 1 for a comparison). This represents a classic example of water scarcity as defined at the beginning of this chapter. In fact, the overall situation at the national level is clearly one of water deficit as defined at the beginning of this chapter, with sustainability

being a key issue. The pie chart corresponding with the Lesotho Highlands and Thukela River Basin is particularly revealing in that virtually all of that water will be transferred outside of those basins. This can be regarded as being a classic case of resource capture. This implies that a very real upper-limit exists in those basins when it comes to using their own water for future economic growth. The Incomati and Maputo River systems are also characterized by significant transfers in this scenario, focussing attention on interstate relations between South Africa, Swaziland and Mozambique in future. This suggests the development of what has been defined as a hydropolitical security complex²⁷ (Schulz, 1995:97) in Southern Africa, as water allocation in these basins start to reach their sustainable limit. The legal requirement under the National Water Act (36/98), which prioritizes water designated in terms of international agreements with riparian states above that of domestic consumption, will be severely tested under these conditions. Institutions and regimes will have to be robust in order to withstand these rigors.

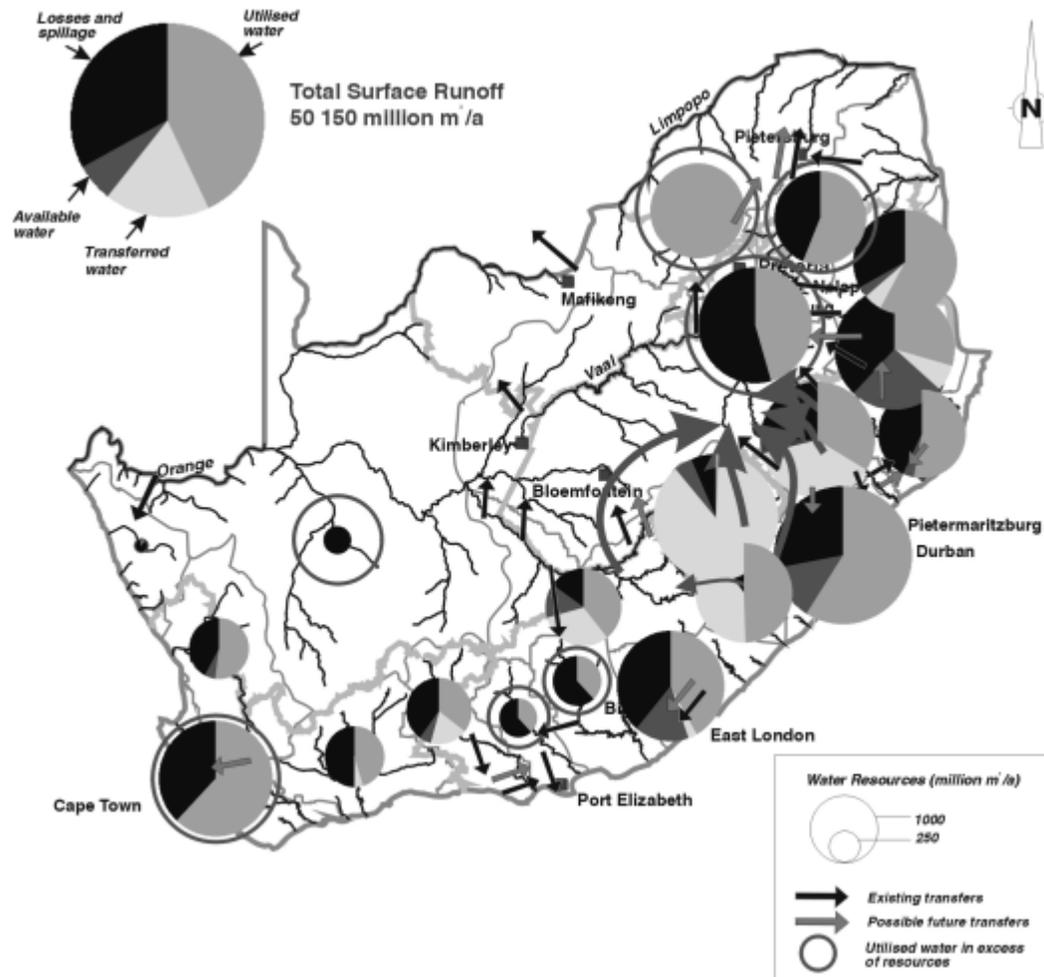


Figure 5. Map of South Africa showing one scenario for the future utilization of surface water resources in 2030 (Basson *et al.*, 1997:62).

The effects that this will have on the hydrosocial contract are not known. It can be speculated though that the Hobbesian form could again be resorted to, with its inherent resource capture rationale and repressive nature. One effect may well be the gradual discarding of the environmental "Reserve" which would also be a retrogressive step. This would be most unfortunate indeed. A viable solution seems to lie with the shift in policy away from national self-sufficiency in food towards food security, with reliance on the trade in 'Virtual Water' to balance out the national water budget. This is recognized already at DWAF level (Basson *et al.*, 1997:67) and is actively being promoted by some researchers (Turton, 2000b) and NGOs (Turton, Moodley, Goldblatt & Meissner, 2000). The role of civil society in developing this discourse further will thus become increasingly important. The problem remains a complex one however, deserving of ongoing research, preferably in a multidisciplinary manner.

The Hydrosocial Contract in a Global Context

The South African transition did not take place in a vacuum however, as there were significant changes occurring at the international level with milestone events such as the Dublin Conference (1992), which introduced the Dublin Principles; the Rio Summit (1992), which introduced Agenda 21 albeit via a convoluted route; and the First World Water Forum at Marrakech (1997) that launched the quest for the so-called World Water Vision, which ultimately saw the light of day at the Second World Water Forum at The Hague (2000). Interestingly, the Second World Water Forum had a special session on "The Social Charter for Water" that was encapsulated in a book with a similar title (Agence de l'Eau, 2000). The content of that book reveals that an evolution of the hydrosocial contract is taking place in many different parts of the world as well, suggesting that the Hobbesian/Lockean transition may in fact be more widespread than just in South Africa.

"The Social Charter applies the same governing principles that were put forth at several conferences on water, especially those at Dublin, Marrakech and Paris. This demonstrates its agreement with several recent declarations focussing on water, such as the Earth Charter (Sweden), the Health Charter (England), the Declaration of Madeira by the OECD, the Report on Water Ethics by UNESCO or the World Water Contract by the Lisbon Group. ... The purpose of the Social Charter is to promote a new policy on water for the XXI century that is ***designed by the policy-makers and their experts, in partnership with the citizens***²⁸, that integrates their demands in the projects and takes into account local economic imperatives." (Agence de l'Eau, 2000:22) (Emphasis added).

This Social Charter, which has been launched at the international level, contains case studies and inputs from over 50 countries, having as a core theme the notion of balance between government, water service providers and the public. It is thus a reflection of the Lockean form of hydrosocial contract, suggesting to the authors that

such a concept may be more universal than originally evident from an analysis of the South African case alone.

The Social Charter is but a smaller component of the larger World Water Vision however. This Vision is built around certain key issues. These issues are: limiting the expansion of irrigated agriculture; increasing the productivity of water; increasing storage; *reforming water resource management institutions*; increasing cooperation in international basins; valuing ecosystem functions and supporting innovation (Cosgrove & Rijsberman, 2000:xxi). To this end, it is illuminating to note that,

"People's initiative and capacity for self-reliance *need to be put at the centre of planning and action for water* supply and sanitation. Doing so can lead to systems that encourage genuine participation by empowering women and men, improving sustainable living conditions for all - particularly women²⁹ and children" (emphasis added)(Cosgrove & Rijsberman, 2000:xxiv).

This statement is clearly couched in the type of phraseology that has been used in this chapter. In short, the World Water Vision, has as its very essence, the desire to reformulate the relationship between people, water, and water resource managers. As such, the Vision is nothing more than the manifestation of a concept that the authors have chosen to call "a Lockean form of the hydrosocial contract".

Conclusion

This chapter has sought to lay out the authors' thinking with respect to the existence of a concept called the "hydrosocial contract". It seems to exist in the South African case where it has undergone two major phases of transition. The first transition saw the birth of a Hobbesian form of hydrosocial contract, with the emergence of a homogenous discursive elite who jealously guarded the dominant or sanctioned discourse that was strongly supply-sided in orientation. When this was overlaid by the national political process, institutionalized resource capture was the inevitable result. A discernable second transition saw the emergence of a new form of hydrosocial contract, this time with a distinctly Lockean character to it. This saw the redistribution of the balance of hydropolitical privilege in South African society, the establishment of a virulent civil society and the move towards privatization in the water sector. It is not known how sustainable this will be however, as this move towards equity has altered the consumption trajectory significantly. The outcome of this is not known, but it is speculated that civil society, in the form of NGOs, will increasingly place pressure on government to develop sustainable water resource policies. Two extreme cases can be envisaged. On the one hand, the gradual erosion of the Lockean form of hydrosocial contract can give rise to a distinctly Hobbesian form again, which would represent a step backwards and the entrenchment of the very driving forces of social instability that were evident under Apartheid rule. On the other hand, a new relationship between government and civil society can map out a different path towards sustainability. In the event of the latter, a gradual erosion of state sovereignty can be anticipated, but this may be the price that needs to be paid in

order to achieve social stability. The concept of the hydrosocial contract is thus offered by the authors in an attempt to contribute to the development of hydropolitical theory.

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¹ This has particular relevance to an understanding of water and gender. The reader is referred to Turton, Schreiner & Leestemaker (2000) for a deeper analysis of the so-called "feminization" of water as a component of the hydrosocial contract.

² In the context of water and gender, this can be understood as being the start of the process of de-feminization of water resource management (Turton, Schreiner & Leestemaker, 2000).

³ This was particularly evident in American engineering circles during the 1950s. Because many engineers were sent from developing countries to be trained in the USA, variations of this idea rapidly took root in other parts of the world as well.

⁴ There is a third pre-condition, but this is usually ignored by engineers during the infrastructural development phase of supply-sided management. This third pre-condition is public support, but typically this is irrelevant during the Hobbesian form of hydrosocial contract.

⁵ This part of the Orange-Vaal transfer scheme would involve cascading a river backwards and thereby transferring water from the Orange River to the Vaal River sub-basin. This is a profound act of controlling nature in its own right.

⁶ Feminization finds its way into the water management discourse via such special interest groups during the Second Transition to the Lockean Form of hydrosocial contract. Refer to Turton, Schreiner & Leestemaker (2000) for more information.

⁷ Equity has many facets to it. Turton & Meissner (2000) have isolated at least five key equity-related issues. These are inter-gender equity; inter-sectoral equity; inter-generational equity (also known as sustainable development); institutional equity and international equity (between riparian states in a shared river basin). The interaction of various aspects of this discourse results in a key component of the Lockean form of hydrosocial contract.

⁸ This was manifest in an ambitious dam building programme (Rowlston, 2000). Dr. Thinus Basson (2000) refers to this as the infrastructural development phase of water resource management in South Africa.

⁹ The major floods of a one in hundred-year magnitude that were experienced in large parts of Southern Africa during the first quarter of 2000 are an example of this.

¹⁰ There are two direct components of this early de-feminization process (Turton, Schreiner & Leestemaker, 2000). On one level, de-feminization has negative connotations because it serves to marginalize women from water resource management and decision-making processes. On another level however, it improves the quality of women's lives, as clean tap water becomes readily available, thereby relieving women of the arduous task of fetching water from relatively distant sources.

¹¹ Water resource management became the almost exclusive domain of mostly Afrikaans-speaking, white, male engineers during the Apartheid era. This started to change when Prof. Kader Asmal, in his capacity of Minister of Water Affairs and Forestry, appointed Ms. Barbara Schreiner as a senior water resource manager within the Department of Water Affairs and Forestry (DWAF), making her the first woman in the history of South Africa to occupy such a senior decision-making post.

¹² Refer to Endnote No. 4.

¹³ Unlike the USA case, the trigger event for the Second Transition in South Africa was not related to environmental considerations in any way. Minister Kader Asmal's primary imperative in reviewing the South African Water Law was to address the imbalances in water services provision - a social concern (Rowlston, 2000). According to commentators who were involved in the process, it took some time before Prof. Asmal began to grasp the connection between water services provision and resource management, and a little longer to embrace the concept of sustainable utilization, and ultimately the need for resource protection in order to achieve sustainability.

¹⁴ According to Mr. Bill Rowlston (2000) of DWAF, Paragraph 27 was much more important in driving the Water Law Review process than Paragraph 24.

¹⁵ This is an interesting story in its own right, specifically within the context of the Lockean form of hydrosocial contract. Rowlston (2000) notes that if the Water Law Review Panel had had its majority way, the "Reserve" would not have ultimately found its way into the National Water Act (36/98). The fact that it finally prevailed in the national legislation was largely the result of Dr. Carolyn (Tally) Palmer's tireless work. For her efforts, Dr. Palmer won a gold medal, which was awarded to her in Swakopmund during 1999 by the Southern African Society of Aquatic Scientists (SASAQS). The National Water Act's (36/98) Resource Directed Measures involving the classification of rivers, the determination of the "Reserve" and the development of Resource Quality Objectives, are largely

founded on the inclusion of the "Reserve" in the legislation. The outcome of this is water legislation that is somewhat unique in a global context, and this in turn is the result of allowing special interest groups to become involved in the drafting of legislation. In short, this is an excellent example of the Lockean form of hydrosocial contract at work.

¹⁶ Refer to Endnote No. 15 for a history of how the "Reserve" came to be a legal concept.

¹⁷ The fact that water use authorizations can be used as Source Directed Controls is based substantially on the fact that resource protection measures can be included as conditions in general authorizations and licenses (Rowlston, 2000).

¹⁸ Technically this is a moot point however. While all licenses are applied for individually, for the most part these applications are likely to arise from invoking Part 8 of Chapter 4 of the National Water Act, which is a compulsory and geographically general application. This is important to note in the context of reducing overall water allocations at the national level. Compulsory license applications are specifically intended to effect re-allocation in areas where demand exceeds sustainable levels of supply (Rowlston, 2000).

¹⁹ This does not imply that water boards are the principle providers of water services under the Water Services Act however. Local authorities are constitutionally the Water Services Authorities, and the Water Services Act makes it clear that water boards are but one Water Services Institution, with a specifically defined role of providing water services to other Water Services Institutions {WSA s29} (Rowlston, 2000).

²⁰ The parliamentary review process was introduced to preclude administrative law-making, which was perfectly possible under the older 1956 Water Act, where potentially powerful regulations were not subject to any substantial regular mandatory review process. According to Rowlston (2000), the legal requirement for public consultation is probably a more significant counterbalance to arbitrary DWAF actions, than the parliamentary review process. The National Water Act thus has two significant forms of counter-balance, making it a good example of the Lockean form of hydrosocial contract.

²¹ Basson (2000) notes that this may be an unrealistic aspiration. At best, according to Dr. Basson, WDM measures may delay augmentation. Gilham & Haynes (2000) concur with this view.

²² The legal requirement that DWAF must be open to public consultations is an example of this.

²³ In this regard, the National Water Act specifically states that the government is the trustee of the nation's water resources. It is interesting to note that NEMA have also adopted this approach (Rowlston, 2000).

²⁴ While whites were in general privileged over their black counterparts, the water resource profession was skewed in favour of white, predominantly Afrikaans-speaking males over time. Refer to Endnote No. 11.

²⁵ The decision to allow existing lawful use to continue *pro tem* was a tacit acknowledgement that DWAF simply did not have the capacity to address all existing uses at once. In the longer-term, there will be a need to reduce existing allocations, on a priority basis, under the loose banner of water stress. There are sufficient mechanisms in the National Water Act to do this. In the long-term, the intention is to make the pie bigger by means of WDM, so these measures should be seen as being short-term strategies only (Rowlston, 2000).

²⁶ As with most hydropolitical issues, these data are contested. The heavy rains that fell over the entire Southern African region during the first quarter of 2000 have probably also served to stave off the inevitable for a bit longer, because they filled most large storage dams and recharged groundwater aquifers significantly. The dates should not be seen as absolutes, but can best be regarded as being one possible scenario.

²⁷ A hydropolitical security complex is defined as including those states that are geographically part 'owners' and technically 'users' of shared rivers, and as a consequence, they all consider the rivers as a major national security issue (Schulz, 1995:97). This happens under conditions of water deficit at the level of the international river basin. This condition of water deficit already exists in the Incomati, Limpopo and Maputo River Basins, and is rapidly approaching in the Orange River Basin.

²⁸ This is a clear manifestation of the Lockean form of hydrosocial contract.

²⁹ This is relevant to feminization as a critical component of the changing hydrosocial contract (Turton, Schreiner & Leestemaker, 2000).