

Back to the Future: A South African Perspective on Mar del Plata and Beyond

Anthony Turton, Jeanette Rascher, Gillian Maree and Kieran Findlater

NRE Report Number: CSIR/NRE/WR/EXP/2007/0105/A

Abstract

South Africa is regarded by many as an example of progressive water sector reform. Given the historic experience of Apartheid, an analysis of this process is useful, because it shows how water sector reform is a key element in the attainment of social justice and historic equity between different groups. In the South African case, developments from the international policy environment were blocked out due to the isolation of the country as a pariah state, but when the transition to democracy occurred in 1994, many of the accumulative ideas that started from Mar del Plata were imported into the country in one action.

Key words

Triialogue Model of Governance, Hydrosocial Contract, Policy

Introduction

South Africa has a turbulent history (Davenport, 1977; Welsh, 2000) and is thus an excellent crucible for the policy-related sciences. It is also a water constrained country

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

(Brown, 1875; Conley, 1996; 1997; Turton *et al.*, 2006a) necessitating complex and ambitious water resource infrastructure to sustain economic growth and future political stability (Brown, 1877; Ninham Shand, 1956; Vorster, 1988; Heyns, 2002; 2003; Ashton & Turton, 2007). Access to, and control over water in an environment that is fundamentally water-constrained, has meant that water resource management is deeply politicized in South Africa, because it has been so closely linked to social privilege, economic opportunity and quality of life (Turton *et al.*, 2004). So it is no surprise that reform is closely associated with any major transition in the political power-base of the country (Findlater *et al.*, 2007). It is in this context that an assessment of Mar del Plata can be made using three theoretical considerations – the Trialogue Model of Governance (Turton *et al.*, 2007); the Hydrosocial Contract (Warner & Turton, 2000; Meissner & Turton, 2003); and Water Futures (GRA, 2006) – all of which enable us to make an assessment of what the impact of Mar del Plata was in the past, and will likely be in the future.

Phases of South African Hydropolitical History

South Africa has a complex history, with 200 years of almost continued violence of one sort or another (Davenport, 1977; Welsh, 2000). In order to unravel this complexity, it is useful to apply the concept of a “frontier” as defined by Thompson and Lamar (1981). These scholars note that a frontier is not a line on a map, but rather a territory, or zone of interpretation, between two previously distinct societies. In terms of this logic, one of the societies is usually indigenous in nature, with a longer history of occupation in the territory concerned, whereas the second society is often intrusive. The frontier is said to “open” when the first representatives of the intrusive

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

society arrive; and “close” only when a single political authority establishes legitimate hegemony over the zone in question. It is the latter that is important for our analysis of South African water policy, because this means that the frontier was opened for a long period of time – from 1652 when the first European’s arrived, until 1994 when the majority of the country became enfranchised and the government was thus capable of generating laws that were both hegemonic and legitimate. In order to make some sense of this long period, we can best break it up into three main phases as shown in Figure 1.

Insert Figure 1 here please.

The Main Phases of Water Policy Evolution in South Africa.

The first phase starts with the opening of the frontier in 1652 with the arrival of the Dutch and the creation of a victualling station at the Cape for the purpose of replenishing ships that were *en route* to the East Indies (Welsh, 2000). This can be called the Private Development Phase and lasted until 1875 when a Hydraulic Engineer was formally appointed (Findlater *et al.*, 2007). The significance of this phase is three-fold. Firstly, the frontier opened when the intrusive society (the Dutch and later the British) arrived and started to clash with the indigenous society (the Khoikhoi and San). Secondly, the main driver of water resource development and legislation was private interest, with no centralized political authority of any significance. Finally, there was almost continuous violence underpinning this period, often of a low intensity nature such as sporadic clashes between members of the intrusive society and the indigenous society, but punctuated with distinct periods of high intensity violence (Welsh, 2000). Included in the latter are two major events,

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

known as the Xhosa Wars and the Mfecane, both of intense violence that eventually led to the destruction of the Xhosa and the Zulu people (along with a number of other cultural groupings as far away as present-day Tanzania, Malawi, Zimbabwe and Botswana). The Xhosa Wars lasted for almost a century, starting from the first opening of the frontier along what was known as the Suurveld, by a group of Trekboers (migrant settler farmers) in 1772, and ending only after the Xhosa nation had been destroyed as a cohesive entity, partly by warfare, but also as a result of drought and a specific event known as the Great Cattle Killing Delusion in April 1856 (Meer, 1990; Welsh, 2000; Peires, 2003). Significantly the last of the major Xhosa Wars is known as the War of the Axe (1846), which was a civil war between Xhosa and Xhosa, and is the first example of total war, including the use of torture against non-combatants (Welsh, 2000; Peires, 20). The Mfecane lasted for a shorter period of time, but was more violent and covered a greater geographic area. Started by King Shaka in 1816 after he had forged the Northern Nguni into what is known today as the Zulu people, the word “Mfecane” means to be crushed in total war. This brutal period of history consisted of what is known in contemporary politics as ethnic cleansing, depopulating the hinterland of what we today call South Africa, displacing people as far as Tanzania in a domino-effect of refugee migration (Welsh, 2000). This ended with the final military engagement of the Anglo-Zulu War, known as the Battle of Ulundi, which saw the first use of Gatling machine-guns against spear-wielding warriors, on 4 July 1879 (Welsh, 2000). During this decisive battle the Zulu nation was subjugated under British colonial authority, leading to a temporary peace only, because the discovery of vast deposits of precious minerals was about to change all that.

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

The second phase is all about centralizing authority, but is characterized by an absence of legitimacy, which starts from 1875 when the Hydraulic Engineer was established for the first time, and it ended with the transition to democracy in 1994. We can call this the Evolution of Statehood Phase, which can be broken down into five distinct sub-phases for purposes of analysis (see Figure 1). The significance of this phase is fourfold. Firstly, the frontier remains open, but a centralized authority starts to emerge. Secondly, resources play a major role, most notably the discovery of diamonds in 1867 (which triggered the ending of the Private Development Phase) and the discovery of gold in 1886. Thirdly, a strong link is forged between water and land, with control over both being seen as critical in the quest for personal wealth and economic development. Finally, as with the Private Development Phase, violence was also a constant companion, always in the background but often boiling over into short periods of intense conflict, including the Anglo-Boer War and what is known in contemporary South African language as the Armed Struggle. The Anglo-Boer War was significant because it saw the first use of concentration camps by the British (Krebs, 1992; Evans, 1999; Farwell, 1999; Raath, 1999; Van Rensburg, 1980), in an attempt to subjugate the Boer people, who were fighting a guerrilla war that was frustrating to the Imperialist forces who were intent only on gaining access to, and control over, the richest goldfields in the world (Turton *et al.*, 2006b). The British Concentration Camps, which were racially segregated with 47 for white people of European descent (Afrikaners, now known as the White Tribe of Africa – see Harrison, 1983) and 85 for black people of indigenous African descent (see <http://www.anglo-boer.co.za/> for more details), had a high mortality rate, prompting Miss Emily Hobhouse of the South African Women and Children's Distress Fund, to lobby the British parliament, triggering what became known as the Fawcett

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

Commission of Enquiry (Fawcett, 1901) that resulted in public outrage at the atrocities being perpetrated against non-combatants (Parliamentary Debates, 1901; Pakenham, 1992; Van Reenen, 2000; Lee, 2002; Hasian, 2003; Hobhouse, 1901; 2007). The concentration camp experience embittered the Afrikaner people, and the Scorched Earth policy of Lord Kitchener reduced them to landless and penniless paupers for the next generation (see <http://www.boer.co.za/boerwar/hellkamp.htm> for a contemporary rendition of this angle to the story). The Armed Struggle also had a major impact, the most notable of which was the isolation of South Africa as a pariah state, which is critical in assessing the impact of the Mar del Plata process.

The third phase is about legitimizing government; and specifically about using water resource management as a vehicle for social equity that has been skewed after more than two centuries of political violence and systematic resource capture. This phase begins in 1994 with the enfranchisement of the majority of the South African population, and is the phase currently underway in the post-Mar del Plata era. This can be called the Nation-building Phase, where natural resource redistribution is a major driver, specifically with water as a vehicle for redistribution as noted in the Preamble of the National Water Act (1998).

In brief, this is the background against which South African water policy has evolved over time. The significance of Mar del Plata needs to be teased out, as it is subtle and complex in the South Africa case, simply because the pariah status of the country effectively blocked out international inputs at a time where the all-consuming focus of government was on national security and defence between the Soweto Riots of 1976

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

and the first democratic elections in 1994. In order to achieve this deeper insight, some uniquely South African theoretical concepts can be used as analytical tools.

Some Theoretical Considerations

An assessment of the impact of Mar del Plata on South African water policy is best achieved using three theoretical considerations, as these enable nuances to be isolated and expanded on, thus providing some insight into the changed dynamics over time.

1) The Trialogue Model of Governance

In the context of a rapid transition from a totalitarian form of government (oligarchy) to a representative form of government (democracy) in South Africa, a theoretical model has been developed for use in the policy field. Dubbed the Trialogue Model of Governance (Turton *et al.*, 2007), this is based on three fundamental sets of conditions. Firstly, there are three Actor Clusters relevant to the water policy field. These are Government, which makes authoritative decisions; Society, which is impacted on directly by those decisions and thus has a vested interest in the architecture of decision-making; and Science, which plays a role in informing both the Government and the Society Actor Cluster as they engage around the process of decision-making. Secondly, it is the quality of interfaces between these three Actor Clusters that are independent variables in policy analysis, because they drive final outcomes after a complex set of cause-effect linkages have been engaged by decision-makers on the one hand; and interested and affected parties on the other. Finally, there

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

is a distinction between governance as process and governance as product. The Trialogue Model of Governance is illustrated schematically in Figure 2.

Insert Figure 2 here.

The Trialogue Model of Governance.

During the Private Development Phase, the key driver was profit-making by the Dutch East India Company, with no interference or intervention from a central state authority. Under such circumstances, the Trialogue Model was poorly developed, with the Government Actor Cluster non-existent locally, and where found it was situated in another country far away. Significantly, slaves were used during this time to maximize profits by reducing costs (Welsh, 2000) so there was no human rights culture in existence. Science was also rudimentary and not really applied in a systematic fashion. The Society Actor Cluster was profoundly fragmented, with a distinct cleavage between the intrusive society (European settlers) and the indigenous society. As a result of these factors, there was a high level of social tension and violence, exacerbated by the absence of a central authority with both the capacity and the legitimacy to exert effective control.

During the Evolution of Statehood Phase, the Government Actor Cluster emerged as a dominant feature, but it was bureaucratically structured around the extraction of wealth by the mining industry, rather than accountability to the broader electorate. Research has shown that the mining industry became so powerful in the absence of a legitimate government capable of regulating it, that it effectively became a profit-maximizing entity with three core strategies to achieve this objective – the avoidance of state regulation, the externalization of costs, and the avoidance of liability through

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

the creation of complex legal structures and shareholding arrangements that insulated the owners from litigation (Adler *et al.*, 2006; 2007). Under these conditions the Science Actor Cluster became subservient to both Government and the mining industry. It was during the latter period of this phase that Mar del Plata happened – coinciding with the period of state repression arising from the Soweto Riots in 1976 – but the influence was non-existent, because South Africa was isolated from the international sphere of inter-state political intercourse, because of its inward-looking national security posture. This was reinforced by a dominant mining industry that had a vested interest in retaining the *laissez faire status quo* under which it had become enormously rich and powerful. This was possible because profits from the mines were taxed heavily (Jordaan *et al.*, 1960), and it was this revenue stream that sustained an illegitimate government during the dark years of Apartheid (Turton *et al.*, 2006b).

This all changed during the Nation-building Phase however, which coincided with the completion of the initial process started by Mar Del Plata – the International Water Supply and Sanitation Decade – and more specifically the adoption of Agenda 21 (see Figure 3). The lifting of international sanctions, followed by the normalization of relations and the rapid reintegration of South Africa into the global political arena, meant that all of the elements of policy that had been incrementally developed over time, starting with Mar del Plata in 1977, were incorporated in one fell swoop. Suddenly the Trialogue Model of Governance started to emerge as interfaces between Government, Society and Science were restored, renewed and reinvigorated (Turton *et al.*, 2007). This was possible only because the post-Apartheid political arena was dominated by the driving need to engage in major policy reform in an attempt to right the wrongs of the past. Political liberation revitalized the Society Actor Cluster, and a

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

period of vigorous public participation activities informed the policy-making process (DWAF, 1996; 1997; De Coning & Sherwill, 2004). Liberation was not restricted only to the Society Actor Cluster however, because the capacity of a considerable Science community was suddenly unleashed, as previously taboo subjects were researched for the first time. Examples of this include the suite of groundbreaking reports that are starting to show the extent to which the mining industry externalized costs during the Evolution of Statehood Phase, thereby maximizing their profits in a largely self-regulated environment (Adler *et al.*, 2006; 2007; Coetzee, 1995; Coetzee *et al.*, 2002a; 2002b; 2005; 2006; IWQS, 1999; Kempster *et al.*, 1996; Wade *et al.*, 2002; Winde *et al.*, 2004; Winde, 2005). Significantly, no public domain reports were generated on this topic before 1994 when Science was being silenced by Government during the Evolution of Statehood Phase.

Insert Fig 3 here.

The Co-evolution of Internal and External Water Policy Drivers in South Africa.

From this assessment we can conclude that while the Mar del Plata process evolved outside of the South African policy ambit, once the transition to democracy occurred in 1994, there was a rapid importation of nearly every singly element of water policy that had evolved in the international sphere since 1977.

2) The Hydrosocial Contract

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

The Hydrosocial Contract can be thought of as the “agreement”, whether formal or informal, that exists between the Government Actor Cluster (those making authoritative decisions) and the Society Actor Cluster (those on whom these authoritative decisions impact) (Turton & Ohlsson, 1999; Turton & Meissner, 2002). It is based on work by classic scholars known collectively as the Contract Theorists (Sabine, 1961; Baradat, 1999). There are a number of configurations to this, but the most notable are the authoritarian form in which an oligarchy makes decisions on behalf of an unrepresented majority; and the democratic form in which a legitimate government makes decisions on behalf of an enfranchised electorate. The oligarchic form is given the technical name of a Hobbesian Hydrosocial Contract (Turton & Meissner, 2002), based on the pioneering work by the political philosopher Thomas Hobbes in 1651 in his book the *Leviathan* (MacPherson, 1968; Tuck, 1990; Baradat, 1999). This form is top down in style, and is based on an authoritarian government enforcing decisions from a centralized bureaucracy, onto a disenfranchised and often disaffected population. The democratic form is given the technical name of a Lockean Hydrosocial Contract (Turton & Meissner, 2002), based on the work by the contract theorist John Locke and his famous *Two Treatises of Government* (Locke, 1690; Dunn, 1990; Baradat, 1999). This is a participative form involving a number of built-in feedback loops that allow policy adjustments to be made incrementally, thus taking into account the needs of the enfranchised population.

During the Private Development Phase, there was no state to exert control over people before the British arrived. Initially the Dutch East India Company acted with considerable constraint, because control normally meant force and that was not good for profits (Welsh, 2000). Once the British arrived however, a weak form of

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

Hobbesian Hydrosocial Contract existed. This persisted through the Evolution of Statehood Phase, becoming progressively more authoritarian after Apartheid was methodically implemented as official Government policy in the period after 1948. A rapid transition occurred when the Nation-building Phase began in 1994 and a Lockean Hydrosocial Contract was implemented. This liberated Science in support of the implementation of policy, after Government so vigorously embraced almost all of the principles arising since Mar del Plata in 1977. The result of this was a more balanced Trialogue within the context of a Lockean Hydrosocial Contract, which was highly conducive to the implementation of water resource management principles that had evolved since Mar del Plata.

3) South African Water Futures

Given that South Africa is fundamentally water constrained (Ashton & Turton, 2007; Brown, 1875; Conley, 1996; 1997; Turton *et al.*, 2006a), a lot of effort has been made by the scientific and policy community to understand different management options and their implications. One such approach is that using scenario planning in which fundamental drivers are isolated and treated as independent variables, with various policy and other choices being treated as dependent variables, thereby generating a plausible set of Water Futures. This approach was used by the Global Research Alliance (GRA) in developing a set of three plausible Water Futures for sub-Saharan Africa projected to 2025 (GRA, 2006). All the scenarios predict high levels of population growth and increased demands on water, with government needing to take cognisance of the implications and impacts of exceeding the limits of the resource. These findings are supported by the National Water Resource Strategy (NWRS, 2004)

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

for South Africa that regards population and economic needs as the primary determinants of the future growth of water demand in South Africa. Population growth will be influenced by increasing urbanisation (Varis 2006), HIV/AIDS and socio-economic development (Ashton & Ramasar, 2002). The National Water Resource Strategy believes that most growth is expected within existing urban centres, particularly the major industrial centres. This projection is consistent with recent empirical work being done on megacities in the developing world (Varis, 2006; Varis *et al.*, 2006). It is important to note that in many cases the scenarios produced in the National Water Resource Strategy show demand for water exceeding the likelihood of sustainable supply, placing a high premium on inter-basin transfers across the entire region (Heyns, 2002). Water scarcity is likely to be a continuing reality for South Africa. Society and aquatic ecosystems will be negatively impacted, placing serious demands on Science and Government, driving the emergence of what is now being dubbed “Sustainability Science” that seeks to bring Science into a more supportive role to policy-makers. Within any of these three sets of scenarios, there will be major demands being made on Government and policy choices are likely to be pivotal in mitigating negative impacts, raising the importance of ingenuity as a key determining variable for the future (Homer-Dixon, 1995; 2000).

Scenario 1: Parched Landscape)

The first scenario deals with a *parched landscape* where the influences of climate change results in perturbations between dry and wet seasons. The interaction of a series of droughts and floods cause severe impacts on agricultural production and the rural economy, driving accelerated levels of urbanisation. The scenario is dominated

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

by a loss of indigenous knowledge and learning systems, accompanied by a loss of scientists who have the formal knowledge to understand the complexity of environmental problems. There is also little or no collaboration, so Government is characterised by weak performance, poor service delivery, outsourcing of core functions and increasing levels of corruption. A Hobbesian Hydrosocial Contract could again emerge, stifling the implementation of policy principles that have evolved from the Mar del Plata process by reducing the impact of Science within the Trialogue Model.

Scenario 2: May it Rain on Us)

This scenario paints a brighter picture where sharing of water and responsibilities dominate the political landscape. Cooperation and sharing within and between Government, Science and Society results in the pooling of knowledge, and a good scientific and interpersonal network sees the rise of Centres of Excellence in Water Research. Information and communication technologies play an important role in connecting individuals and organisations. This is only possible with increased government expenditure in ICT infrastructure and networks that enable the deployment of appropriate technology (such as the Water Resource Observation Network – WRON – currently under development at the CSIR). With the emphasis on international cooperation, the Integrated Water Resources Management (IWRM) paradigm is adopted as a model for riparian interaction in transboundary rivers. A balance exists between the need for water for people, the economy and nature. Increases in food production result in lower urbanisation rates as more people choose to live in agricultural landscapes. In this scenario a Lockean Hydrosocial Contact

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

continues to foster a balance in the three interfaces of the Trialogue Model, so the Mar del Plata policy principles are likely to continue to evolve as new ingenuity is mobilized to counter the negative impact of water scarcity.

Scenario 3: Crossroads

This scenario focuses on a point in time where decisions can take one down the path of either Scenario 1 or Scenario 2. A water shortage is present and certain factors influence the changes to either a positive or negative outcome. These factors are: political processes; knowledge, learning and technology; and the ability to manage water resources effectively with minimal conflict – all of which are ingenuity-intensive (Homer-Dixon, 2000).

If the low road is taken then political instability and a lack of transparency will characterise Government and corruption will undermine investor confidence. Knowledge and information will not be shared and cooperation will be weak. The management know-how for water resource management under conditions of complexity and uncertainty will be stressed and poor decisions will be made, manifest as a lack of implementation and poor leadership. Short term gains will be favoured at the expense of longer term investments. Regional frameworks and organisations are likely to collapse with little or no integrity for political institutions. A Hobbesian Hydrosocial Contract will slowly emerge as the interfaces between Science, Government and Society are eroded due to a shortage in research funding and an out-migration of skilled scientists and engineers.

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

If the high road is chosen then good governance and transparency will characterise a system with balance between strong political and technical leadership, unleashing the science, engineering and technology base of the country by mobilizing sufficient ingenuity to overcome the constraints of water to economic growth and social development (Homer-Dixon, 1995). Transboundary collaboration (national and international) will result in effective integrated water resource management. There will be an increased investment in research and development initiatives and the interfaces between Government, Science and Society will be improved. A Lockean Hydrosocial Contract will sustain the Trialogue Model and a viable set of policy options will be selected from an informed cadre of decision-makers. This will allow the cumulative wisdom embedded in the Mar del Plata policy elements to continue to be improved and incrementally implemented to the benefit of Society as a whole.

A Critical Assessment of Mar Del Plata in a South African Context

From this analysis it is evident that Mar del Plata as a process has had a unique set of impacts in the South African context in three distinct ways. Firstly, South African water policy was closed off to any outside stimulus during the Evolution of Statehood Phase, specifically during that critical period from 1976 to 1994 – the period of vigorous internal political struggle starting with the Soweto Riots and ending with the first democratic elections. Secondly, most countries were at leisure to adopt elements of the Mar del Plata process, at a rate and intensity that suited their own internal water resource management needs. In South Africa this was not so, with all of the Mar del Plata policy elements being imported in one fell swoop during the period of fundamental water sector reform in the immediate post-Apartheid period. Finally, this

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

sudden importation of policy has meant that institutional adjustments have not been possible. Major restructuring of key Government agencies has resulted in a short-term loss of implementation capability. This is placing a major burden on the Science institutions, with an acute shortage of ingenuity now starting to undermine the good intentions of policy reform, eroding government legitimacy.

Conclusion

Mar del Plata started a significant process of policy reform that has had a ripple effect throughout the global water sector. Due to the fact that South Africa was inward-looking from 1976 to 1994, it was not an active participant in the Mar del Plata process. This has meant that incremental adjustments to policy have not characterized the South Africa water policy reform process. The sudden importation of major policy changes in one action has overwhelmed Government and resulted in a major challenge to Science as it has tried to support the decision-making process. This is now a classic case of what Homer-Dixon (2000) has called an ingenuity gap, and what Turton & Ohlsson (1999) and Turton (2003) have called a second-order resource scarcity. This suggests that the determining variable for the future implementation of policy arising from the Mar del Plata process, will be ingenuity, rather than the availability of water as a natural resource. The Trialogue Model of Governance has been developed (Turton *et al.*, 2007) in an attempt to sustain the mobilization of ingenuity, into the right format and delivered at the appropriate time, in order to ensure a future that is brighter than the past has been.

Bibliography

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

Adler, R., Funke, N., Findlater, K. & Turton, A.R. 2006. *The Changing Relationship between the Government and the Mining Industry in South Africa: A Critical Assessment of the Far West Rand Dolomitic Water Association and the State Coordinating Technical Committee.* Pretoria: Council for Scientific and Industrial Research (CSIR).

Adler, R., Claassen, M., Godfrey, L. & Turton, A.R. 2007. Water, Mining and Waste: A Historical and Economic Perspective on Conflict Management in South Africa. In *The Economics of Peace and Security Journal*, Vol. 2, No. 2 (2007), Pp 25 – 34.

Ashton, P.J. & Ramasar, V. 2002. Water and HIV/AIDS: Some Strategic Considerations in Southern Africa. In **Turton, A.R. & Henwood, R.** (Eds.) 2002. *Hydropolitics in the Developing World: A Southern African Perspective.* Pp 217-235. Pretoria: African Water Issues Research Unit (AWIRU).

Ashton, P.J. & Turton, A.R. 2007. Water and Security in Sub-Saharan Africa: Emerging Concepts and their Implications for Effective Water Resource Management in the Southern African Region, in **Brauch, Hans Günter; Grin, John; Mesjasz, Czeslaw; Dunay, Pal; Chadha Behera, Navnita; Chourou, Béchir; Oswald Spring, Ursula; Liotta, P.H.;** Kameri-Mbote, Patricia (Eds.): *Globalisation and Environmental Challenges: Reconceptualising Security in the 21st Century.* Hexagon Series on Human and Environmental Security and Peace, Vol. 3. Berlin – Heidelberg – New York – Hong Kong – London – Milan – Paris – Tokyo: Springer-Verlag, Chapter 56.

Baradat, Leon. P. 1999. *Political Ideologies: Their Origin and Impact.* New Jersey: Prentice Hall.

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

Brown, J.C. 1875. *Hydrology of South Africa; or Details of the Former Hydrographic Conditions of the Cape of Good Hope, and causes of its Present Aridity, with Suggestions of Appropriate Remedies for this Aridity.* London: Kirkaldy.

Brown, J.C. 1877. *Water Supply of South Africa and the Facilitation for the Storage of It.* Edinburgh: Oliver Boyd, Tweeddale Court.

Coetzee, H. 1995. Radioactivity and the Leakage of Radioactive Waste Associated with Witwatersrand Gold and Uranium Mining. In **Merkel, B., Hurst, S., Löhnert, E.P. & Struckmeier, W.** (Eds.) *Proceedings of the International Conference and Workshop in Freiberg, Germany, October 1995.* GeoCongress, 1. Köln, Pp 34-39.

Conley, A.H. 1996. A Synoptic View of Water Resources in Southern Africa. In **Solomon, H.** (Ed.) 1996. *Sink or Swim? Water, Resource Security and State Co-operation.* Pp 17-69. IDP Monograph Series.

Conley, A.H. 1997. To be or not to be? South African Irrigation at the Crossroads. In **Kay, M., Franks, T. & Smith, L.** (Eds.) 1997. *Water: Economics, Management and Demand.* Pp 21-28. London: E & FN Spon.

Coetzee, H., Wade, P., Ntsume, G. & Jordaan, W. 2002(a). *Radioactivity Study on Sediments in a Dam in the Wonderfonteinspruit Catchment. DWAF Report.* Pretoria: Department of Water Affairs and Forestry.

Coetzee, H., Wade, P. & Winde, F. 2002(b). Reliance on Existing Wetlands for Pollution Control Around the Witwatersrand Gold/Uranium Mines in South Africa – Are They Sufficient? In **Merkel, B.J., Planer-Friederich, B. & Wolkersdorfer, C.** (Eds.). 2002. *Uranium in the Aquatic Environment.* Berlin: Springer. Pp 59-65.

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Coetzee, H., Venter, J. & Ntsume, G.** 2005. *Contamination of Wetlands by Witwatersrand Gold Mines – Processes and the Economic Potential of Gold in Wetlands.* Council for Geosciences Report No. 2005-0106. Pretoria: Council for Geosciences.
- Coetzee, H., Winde, F. & Wade, P.W.** 2006. *An Assessment of Sources, Pathways, Mechanisms and Risks of Current and Potential Future Pollution of Water and Sediments in Gold-Mining Areas of the Wonderfonteinspruit Catchment.* WRC Report No. 1214/1/06. Pretoria: Water Research Commission.
- Davenport, T.R.H.** 1977. *South Africa: A Modern History.* London: Macmillan Press.
- De Coning, C. & Sherwill, T.** 2004. *An assessment of the water policy process in South Africa (1994 to 2003).* Water Research Commission Report TT232/04. Pretoria: water Research Commission.
- Dunn, J.** 1990. John Locke: The Politics of Trust. In **Redhead, B.** (Ed.). *Plato to NATO: Studies in Political Thought.* London: BBC. Pp 108 – 119.
- DWAF.** 1996. *Discussion Document on Water Law Principles.* Pretoria: Department of Water Affairs and Forestry.
- DWAF.** 1997. *White Paper on Water Policy. South Africa.* Pretoria: Department of Water Affairs and Forestry.
- Evans, M.M.** 1999. *The Boer War: South Africa 1899 – 1902.* Osprey Military. Mechanicsburg: Stackpole Books.
- Farwell, B.** 1999. *The Great Boer War.* London: Wordsworth Editions.
- Fawcett, M.H.** 1901. *The Concentration Camps in South Africa.* London: Westminster Gazette.

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Findlater, K., Funke, N., Adler, R. & Turton, A.R.** 2007. *South Africa's Hydropolitical History: Actors, Actions, Roles and Responsibilities*. Report No. CSIR/NRE/IR/WR/2007/0064/A. Pretoria: Council for Scientific and Industrial Research.
- GRA.** 2006. *Science and Technology-based Water Scenarios for sub-Saharan Africa*. Pretoria: Global Research Alliance (GRA).
- Harrison, D.** 1983. *The White Tribe of Africa (Perspectives on Southern Africa)*. Berkley: University of California Press.
- Hasian, Marouf.** 2003. The “hysterical” Emily Hobhouse and Boer War Concentration Camp controversy. In *Western Journal of Communication*, March 2003. (Available online at http://www.accessmylibrary.com/coms2/summary_0286-23546431_ITM)
- Heyns, P.** 2002. Interbasin Transfer of Water between SADC Countries: A Development Challenge for the Future. In **Turton, A.R. & Henwood, R.** (Eds.) *Hydropolitics in the Developing World: A Southern African Perspective*. Pretoria: African Water Issues Research Unit (AWIRU). Pp157-176.
- Heyns, P.** 2003. Water Resources Management in Southern Africa. In **Nakayama, M.** (Ed.) *International Waters in Southern Africa*. Tokyo: United Nations University (UNU) Press.
- Hobhouse, E.** 1901. *Report of a visit to the camps of women and children in the Cape and Orange River Colonies*. London: Friars Printing Association Ltd.
- Hobhouse, E.** 2007. *The Brunt of War and where it fell*. Portrayer Publishers: London.

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Homer-Dixon, T.** 1995. The Ingenuity Gap: Can Poor Countries Adapt to Resource Scarcity? In *Population and Development*, Vol. 21, No. 3; 587-612.
- Homer-Dixon, T.F.** 2000. *The Ingenuity Gap*. London: Jonathan Cape.
- IWQS.** 1999. *Report on the Radioactivity Monitoring Programme in the Mooi River (Wonderfonteinspruit) Catchment. Report No. N/C22/00/RPQ/2399*. Pretoria: Institute for Water Quality Studies.
- Jordaan, J.M., Enslin, J.F., Kriel, J.P., Havemann, A.R., Kent, L.E. & Cable, W.H.** 1960. *Finale Verslag van die Tussendepartmentele Komitee insake Dolomitiese Mynwater: Verre Wes-Rand, Gerig aan sy Edele die Minister van Waterwese deur die Direkteur van Waterwese*. (In Afrikaans translated as, Final Report of the Interdepartmental Committee on Dolomitic Mine-water: Far West-Rand, Directed at His Excellency the Minister of Water Affairs by the Director of Water Affairs). Pretoria: Department of Water Affairs.
- Kempster, P.L., Van Vliet, H.R., Looser, U., Parker, I., Silberbauer, M.J. & Du Toit, P.** 1996. Overview of Radioactivity in Water Sources: Uranium, Radium and Thorium. Final Report, IWQS-No:N/0000/00/RPQ/0196. Pretoria: Institute for Water Quality Studies.
- Krebs, P.M.** 1992. "The Last of the gentleman's wars": Women in the Boer War concentration camp controversy, in *History Workshop Journal*. No. 33. Pp 38 – 56.
- Lee, E.** 2002. *To the Bitter End: A Photographic History of the Boer War 1899 – 1902*. Pretoria: Protea Book House.
- Locke, J.** 1690. *Two Treatises of Government*. Cambridge: Cambridge Bibliographical Society.
- MacPherson, C.B.** 1968. *Hobbes: Leviathan*. Harmondsworth: Penguin Books Ltd.

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Meer, F.** 1990. *Higher than Hope*. London: Harper Collins.
- Meissner, R. & Turton, A.R.** 2003. The Hydrosocial Contract Theory and the Lesotho Highlands Water Project. In *Water Policy*, Vol. 5, No. 2; 115-126.
- National Water Act.** 1998. *The National Water Act*. Act 36 of 1998. Pretoria: Government Gazette.
- Ninham Shand.** 1956. *Report on the Regional Development of the Water Resources of Basutoland*. Report Commissioned for the Government of Basutoland by the Director of Public Works under Terms of Reference 1290/W30 dated 11 October 1955. Cape Town: Ninham Shand.
- NWRS.** 2004. *National Water Resource Strategy*. Pretoria: Department of Water Affairs and Forestry (DWAF).
<http://www.dwaf.gov.za/Documents/Policies/NWRS/Default.htm>
- Pakenham, Thomas.** 1992. *The Boer War*. Harper Perennial: London.
- Parliamentary Debates.** 1901. *South African War mortality in the camps of detention. 1901, June 17. The Parliamentary Debates, Fourth Series, Second Session of the Twenty-seventh Parliament of the United Kingdom of Great Britain and Ireland, Volume XCV*. London: Wyman and Sons.
- Peires, J.** 2003. *The Dead Will Arise. Nongqawuse and the Great Xhosa Cattle-Killing of 1856-7. History of Political Thought*. Johannesburg: Jonathan Ball Publishers (Pty) Ltd.
- Raath, A.W.G.** 1999. *The British Concentration Camps of the Anglo Boer War 1899-1902: Reports on the Camps*. Bloemfontein: The War Museum. (Available from Thorrold's Africana Books).
- Sabine, George. H.** 1961. *A History of Political Thought*. London: Lowe and Brydone Ltd.

Turton, A.R., Rascher, J., Maree, G. & Findlater, K. 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.

Thompson, L. & Lamar, H. 1981. Comparative Frontier History, in **Lamar, H &**

Thompson, L. (Eds.) *The Frontier in History: North America and Southern Africa Compared.* New Haven & London: Yale University Press.

Tuck, Richard. 1990. Thomas Hobbes: The Sceptical State. In **Redhead, Brian.**

(Ed.). *Plato to NATO: Studies in Political Thought.* London: BBC. Pp 96 – 107.

Turton, A.R. 2003. The Political Aspects of Institutional Development in the Water Sector: South Africa and its International River Basins. Unpublished draft of a D.Phil. Thesis. Department of Political Science. Pretoria: University of Pretoria.

Turton, A.R. & Ohlsson, L. 1999. Water Scarcity and Social Adaptive Capacity:

Towards an Understanding of the Social Dynamics of Managing Water Scarcity in Developing Countries. Paper presented in the Workshop No. 4: Water and Social Stability of the 9th Stockholm Water Symposium "Urban Stability through Integrated Water-Related Management", hosted on 9-12 August by the Stockholm International Water Institute (SIWI) in Sweden. Also available as *MEWREW Occasional Paper No. 18* from Website <http://www.soas.ac.uk/Geography/WaterIssues/OccasionalPapers/home.html>

Turton, A.R. & Meissner, R. 2002. The Hydro-Social Contract and its Manifestation in Society: A South African Case Study. In **Turton, A.R. & Henwood, R.** (Eds.) 2002. *Hydropolitics in the Developing World: A Southern African Perspective.* Pretoria: African Water Issues Research Unit (AWIRU). (Page 37-60).

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Turton, A.R., Meissner, R., Mampane, P.M. & Seremo, O.** 2004. *A Hydropolitical History of South Africa's International River Basins*. Report No. 1220/1/04 to the Water Research Commission. Pretoria: Water Research Commission.
- Turton, A.R., Patrick, M.J. & Julien, F.** 2006(a). Transboundary Water Resources in Southern Africa: Conflict or Cooperation? In *Development*, 49(3), Pp 22-31.
- Turton, A.R., Schultz, C., Buckle, H, Kgomongoe, M., Malungani, T. & Drackner, M.** 2006(b). Gold, Scorched Earth and Water: The Hydropolitics of Johannesburg. In *Water Resources Development*, Vol. 22., No. 2; 313-335.
- Turton, A.R., Hattingh, J., Claassen, M., Roux, D.J. & Ashton, P.J.** 2007. Towards a Model for Ecosystem Governance: An Integrated Water Resource Management Example. In **Turton, A.R., Hattingh, H.J., Maree, G., Roux, D.J., Claassen, M. & Strydom, W.F.** (Eds). 2007. *Governance as a Trialogue: Government – Society – Science in Transition*. Berlin: Springer Verlag. Pp. 1 – 28.
- Van Reenen, R.** 2000. *Emily Hobhouse: Boer War Letters*. Cape Town: Human & Rousseau.
- Van Rensburg, T.** 1980. *Camp Diary of Henrietta E.C. Armstrong: Experiences of a Boer Nurse in the Irene Concentration Camp 6 April – 11 October 1901*. Pretoria: Human Sciences Research Council (HSRC).
- Varis, Olli.** 2006. Megacities, Development and Water, in *International Journal of Water Resources Development*, Vol. 22, No. 2, 199-225, June 2006.
- Varis, Olli., Biswas, Asit, K., Tortajada, Cecilia. & Lundqvist, Jan.** 2006. Megacities and Water Management, in *International Journal of Water Resources Development*, Vol. 22, No. 2, 377-394, June 2006.

- Turton, A.R., Rascher, J., Maree, G. & Findlater, K.** 2007. Back to the Future: A South African Perspective on Mar del Plata and Beyond. CSIR Report No: CSIR/NRE/WR/EXP/2007/0105/A.
- Vorster, M.P.** 1988. The Lesotho Highlands Water Project, in *South African Yearbook of International Law*, Vol. 13; 95-118.
- Wade, P.W., Woodbourne, S., Morris, W.M., Vos, P. & Jarvis, N.W.** 2002. *Tier 1 Risk Assessment of Selected Radionuclides in Sediments of the Mooi River Catchment*. WRC Project No. K5/1095. Pretoria: Water Research Commission.
- Warner, J. & Turton, A.R.** 2000. *Integrated Management Requires an Integrated Society: Towards a New Hydrosocial Contract for the 21st Century*. AWIRU Occasional Paper No. 12. African Water Issues Research Unit, Pretoria University.
- Welsh, Frank.** 2000. *A History of South Africa*. London: Harper Collins Publishers.
- Winde, F.** 2005. Impacts of Gold-mining Activities on Water Availability and Quality in the Wonderfonteinspruit Catchment. In **Coetzee, H.** (Ed.) *An Assessment of Current and Future Water-pollution Risk with Application to the Mooirivierloop (Wonderfonteinspruit)*. WRC Report No. K5/1214. Pp 14-38. Pretoria: Water Research Commission.
- Winde, F. & Van Der Walt, I.J.** 2004. The Significance of Groundwater-Stream Interactions and Fluctuating Stream Chemistry on Waterborne Uranium Contamination of Streams – A Case Study from a Gold Mining Site in South Africa. In *Journal of Hydrology*, 287. Pp 178-196.

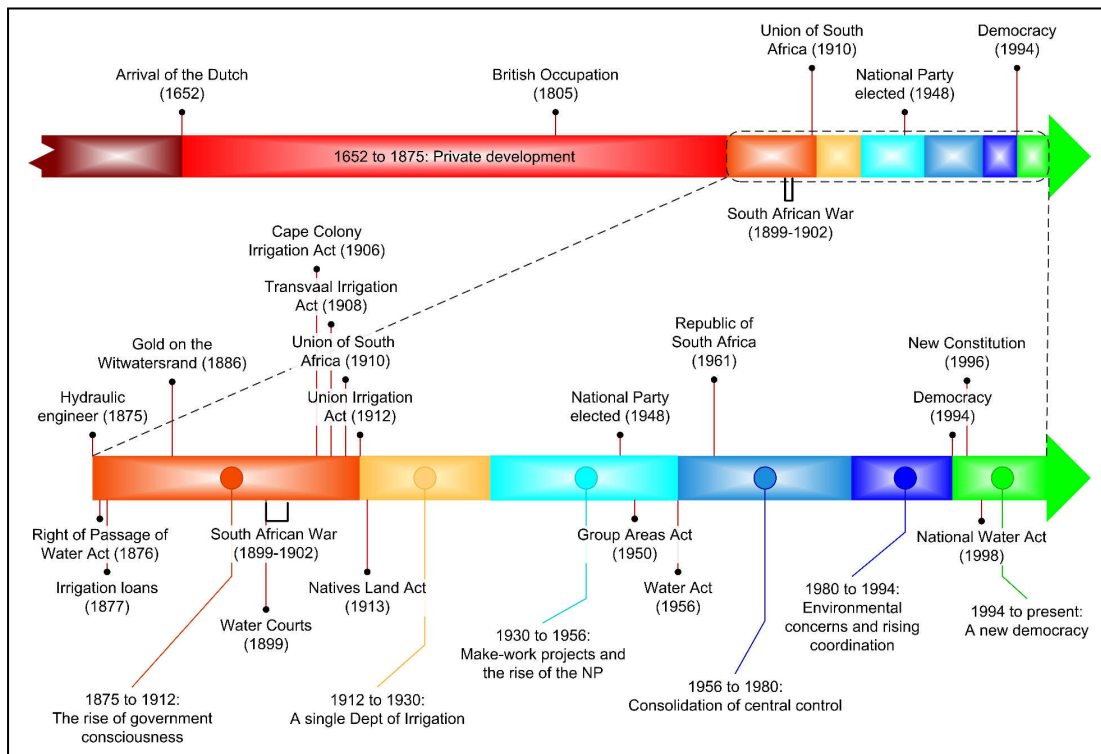


Figure 1: The Main Phases of Water Policy Evolution in South Africa.

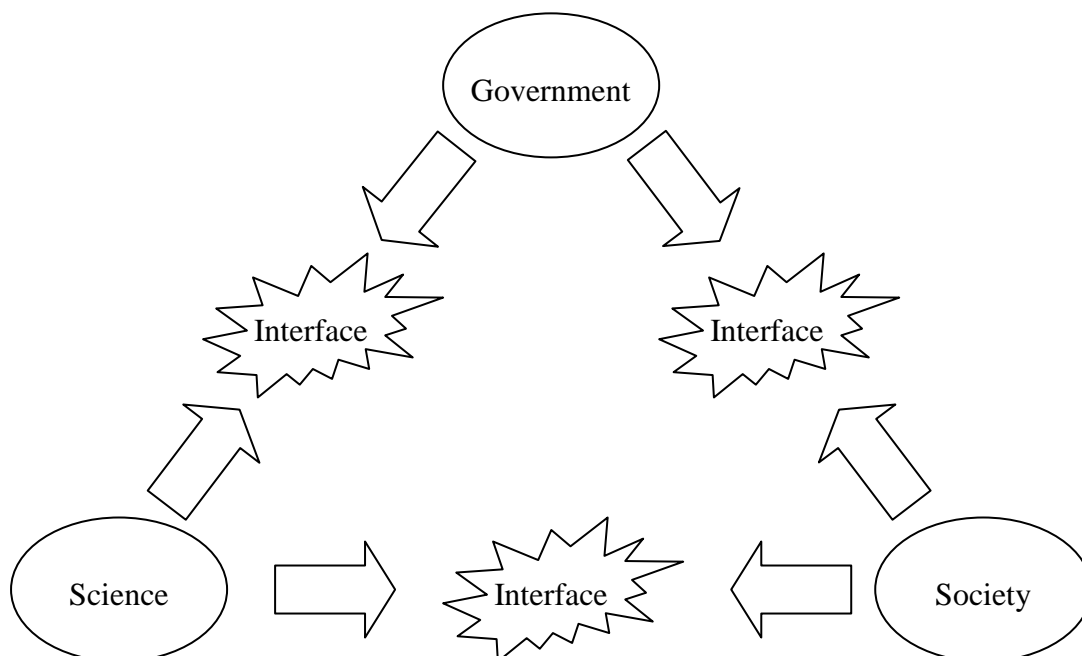


Figure 2: The Trialogue Model.

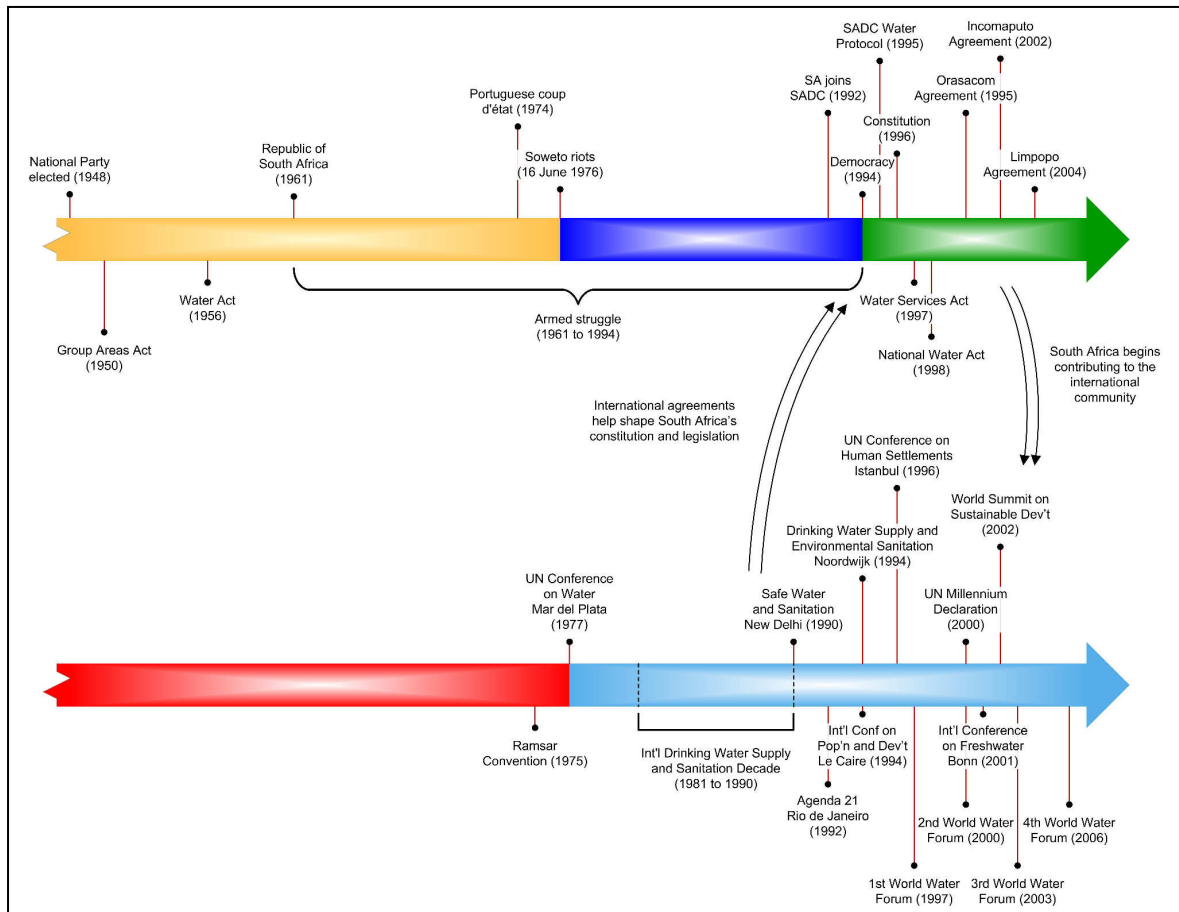


Figure 3: The Co-evolution of Internal and External Water Policy Drivers in South Africa.