The political aspects of institutional developments in the water sector: South Africa and its international river basins

by

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ANC: African National Congress
AU: African Union
BSE: Bovine Spongiform Encephalopathy
CCB: Civil Cooperation Bureau
CIA: Central Intelligence Agency
CMA: Catchment Management Agency
CODESA: Convention for a Democratic South Africa
CONSAS: Constellation of Southern African States
CSCT: Classic Security Complex Theory
CSD: Commission for Sustainable Development
DIWCC: Demographically-Induced Water Consumption Curve
DMI: Department of Military Intelligence
DNA: Mozambican National Department of Water Affairs
DOP: Declaration of Principles
DRC: Democratic Republic of Congo
DWAF: Department of Water Affairs and Forestry
ESCOM: Electricity Supply Commission
FAO: Food and Agriculture Organization
GCC: Global Climate Coalition
GCI: Green Cross International
GDP: Gross Domestic Product
GGP: Gross Geographic Product
GNP: Gross National Product
GWP: Global Water Partnership
HMEWP: Harvard Middle East Water Project
IBT: Inter-basin Transfer
ICJ: International Court of Justice
ICWE: International Conference on Water and Environment
IDRC: International Development Research Centre
IFP: Inkatha Freedom Party
IFR: Instream Flow Requirement
ILA: International Law Association
ILC: International Law Commission
IWMI: International Water Management Institute

IWRM: Integrated Water Resource Management
JIA: Joint Irrigation Authority
JIBS: Joint Incomati Basin Study
JPCC: Joint Permanent Commission for Cooperation
JPTC: Joint Permanent Technical Committee (South Africa and Botswana)
JPTC: Joint Permanent Technical Commission (South Africa and Botswana)
JPTC: Joint Permanent Technical Commission (South Africa and Lesotho)
JPTWC: Joint Permanent Technical Water Commission
JTC: Joint Technical Committee
JULBS: Joint Upper Limpopo Basin Study
JWC: Joint Water Commission
KOBWA: Komati Basin Water Authority
LBPTC: Limpopo Basin Permanent Technical Committee
LHDA: Lesotho Highlands Development Authority
LHWC: Lesotho Highlands Water Commission
LHWP: Lesotho Highlands Water Project
MAD: Mutually Assured Destruction
MAP: Mean Annual Precipitation
MAR: Mean Annual Runoff
MENA: Middle East North Africa
MPLA: Popular Movement for the Liberation of Angola
NATO: North Atlantic Treaty Organization
NEPAD: New Partnership for Africa's Development
NGO: Non-governmental Organization
NIS: National Intelligence Service
NP: National Party
NSC: North-South Carrier
OAU: Organization of African Unity
OECD: Organization for Economic Cooperation and Development
OKACOM: Permanent Okavango River Basin Water Commission
OPEC: Organization of Petroleum Exporting Countries
ORASECOM: Orange-Senqu River Commission
ORP: Orange River Project
ORRS: Orange River Replanning Study
PAC: Pan Africanist Congress
PLO: Palestine Liberation Organization

PPP: Purchasing Power Parity
PWA: Palestinian Water Authority
PWC: Permanent Water Commission
RBA: River Basin Authority
RBC: River Basin Commission
RBO: River Basin Organization
RENAMO: *Resistência Nacional Moçambicana* (Mozambican National Resistance Movement)
RWB: Rand Water Board
SADCC: Southern African Development Coordination Conference
SADC: Southern African Development Community
SADC-HYCOS: Southern African Development Community Hydrological Cycle Observing System
SADC-WSCU: Southern African Development Community Water Sector Coordination Unit
SADF: South African Defence Force
SARCCUS: Southern African Regional Commission for the Conservation and Utilization of the Soil
SASOL: *Suid Afrikaanse Steenkool en Olie Maatskappy* (South African Coal and Oil Company)
SCT: Security Complex Theory
SEI: Stockholm Environment Institute
SIDA: Swedish International Development Agency
SIRWA: Structurally-Induced Relative Water Abundance
SIRWS: Structurally-Induced Relative Water Scarcity
SOAS: School of Oriental and African Studies
SSC: State Security Council
SWAPO: South West Africa Peoples Organization
SWE: Sectoral Water Efficiency
TCTA: Trans Caledon Tunnel Authority
TPTC: Tripartite Permanent Technical Committee
TVA: Tennessee Valley Authority
UDI: Unilateral Declaration of Independence
UN: United Nations
UNCED: United Nations Conference on Environment and Development
UNDP: United Nations Development Programme

UNEP: United Nations Environment Programme
UNESCO: United Nations Educational Scientific and Cultural Organization
UNFCCC: United Nations Framework Convention on Climate Change
UPTW: Universities Partnership for Transboundary Waters
USA: United States of America
US: United States (of America)
USSR: Union of Soviet Socialist Republics
VNJIS: Vioolsdrift and Noordoewer Joint Irrigation Scheme
WBS: Water Barrier Scale
WCD: World Commission on Dams
WDM: Water Demand Management
WHO: World Health Organization
WMA: Water Management Area
WMO: World Meteorological Organization
WP: Water Poverty
WSI: Water Scarcity Index
WSSD: World Summit on Sustainable Development
WWC: World Water Council
WWF: World Water Forum
WWV: World Water Vision

Chapter 1

THE PROBLEM AND ITS SETTING

1.1 Background to the Problem

Water resources are relatively finite, with a given volume of freshwater in circulation at any one moment in time through the global hydrological cycle. Natural fluctuations in this hydrological cycle cause temporary disturbances to the distribution of this relatively finite volume of water, with extreme events such as droughts and floods impacting differently on various regions of the world. This fluctuation is more pronounced in some parts of the world than in others, with Southern Africa in general being one of the areas that is characterized by extreme variability (Rabie & Day, 1992:647). In fact, it is this variability that forms the basic driving force behind the ecosystems evolving under such conditions. In some instances humans have chosen to inhabit areas that are less well endowed with water. This means that they have had to evolve a set of coping strategies over time, inadvertently becoming what Descartes referred to in 1637 as "masters and owners of nature" (Anscombe & Geach, 1954:46). In rapidly developing countries that are located in areas of aridity, this often gives rise to the hydraulic mission of the state, which has as its central aim, the mobilization of water resources and the guarantee of a high security of supply (Reisner, 1993:112-114). In some parts of the world, water insecurity, combined with a strong hydraulic mission, has resulted in the securitization of water resource management in international river basins. This study focuses specifically on the political aspects of institutional developments in the water sector as it pertains to South Africa's international river basins, and is about such processes. Southern Africa as a geopolitical region has certain unique characteristics, making this study particularly appropriate to the field of international relations:

- The region has a rapid population growth, with many populations doubling (and more) in a thirty-eight year period (Turton & Warner, 2002:58). The water wars literature considers this to be a fundamental driver of conflict.

- The Southern African region is characterized by a large number of international river basins, with no less than fifteen of them traversing the geographic area of the Southern African Development Community (SADC). Three of these are large enough to link more than 8 different states (Nile, Zaire and Zambezi) (Pallett *et*

al., 1997:71; UNEP, 2002:27). In fact, continental Africa is connected through these shared river basins to such an extent that South Africa (in the extreme South) is linked to Egypt (in the extreme North), through the Limpopo, Zambezi, Zaire and Nile river basins, all of which meet on common watersheds in the sovereign territories of various SADC member states. This arises from the colonial experience where rivers (rather than watersheds) were used to demarcate future state borders.

- A recent study of hydropolitical conflict has shown that of the seventeen international river basins in the world that can be considered to be "at risk", 8 of these are in Africa (Incomati, Kunene, Lake Chad, Limpopo, Okavango, Orange, Senegal & Zambezi), with 6 being in the SADC region (Incomati, Kunene, Limpopo, Okavango, Orange & Zambezi) of which 3 are rivers to which South Africa is a riparian (Incomati, Limpopo & Orange) (Wolf *et al.,* 2003:47).

- While the SADC region is in transition from a period of conflict to a period of potential peace, stability and economic development, the results from the study by Wolf *et al* (2003) suggest that particular attention must be given to the management of international rivers if peace is to become an enduring condition.

- The most economically developed states in SADC - Zimbabwe, Botswana, Namibia and South Africa - are also among the driest in the region, generally characterized by relatively low levels of precipitation, high levels of evaporation and an inherently high degree of climatic variability. This is a natural driver of potential conflict if states compete for strategic access to water.

- These states - Zimbabwe, Botswana, Namibia and South Africa - are all riparians to the international river basins that are found in South Africa, with 3 of these known to be "at risk" (Incomati, Limpopo & Orange) (Wolf *et al.,* 2003:47).

- As a result of these crosscutting linkages, it is argued that a hydropolitical complex is starting to emerge in Southern Africa, given the strategic importance that water plays in the economic development and social stability of these states. As a result of this process, the ramifications of this concept are investigated in the study by using the various international river basins that are found in South Africa as a source of empirical case study data.

The central issue that is under scrutiny relates to the political aspects of institutional developments in the water sector as it pertains to the four South African international river basins. At the very heart of this issue is the conflict potential that is inherent in basin closure, with the Middle East North Africa (MENA) region providing many examples of this. It is from this set of examples that the literature on water wars has emerged (Bullock & Darwish, 1993; de Villiers, 1999; Falkenmark, 1989a; Falkenmark, 1994; Gleick, 1992:23; Gleick, 1993a:96; Gleick, 1994; Starr, 1991). This form of literature, which tends to dominate most hydropolitical studies, provides a skewed representation of reality by extrapolating future water scarcity projections from historic trends in a near-linear fashion; and then concluding that the likely outcome will be conflict because the actual resource-base is relatively finite (Turton, 2002a:13). This teleological argument is deconstructed in the study and examined in greater detail. The doomsday scenarios that this body of water war literature develops, suggests that conflicts are more-or-less inevitable, as population-induced water scarcity outstrips available supply. This raises the crucial issue of managing scarce water resources in international river basins, particularly those facing closure and thereby becoming a possible limiting factor to the economic growth potential of the state. This is a key component of the study. In short, this study seeks to generate a scientific report that accurately reflects the South African experience, where peaceful coexistence seems possible rather than the debilitating outcomes that the water war pundits once confidently predicted. The major focal points that form the logical structure of this study are encapsulated in the following questions:

- If water scarcity has an inherently high conflict potential, what can (or should) be done to mitigate that conflict?

- What are the fundamental hydropolitical dynamics at work in shared international river basins facing closure?

- How can one understand the political dynamics of securitization, desecuritization, regime creation and institutional development, in the context of the international river basins in South Africa?

1.2 The Research Question

The fundamental research question relates to the political aspects of institutional developments in the water sector as applicable to South Africa's international river

basins. At the heart of this lies the linkage between basin closure and possible future political dynamics between riparian states. Consequently the fundamental research question asks how the potential zero-sum outcome of basin closure can be transformed into a plus-sum outcome in South Africa's international river basins?

1.2.1 The Sub-problems

In order to provide an adequate answer to the fundamental research question, 5 related sub-problems have been isolated. These seek to determine the following:

(a) *First sub-problem:* What are the possible consequences of basin closure in an international river basin?

(b) *Second sub-problem:* What are the possible consequences of increasing levels of insecurity within a closed (or closing) international river basin?

(c) *Third sub-problem:* What are the alternatives to the securitization of water resource management that exist in an international river basin facing closure?

(d) *Fourth sub-problem:* What are the critical elements of regime creation that can be considered as a management model in the various South African international river basins?

(e) *Fifth sub-problem:* What is the necessary condition for the establishment of a regime in a closed (or closing) international river basin?

1.2.2 The Hypotheses

In order to attack the fundamental research question, the following hypotheses have been developed with respect to each sub-problem:

(a) *First hypothesis:* If basin closure is left unchecked then it can give rise to an increasing level of insecurity in different riparian states within the given international river basin, which can translate into a fundamental national security concern when the economic growth potential of the state depends on secure access to that water.

(b) *Second hypothesis:* If increasing levels of insecurity arise from basin closure in an international river basin, then one of the possible outcomes is a process of securitization, whereby a hydropolitical security complex emerges. The process of securitization is generally based on a zero-sum principle, so consequently this sparks off an escalation in the levels of insecurity for downstream users of the water, thereby exacerbating the conflict potential that already exists between the riparian states. Broader threat perceptions therefore play a role in either attenuating, or accelerating this process, because they are formed through historic experience and influence decision-making into the future.

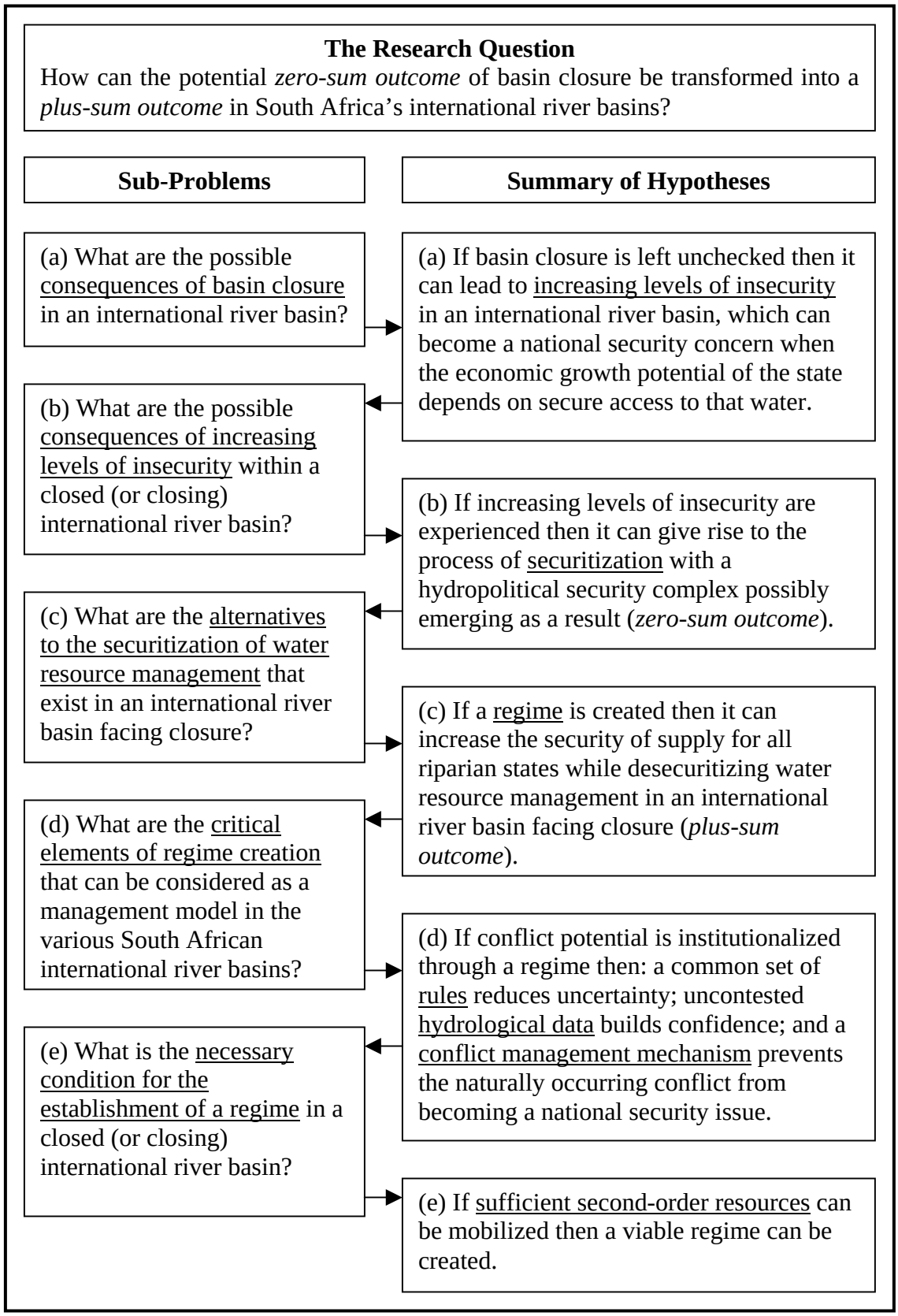
(c) *Third hypothesis:* If regimes are based on a plus-sum principle, then regime creation can become an effective mechanism for increasing the security of supply, while actually desecuritizing the management of water resources in an international river basin that is facing closure.

(d) *Fourth hypothesis:* If the conflict potential is institutionalized, and a confidence building mechanism is established between potentially hostile riparian states by means of a regime, then three critical elements are needed in order for this to be effective. These are: (i) a common set of rules and procedures that are mutually acceptable to all of the affected role-players, because this fosters the plus-sum principle by reducing uncertainty, and creates the normative foundation for future cooperation; (ii) uncontested hydrological data because this builds confidence and creates the capacity to manage problems effectively; (iii) a conflict management mechanism needs to be developed in order to address the naturally existing conflict potential that is inherent in basin closure, because it prevents the conflict from escalating into an issue of possible national security concern.

(e) *Fifth hypothesis:* If sufficient second-order resources can be mobilized by the various riparian states, then a viable regime can be created within the respective water resource management structures in a closing international river basin.

The logical framework for this study is created by the need to answer the fundamental research question. This is developed through the systematic interrogation of the various sub-problems and the subsequent validation of their respective hypotheses, as illustrated in Figure 1, thereby creating a chain of cause-effect linkages that enable the highly nuanced nature of the fundamental research question to be answered.

Figure 1. The Sub-problems and Hypotheses.



1.3 The Delimitation of the Study

The study focuses on the regimes that exist within the international river basins that are found in South Africa as defined in the *United Nations Register of International Rivers* (United Nations, 1978: 6 & 9), as refined by Wolf *et al* (1999:395-399) and presented in UNEP (2002:27, 32, 36, 37 & 43). These basins are the:

- Orange River that is shared between Lesotho, South Africa, Botswana and Namibia. This basin is categorized by Wolf *et al* (2003:47) as being "at risk".
- Limpopo River that is shared between South Africa, Botswana, Zimbabwe and Mozambique. This basin is categorized by Wolf *et al* (2003:47) as being "at risk".
- Incomati River that is shared between South Africa, Swaziland and Mozambique. This basin is categorized by Wolf *et al* (2003:47) as being "at risk".
- Maputo River that is shared between South Africa, Swaziland and Mozambique.

Within the context of these four international river basins, the study focuses on regimes that have already been created to which South Africa is a party; are in the process of being created with South Africa as a party; or regional cooperative activities that involve, or that could result in, the creation of new regimes to which South Africa is a party at some time in the future.

1.4 The Definition of Concepts

Hydropolitics as a discipline is relatively new and generally lacks conceptual rigour. It is also being developed by scholars from a variety of disciplines, each with their own set of core concepts and perceptions of reality, resulting in the fact that many hydropolitical concepts are used interchangeably with a high degree of ambiguity. For the purpose of this study, the following definitions apply:

Abstraction. The abstraction of water is the withdrawal of water from a river, lake, reservoir or aquifer for reticulation elsewhere (common usage).

Actor. An actor, in the context of security complex theory (SCT), is a person, agency or institution that seeks to either securitize or desecuritize specific issue areas (adapted from Buzan *et al.,* 1998: 26, 32-42).

Adaptive capacity. Adaptive capacity is the amount of social ingenuity and technical ingenuity available within a given state (or institutional manifestation of the state) with which to solve critical problems such as water deficit (Ohlsson, 1998:9; Ohlsson, 1999:163).

Allocative efficiency. Allocative efficiency is the efficiency of the productive activity involving water that would yield the best return per unit of water used (Turton & Ohlsson, 1999). There are two broad categories of allocative efficiency, namely inter-sectoral and intra-sectoral allocative efficiency. These are based on the relative degree of sectoral water efficiency that is inherent to specific economic sectors.

Aridity. Aridity is the climatic description of an area that expresses the relationship between precipitation and potential evapotranspiration, in which the naturally occurring precipitation is lower than the potential evapotranspiration demand (adapted from Arnestrand & Hanson, 1993:8, 14 & 20).

Basin closure. A river basin with no utilizable outflow of water is a closed basin (Seckler, 1996). A river basin is said to be facing closure when all of the available water has been allocated to some productive activity and there is no more water left to be allocated (Svendsen *et al.*, 2001:184). This differs from the hydrological definition of the term where a closed basin is a basin that has an outflow into internal seas, lakes or other sinks (Wester *et al.*, 2001:161).

Coping strategy. A coping strategy is a policy response to a relative scarcity of a first-order resource that represents an empirically verifiable indicator of a second-order resource being applied (own definition).

Crisis. A crisis is an unstable or crucial time (or state of affairs) that has been brought about by environmental stress, which requires extraordinary measures to counteract (Alcamo, 2000:164). This can become a trigger event driving future securitization processes.

Demand-induced scarcity. Demand-induced scarcity is a form of environmental scarcity that is caused by a growing population with rising demands for greater prosperity (Ohlsson, 1998:4).

Demand-sided management approach. A demand-sided management approach is that style of water management adopted by a state, or structures within that state, that is deliberately aimed at curbing or controlling the demand for water. These methods include tariff structures, penalties, efficiency of delivery and preferential allocation to specific economic sectors that display a higher sectoral water efficiency (own definition).

Desecuritization. Desecuritization is the shifting of specific (strategically important) issues out of emergency mode and into the formal bargaining processes of the political sphere (Buzan *et al.,* 1998:4). It is the opposite of securitization.

Drought. Drought is a naturally occurring, true meteorological event involving irregular precipitation, which causes spells of exceptionally dry years (Arnestrand & Hanson, 1993:18).

Ecological marginalization. Ecological marginalization arises from resource capture where weaker social groupings are economically marginalized as the direct result of pressure that is placed on their environmental support-base (Homer-Dixon, 1994:10; Homer-Dixon, 1996:360; Percival & Homer-Dixon, 1998:287; Ohlsson, 1999:38).

End-use efficiency. End-use efficiency refers to an element of a coping strategy that seeks to improve the efficiency of water delivery to its point of use, at the level of the production unit, such as the improvement in irrigation technology. This is fundamentally different to allocative efficiency, but a coping strategy using allocative efficiency logic may include end-use efficiency elements as well (own definition).

Endogenous water. Endogenous water is that portion of the overall water resources of a country, or region, consisting of precipitation that falls within the geographic area of that country, or region, which does not evaporate, and which feeds aquifers and surface water drainage basins (Falkenmark & Lindh, 1993:82).

Endoreic. An endoreic river system is one that terminates inland, rather than into the sea (exoreic) due to changes in geological, climatic or environmental factors over time (adapted from Seeley *et al.*, 2003).

Environmental security. Environmental security concerns the maintenance of the local and planetary biosphere as the essential support system on which all human enterprises depend (Buzan, 1991:19-20; Buzan *et al*., 1998:76).

Environmental stress. Environmental stress refers to the intensity of an environmental change that involves an undesirable departure from long-term or normal conditions, is usually of short duration, is directly or indirectly influenced by society, and is not only the result of natural geological factors (Alcamo, 2000:164).

Exogenous water. Exogenous water is that portion of the overall water resources of a country or region, consisting of water originating from outside of the geographic area of a country, or region, and flowing into that country or region through underground aquifers or surface water drainage basins (Falkenmark & Lindh, 1993:82).

First-order resource. A first-order resource is a natural resource like water and land, which can be either scarce or abundantly available (adapted from Ohlsson, 1999).

First-order scarcity. A first-order scarcity is the scarcity of a first-order resource such as water, which can be either short-term such as that experienced during a drought, or long-term such as a water deficit that occurs at a basin level because of over abstraction (own definition).

Functional actors. Functional actors are actors who affect the dynamics of a sector, without being the referent object or the actor calling for security on behalf of a referent object, such as an environmental non-governmental organization (NGO) (Porter & Brown, 1991; Buzan *et al.*, 1998:36). This is an actor that significantly influences decisions in the field of security such as NGOs and third-party actors (Buzan *et al.*, 1998:79).

Gross geographic product. The gross geographic product (GGP) is a measure of the total flow of goods and services produced within a given geographical area of any specific national economy over a specified period of time (own definition adapted from common usage in the South African water sector).

Groundwater. Groundwater is any water, whether running in a defined channel or not, that is found underground (O'Keeffe *et al.*, 1992:304).

Heterogeneous security complex. This approach to SCT assumes that the regional logic can integrate different types of actors that interact across two or more sectors such as states, nations, firms and confederations interacting across the political, economic and societal sectors (Buzan *et al.,* 1998:16).

Homogenous security complex. This approach to SCT retains the classical assumption that security complexes are concentrated within specific sectors and are therefore composed of specific forms of interaction among similar types of units such as power rivalries among states (Buzan *et al.,* 1998:16).

Hydraulic mission. The hydraulic mission of a state is the official policy that seeks to mobilize water and improve the security of supply as a foundation for social and economic development (adapted from Reisner, 1993:112-114; Turton & Meissner, 2002:38).

Hydropolitical security complex. A hydropolitical security complex is a special form of regional security complex that exists when those states that are part "owners" and technically "users" of shared rivers start to consider the rivers to be a major national security issue (Schulz, 1995:97).

Ingenuity. Ingenuity consists of the ideas that can be applied to solve practical technical and social problems, such as those arising from water scarcity and water deficit (Homer-Dixon, 2000:21). There are two distinct forms of ingenuity - social ingenuity and technical ingenuity - that are both manifestations of adaptive capacity or a second-order resource (Ohlsson, 1998:9; Ohlsson, 1999:163).

Ingenuity gap. An ingenuity gap exists when there is a shortfall between the rapidly rising need for ingenuity and the inadequate supply of ingenuity within a given social entity (Homer-Dixon, 2000:1). An ingenuity gap is the manifestation of a second-order resource scarcity in society.

Institution. An institution is a set of formal and informal rules, including their enforcement arrangements (Schmoller, 1900 in Furubotn & Richter, 2000:6). Institutions differ from regimes in the aspect of enforceability.

Instream flow requirement. The instream flow requirement (IFR) is the minimum flow of water that has been reserved, as part of an overall water management plan, for the maintenance of the ecological integrity and biological functioning of that river system (King & Louw, 1996).

Inter-basin transfer. An inter-basin transfer (IBT) constitutes the transfer of water from one geographically distinct river catchment, or basin to another, or from one river reach to another (Davies *et al*., 1993:161).

International drainage basin. An international drainage basin is an area within the territories of two or more states in which all the streams of flowing surface water, both natural and artificial, drain a common watershed, terminating in a common outlet or outlets, either to the sea, a lake or to some inland place, from which there is no apparent outlet to the sea (Maluwa, 1992:22). Article II of the *Helsinki Rules* defines an international drainage basin as being a geographical area extending over two or more states determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus (Akweenda, 2002:101).

International river basin. An international river basin is the area that contributes hydrologically (including both surface and groundwater) to a stream when any of the perennial tributaries crosses the political boundaries of two or more states (Wolf *et al.*, 1999:389).

International subsystem. An international subsystem consists of units within the international system that can be distinguished from the entire system by the particular nature or intensity of their interactions with, or interdependence on, each other (Buzan *et al.*, 1998:6).

Inter-sectoral allocative efficiency. Inter-sectoral allocative efficiency is achieved by allocating water away from an economic sector or activity that has a low sectoral water efficiency, usually agriculture, to another economic sector that has a higher sectoral water efficiency, usually industry (Turton & Ohlsson, 1999). It is a necessary condition for managing basin closure effectively and is typically used as a policy option in the latter stages of basin closure.

Intra-sectoral allocative efficiency. Intra-sectoral allocative efficiency is achieved by allocating water within a given economic sector, usually at the level of the production unit (farm or factory), away from a productive activity with a low level of efficiency, to an alternative productive activity that has a higher level of efficiency (Turton & Ohlsson, 1999). It is a necessary but insufficient condition for managing basin closure effectively and is typically used as a policy option in the early stages of basin closure.

Knowledge. Knowledge, in the context of regimes, is the sum of technical information and theories about that information which commands sufficient consensus at a given time among interested actors to serve as a guide to public policy designed to achieve some social goal (Haas, 1980 in Krasner, 1983:19). In a hydropolitical context, knowledge refers to the uncontested data that forms the basis of any given regime (own definition).

Lead actor. A lead actor has a strong commitment to the effective international action on an environmental issue in specific cases (Porter & Brown, 1991 in Buzan *et al.*, 1998:77). These lead actors may be states but are not always so, sometimes manifesting in the form of global or environmental epistemic communities (Haas, 1992 in Buzan *et al.*, 1998:77).

Lower order riparian. A low order riparian position is one close to the estuary of the river. In hydropolitical terms this is a vulnerable position as both the water quality and quantity is determined by upstream higher order riparians over which the downstream state has little or no control (Turton, 1998:7).

Micro-region. A micro-region refers to the subunit level within the boundaries of a state or unit (Buzan *et al.*, 1998:19).

Minus-sum outcome. A minus-sum outcome is one that results in a lose-lose solution (common usage).

Norms. Norms, when used in the context of regimes, are standards of behavior defined in terms of rights and obligations (Krasner, 1983:2).

Overlay. Overlay refers to that condition when great power interests transcend mere penetration, and come to dominate a region so heavily that the local pattern of security relations virtually ceases to operate, such as occurred with the European colonization of Africa (adapted from Buzan *et al.*, 1998:12; Buzan & Wæver, forthcoming).

Plus-sum outcome. A plus-sum outcome is a non-zero-sum outcome that results in a win-win solution (common usage).

Policy contingency. Policy contingency is that situation found in regimes in which actors carefully consider the opportunity costs of disrupting a relationship before practicing self-help (Haas, 1983:27).

Principles. Principles, when used in the context of regimes, are beliefs of fact, causation and rectitude (Krasner, 1983:2).

Referent objects. Referent objects are things that are seen to be existentially threatened and that have a legitimate claim to survival such as state sovereignty, national identity, the environment and the economic stability of a state (Buzan *et al.*, 1998:36).

Reflexivity. Reflexivity is said to exist when a given social grouping becomes concerned with the undesirable and unintended consequences of their actions (Giddens, 1990), such as environmental degradation caused by industrialization, and actively seek to limit those consequences by developing coherent strategies, policies, regimes and institutions to effect this desire (Turton, 2000a).

Regimes. Regimes are a set of implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations (Krasner, 1982:186; Krasner, 1983:2). Regimes differ from institutions because of their lack of enforceability, but regimes are a form of institution.

Region. A region is a spatially coherent territory composed of two or more states (Buzan *et al.*, 1998:18).

Regional security complex. A regional security complex is a pattern of rivalry, balance of power and alliance configuration among the main powers within a given region, including the impacts of penetration by external powers (Buzan & Wæver, forthcoming).

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 leading to the ecological marginalization of weaker groups of people (Homer-

Dixon 1994:10; Percival & Homer-Dixon, 1998:286; Ohlsson, 1998:4; Ohlsson, 1999:38, Bryant & Bailey, 1997:39). Resource capture can result in structural scarcity and can become an independent variable in hydropolitics when it starts to define the actions of major role-players (Lichtenthäler & Turton, 1999; Turton & Meissner, 2002:38).

Revenge effects. The revenge effects are the ironic and unintended consequences of mechanical, chemical, biological and medical ingenuity (Tenner, 1996:5-6 cited by Homer-Dixon, 2000:178).

Riparian state. According to customary international law, states that are territorially concerned with an international drainage basin are referred to as riparian (Akweenda, 2002:101).

Riparian position. The riparian position refers to the physical location of a state within a given international river basin and hence the position that it adopts within this basin vis-à-vis other riparian states. A high order riparian position is one closer to the source of the river. In hydropolitical terms this is a strong position to be in as theoretically it implies that the state concerned can divert the water and withhold supplies from a lower order state. A low order riparian position is one close to the estuary of the river. In hydropolitical terms this is a vulnerable position as both the water quality and quantity is determined by upstream higher order riparian states over which the downstream state has little or no control (Turton, 1998:7).

Rules. Rules, when used in the context of regimes, are specific prescriptions or proscriptions for action (Krasner, 1983:2).

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 (Turton, 2000a; Turton & Meissner, 2002:39). It represents what may be said, who may say it and how it is to be interpreted, thereby leading to the creation of a dominant belief system or paradigm that is sometimes referred to as a hydraulic mission (Reisner, 1993:112-114; Swyngedouw, 1999a; Swyngedouw, 1999b) or the phase of heroic engineering (Platt, 1999). The sanctioned discourse can best be understood as being a form of hydropolitical ideology, particularly when it links up with other ideologies such as nationalism or economic modernization (adapted from Waterbury, 1979:116).

Second-order resource. A second-order resource is a social resource (Ohlsson, 1999). It is the ability of societies, administrative organizations and managers responsible for dealing with natural resource scarcities, to find the appropriate tools (also known as a coping strategy) for dealing with the social consequences of a first-order resource scarcity (Ohlsson, 1999:161). It is consequently a specific form of scarcity, namely the scarcity of the necessary adaptive capacity including skills, data and institutions (see definition of "knowledge") by which basin closure can be managed in a sustainable and relatively conflict-free manner. Some literature refers to this as social capital (Putnam, 1993:167).

Second-order scarcity. A scarcity of the necessary social resources and adaptive capacity, including social ingenuity and technical ingenuity, can be regarded as being a second-order scarcity (Homer-Dixon, 1994:16; Ohlsson, 1999:161).

Sector. A sector is defined in terms of specific security relationships that exist therein. These include: the military sector which is about relationships of forceful coercion; the political sector which is about relationships of authority; the economic sector which is about relationships of trade and production; the societal sector which is about relationships of collective identity; and the environmental sector which is about relationships between human activity and the planetary biosphere (Buzan *et al.*, 1998:7).

Sectoral water efficiency. The sectoral water efficiency is the ratio of water consumed within a given economic sector (expressed as a percentage of total national water consumption) in relation to the contribution of the same economic sector to overall GDP (expressed as a percentage of total GDP). (Sectoral water efficiency = sectoral water consumption as % : sectoral contribution to GDP as %) (Turton, 1998:7).

Securitization. Securitization is constituted by the intersubjective establishment of an existential threat (within any sector) with a saliency sufficient to have substantial political effects (Buzan *et al.*, 1998:25). It is the opposite of desecuritization.

Securitizing actors. Securitizing actors are actors who securitize issues by declaring something, usually a referent object, to be existentially threatened (Buzan *et al.*, 1998:36).

Security complex. A security complex is a set of units whose major processes of securitization, desecuritization, or both are so interlinked that their security problems cannot reasonably be analyzed or resolved apart from one another (Buzan *et al.*, 1998:201; Buzan & Wæver, forthcoming).

Social capital. Social capital refers to the features of social organization such as the trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions (Putnam, 1993:167). Social capital is a form of second-order resource in society, which is needed to negotiate and maintain regimes and is mobilized through social ingenuity.

Social ingenuity. Social ingenuity is needed to create institutions and organizations that buffer people from the effects of natural resource scarcity (first-order scarcity) and provide the right incentives for technological entrepreneurs to develop appropriate solutions (Homer-Dixon, 1994:16-17). Social ingenuity is therefore a precursor to technical ingenuity (Homer-Dixon, 2000:22). It is this type of social capital (or social adaptive capacity) that Ohlsson (1998; 1999) calls a second-order resource, and it is often manifest in an institution.

State susceptibility. State susceptibility is the ability of a state to resist and recover from crisis (Alcamo, 2000:164).

Structurally-induced relative water abundance. Structurally-induced relative water abundance (SIRWA) is a condition that exists when a combination of a low level of second-order resource scarcity and a high level of first-order resource scarcity occur simultaneously in a given society (Turton & Ohlsson, 1999; Turton, 2000a; Turton & Warner, 2002:55). Under such conditions the problem of water scarcity can be effectively managed as the result of sufficient adaptive capacity (or social ingenuity) being available in society.

Structurally-induced relative water scarcity. Structurally-induced relative water scarcity (SIRWS) is a condition that exists when a combination of a high level of second-order resource scarcity and a high level of first-order resource abundance occur simultaneously in a given society (Turton & Warner, 2002:54). Under such conditions the potential water abundance cannot be harnessed for economic growth and development because of the

lack of adaptive capacity (Ohlsson, 1999) or ingenuity (Homer-Dixon, 2000) in society at that specific moment in historic time.

Structural scarcity. Structural scarcity is a form of environmental scarcity that is caused by social inequality or unequal access to the resource, usually as the result of the actions by decision-making elites who monopolize key gate-keeping positions in water resource management institutions (Ohlsson, 1998:4). This is often linked to resource capture that can become an independent variable in hydropolitics when it becomes a driver of political dynamics.

Structure. Structure, when used in the context of regimes, is primarily the distribution of capability among states to act autonomously, measured in terms of the "good exchanged" in a specific regime (Haas, 1983:28).

Sub-region. A sub-region is a part of a region whether it involves more than one state (but fewer than all of the states in the region) or some transnational composition (some mix of states, parts of states or both) (Buzan *et al.*, 1998:19).

Supply-sided management approach. A supply-sided management approach is that style of water management adopted by a state, or structures within that state, that is deliberately aimed at responding to increasing water scarcity by attempts to improve the overall security of supply, usually through engineering-type solutions such as IBTs, pipelines, impoundments etc., without any corresponding attempt to reduce the overall demand on an ongoing basis (adapted from common usage).

Support actor. A support actor is an actor (or actors) that is (are) located away from the danger spots of ecological concern, which by virtue of the issue-specific nature of their central concern, have not yet accumulated into an overall power constellation (Porter & Brown, 1991 in Buzan *et al*., 1998:78). As such, the central issue on which they focus has not yet become a conscious ordering device for society as a whole, in the way that military, economic and identity interests have done (Buzan *et al.*, 1998:79).

Sustainability. A development is considered to be sustainable when the current setting of socioeconomic activities can continue indefinitely, or when current use of a natural resource does not impair possibilities for comparable future uses (Bannink, 1996:34).

Technical ingenuity. Technical ingenuity is needed to develop a coping strategy such as a new set of agricultural and forestry techniques in order to compensate for environmental scarcity (Homer-Dixon, 1994:16). Technical ingenuity is dependent on social ingenuity however, so if the latter is absent then the former is unlikely to develop (Homer-Dixon, 2000:22).

Threshold effect. The threshold effect occurs when a non-linear outcome arises from an incrementally small change in a resource-use pattern, at some point suddenly becoming irreversible (Ohlsson, 1999:62). An example is the drawdown of a water table in an aquifer that suddenly results in irreversible salinization. Under these conditions environmental scarcity becomes an independent variable in its own right. As such the concepts of the threshold effect and nonlinearity are central to any understanding of sustainability in the field of hydropolitics.

Trigger event. A trigger event is a manifestation of the threshold effect, and is a specific event beyond which a non-linear response can escalate a sub-national issue into an international issue, in a relatively short space of time (own definition).

Units. Units are actors composed of various sub-groups, organizations, communities, and many individuals that are sufficiently cohesive to be differentiated from others and to have standing at the higher levels of analysis such as states, nations and transnational firms (Buzan *et al.*, 1998:6).

Veto actor. A veto actor is an actor, usually a state but not always so, that embodies both political and security moves, but which fails to give a useful insight into the actions of security actors within a given sector (Porter & Brown, 1991 in Buzan *et al*., 1998:77).

Virtual water. Virtual water is the volume of water needed to produce a commodity or service (Allan, 1996a). Allan (1996b) notes that it typically takes around 1 000 tonnes of water to grow one tonne of grain. This represents the virtual water value of grain (Turton *et al*., 2000a:12). Virtual water is also present in hydroelectric power and constitutes the volume of water needed to produce a given unit of hydroelectricity (Turton, 2000b:144).

Water barrier. The water barrier is a conceptual unit that measures water stress, and is defined as 2 000 people / flow unit of water ($10^6 m^3 yr^{-1}$), which is the maximum number

of people that an advanced society is able to support and manage with currently available technologies (Falkenmark, 1990:181).

Water deficit. Water deficit refers to the prevailing condition that exists when the demand for, and use of freshwater within a given social entity, exceeds the level of sustainable supply (Turton & Ohlsson, 1999; Turton, 2002b; Turton & Meissner, 2002:39).

Water demand management. Water demand management (WDM) refers to the set of coping strategies that water resource managers develop, which are designed specifically to reduce the demand for water, as opposed to the augmentation of supply. In this respect, WDM can yield a volume of water that can be used to delay the planned future augmentation of supply through a conventional supply-sided management approach. The effectiveness of a WDM strategy is an indicator of second-order resources within society (Turton & Ohlsson, 1999; Turton *et al.*, 2000b; Turton, 2002b).

Water poverty. Water poverty (WP) is a condition that exists when a combination of a high level of second-order resource scarcity and a high level of first-order resource scarcity occur simultaneously in a given society (Turton & Warner, 2002:55). Under such conditions the problem of water deficit cannot be effectively managed due to a scarcity of adaptive capacity and technical ingenuity, so a spiral of underdevelopment starts to occur from which it becomes increasingly difficult to escape (Allan & Karshenas, 1996:127).

Water regime. A water regime exists when the affected states observe a set of rules designed to reduce the conflict potential, caused by the use, pollution or division of a given water resource; or the reduction of the standing costs; and the observance over time of these rules (Haftendorn, 2000:65).

Water resource management. Water resource management refers to all of the decision-making activities and associated institutional arrangements needed for the abstraction of bulk and untreated water found in river basins or in groundwater aquifers, and its subsequent delivery in raw form to the place where it is in demand (own definition adapted from common usage in the South African water sector).

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; Turton & Meissner, 2002:39).

Zero-sum outcome. A zero-sum outcome is a fixed-sum outcome that results in a win-lose solution (common usage).

1.5 The Importance of the Study

The discipline of international relations is relatively new, having emerged after the First World War, and is still regarded by many as being an inter-discipline rather than an individual discipline (Hollis & Smith, 1990:16). As such it generally lacks concrete models that are capable of adequate explanation and prediction. According to Homer-Dixon (2000:292), political science as a discipline has produced very little useful new knowledge capable of guiding scholars into an uncertain future with some degree of confidence. This reflects a positivist bias that is questioned in the social sciences, and is not only a problem in international relations or political science, for as Homer-Dixon (2000:293) notes:

> "The social sciences plod along behind [the natural sciences], unable to generate fast enough *the knowledge we need to build new institutions* for our new world. The renowned management expert Peter Drucker sums up the problem this way: 'Effective government has never been needed more than in this highly competitive and fast-changing world of ours, in which the dangers created by pollution of the physical environment are matched only by the dangers of world-wide armaments pollution. *And we do not have even the beginnings of the political theory or the political institutions needed for effective government* in the knowledge-based society of organizations'" (Drucker, 1994 in Homer-Dixon, 2000:293) (emphasis added).

In contrast to the natural sciences, where the wall of knowledge is built brick by brick, political science, like anthropology and sociology, is not very accumulative (Homer-Dixon, 2000:293). To this end, Allan (2000:190-191; 2001) notes by way of example, that one hydropolitical concept which has been converged upon by different disciplines is that which some describe as "emblematic events" (Hajer, 1996), another as "windows of opportunity" (Kingdon, 1984), and yet others as "security politics" (Buzan *et al.*, 1998), whereas in reality they seem to be unacquainted with each others' work on what is essentially the same thing. Systematic multidisciplinarity (or interdisciplinarity) it seems, is largely absent in studies of the environment in general, and hydropolitics in particular.

Theory development is particularly absent in the literature on hydropolitics, for as one commentator concludes:

> "As a specific sector is concerned - namely the water discourse - it is obvious that international relations theory as such, or any explicit attempt to construct such a theory, is singularly absent. What is at issue, are theoretical pointers in the water discourse and their relevance to international relations theory (Du Plessis, 2000:12)… [I]t is advocated that participants in the water discourse should exhibit a greater sensitivity towards and explicitly involve themselves more in theorizing, irrespective of the level of theory (i.e. contending theoretical positions, partial theory, or hypotheses-testing theory) and the order of theory (i.e. theorizing about theory, theory about the international relations context of water, or ideas and thoughts on how to manage the water issue) (Du Plessis, 2000:28-29)."

This is particularly true for the field of water resource management in international river basins facing closure, where the existing literature tends to focus on river basins with a high conflict potential, suggesting that water resource management and conflict are an inevitable outcome of basin closure, but generally without offering much by way of theory to describe, explain or predict outcomes (Turton, 2002a:13). This approach to the study of hydropolitics is not very useful in a geographic setting such as Southern Africa, where there is limited historic experience of open water-related conflict at the international level, at least for the time being. Under such conditions, there is very little development of useful theory (Wolf, 2003:1), which is important because as Basson (1999) notes, a long-term crisis is looming in South Africa's international river basins, necessitating the development of durable institutions. This study therefore seeks to contribute to the development of knowledge that is practically useful in two distinct ways. Firstly, to assist water resource managers as they negotiate international agreements and develop suitable transnational institutions with which to manage the shared water resources in any given international river basin, and in particular those basins located in South Africa. Secondly, to contribute to the international relations, political science and hydropolitics literature by integrating existing concepts and theories, and by developing a deeper understanding of linkages that may be found within the water sector.

This is achieved by focusing on four distinct areas of existing international relations, political science or hydropolitics theory. The first is the process of securitization and desecuritization that is found in the body of literature that is known as SCT (Buzan *et al.*,

1998; Buzan & Wæver, forthcoming). This body of theory has some relevance to water resource management in international river basins that are facing closure, where access to water becomes a strategic concern given the social and economic ramifications of this condition. More specifically there is a natural securitization dynamic at work in some international river basins facing closure, which may have unintended consequences if left unmanaged.

The second is the process of institutionalization (as opposed to institutional development as this occurs in the formal sense of the definition of an "institution") that can be found in the literature on regime theory. While the majority of the existing regime theory literature is focussed on issues other than water resource management, there is a lot that can be applied to hydropolitics in international river basins. One aspect that is of particular relevance is the role of regimes in building confidence between riparian states and thereby reducing insecurity in the face of increasing water deficit. The role of crisis is particularly relevant in this regard, with the avoidance of crisis becoming an important security concern, potentially leading to regime creation (Alcamo, 2000:164).

The third is a relatively new and as yet poorly developed literature that is capable of explaining why regime creation fails, or conversely what is needed as a pre-condition for the successful negotiation and continued maintenance of a regime in an international river basin. In this regard the concept of second-order scarcity is used. This is based on the research being done by Ohlsson (1998; 1999) in the field of what he calls social adaptive capacity; work being done by Homer-Dixon (1994; 1995; 1996; 2000) in the field of what he calls ingenuity; and work being done by Putnam (1993) and Ostrom (1990; 1994; 2000) in the field of what they call social capital. The usefulness of the concept of a second-order resource as a generic label for adaptive capacity, ingenuity and social capital is examined, and where relevant, integrated into security complex theory and regime theory.

Finally, these three separate strands of theory are integrated into a coherent model that can hopefully explain and predict some of the political dynamics of institutional development in South Africa's international river basins. This is part of an ongoing attempt to develop the newly emerging field of hydropolitics as a distinct field of international relations and political science theory (Turton, 2002a; Wolf, 2003:1).

1.6 Research Design and Methodology

This research is based on descriptive analysis methodology (Good & Scates, 1954:277) and is presented in terms of the structured model proposed by Leedy (1993). In essence there are three distinct components to this research.

- The securitization (and possible desecuritization) aspects of water resource management in the respective international river basins within the study area.

- The development of regimes in the respective international river basins within the study area.

- The process of institutionalization in the respective international river basins within the study area.

Firstly, the methodology and concepts that deal specifically with the securitization (and desecuritization) component to this research is guided by Buzan *et al* (1998) and Buzan & Wæver (forthcoming) with respect to the gathering and interpretation of data. As such, the levels of analysis that are used are presented in Figure 5, where items in parenthesis indicate how the respective level is used in this study. It has been shown that scale is an important aspect of hydropolitics (Turton, 2002a:17). Consequently the level of analysis that is indicated in Figure 5 ranges from: the individual (in the context of SCT this is a specific decision-maker that has a political impact); through the respective national bureaucracies (in the context of SCT these are the various Departments of Water Affairs with an interest in a specific international river basin); the riparian state as a sovereign entity and therefore a specific role-player in any interstate dialogue with respect to international river basins (in the context of SCT these are important - but not exclusive - units of analysis); to the international subsystem (in the context of SCT this is SADC as a regional political grouping); finally up to the international system level (in the context of SCT this is the global inter-state political system). These have been adapted from Buzan *et al* (1998:5-6). In this regard there is a natural congruence in the epistemological requirements of both SCT and hydropolitics, rendering this approach highly suited to the purpose for which it has been selected.

In keeping with Buzan *et al* (1998), the instruments of measurement that are used are presented in Table 8. These relate specifically to the levels of analysis introduced in the previous paragraph and define what instrument of measurement is used for each level of analysis in the context of SCT. In this regard: the regional level is SADC with the unit of measurement being the SADC Water Protocol when applied to hydropolitics; the sub-regional level is the international river basin with the unit of measurement being a river basin organization (RBO), or a regime that is specific to any given international river basin(s); while the micro-region is a catchment within any given international river basin, or component of that international river basin that falls under the sovereign control of a riparian state and is managed by a bureaucratic structure such as a catchment management agency (CMA) (or equivalent) at the sub-national level. These have been adapted from Buzan *et al* (1998:18-19), with the key defining parameter being state sovereignty expressed as a function of scale.

The types of units that are involved in security complex analysis, along with details of the way that they are used in this study, are presented in Table 7. Consistent with the logic used in the above two paragraphs, the units of analysis are scale-specific, meaning that a specific level of analysis focuses exclusively on a specific unit of analysis. As used in this study: the referent object is the perception of economic and social stability by the political elite of a specific riparian state with a strategic interest in a given international river basin; the securitizing actor is either an affected riparian state with a strategic interest in a given international river basin, or a lead actor that is not a riparian state; and a functional actor is a non-affected riparian state in a given international river basin. These have been adapted from Buzan *et al* (1998:36) for the purpose of this study.

The sectors that are examined within the emergent hydropolitical security complex are presented in Table 9. It must be noted that given the central role of water as a life sustaining resource, water deficit impacts on the economic and environmental sectors, even being linked with the political and military sectors under certain conditions, so these sectors are also analyzed where relevant.

The key questions that are used to analyze the securitization processes of water resource management in the South African case study are as follows:

(a) Is there evidence of the securitization of water resource management in any of the international river basins in South Africa? (i) If so, who are the main securitizing actors

and what are their long-term objectives? (ii) If so, what is the referent object that is being existentially threatened; by whom is it being threatened; and what is the nature of that threat? (iii) Who are the functional actors, support actors and veto actors; what are their long-term objectives; and what is the nature of the relationship between them?

(b) Is there evidence that water scarcity can have an impact on the economic growth potential and social stability in any of the riparian states found in the international river basins in the study area? (i) If so, what is the nature of that impact and how is this threat perception being articulated?

(c) Is there any evidence of the desecuritization of water resource management in the study area? (i) If so, who are the functional actors, and what are their long-term objectives? (ii) Is there any evidence that regimes are acting as potential desecuritizing agents?

(d) Is there any evidence that a hydropolitical security complex is emerging, or is likely to emerge, within the study area in the near future? (i) If so, what are the main drivers of this process? (ii) If so, can the emergent hydropolitical security complex be regarded as being a component of a broader regional security complex?

Secondly, the methodology and concepts that deal specifically with the creation of regimes are guided by the framework proposed by Gupta *et al* (1993) with respect to the collection and interpretation of data. This methodology requires that a parallel study of each regime involving South Africa be made, which is done within the context of the four separate international river basins - Orange, Limpopo, Incomati and Maputo - using the following three questions as a guide:

(a) How do actors define the situation?

(b) What changes do the role-players make in their definitions of the situation and their preference structure?

(c) What vision do governments and all of the other relevant actors have?

In support of this, and in an attempt to flesh out more detail of the political dynamics of regime creation in South Africa's international river basins, the four key questions that

are posed by Haas (1983:28-29) for the study of regimes are used as a general guide for the analysis of the data from the South African case study. These are as follows:

(a) How do regimes originate and change? The outcomes that a given regime is to produce are a good to be managed in order to provide a benefit to all of the members. The empirical question about the origin of regimes, and in particular about the dynamics of their evolution and change over time, makes use of several key terms including interest, common interest, costs, benefits, and collective goods (Haas, 1983:28).

(b) What structural principles explain regimes? This is an analytical question that seeks to pinpoint non-perceptual features of international relations that constrain actor behavior. Power and hierarchy are core concerns in defining structure, which is primarily the distribution of capability among states to act autonomously, measured according to the "good exchanged" in a specific regime. Because regimes arise when the respective states realize that a defined distribution of "the goods" cannot occur by way of self-help or autonomous action, interdependence is recognized as a regrettable condition (Haas, 1983:28). The key concepts that guide this question are therefore hegemony and coalition (Haas, 1983:29).

(c) How do regimes work? Goods are delivered through agreements that are negotiated. As a result of this, bargaining becomes a key process that needs to be focussed on specifically (Haas, 1983:29). Consequently the concept of second-order resources becomes crucial (Ohlsson, 1999; Ohlsson & Turton, 1999; Allan, 2000:322-325), because without such resources being distributed among all of the relevant actors, regimes are unlikely to be negotiated in the first place; and where negotiated, are unlikely to be either durable or resilient.

(d) What purposes do regimes serve? The teleology of regimes is the core normative question that concerns all schools of thought, because it focuses on the question of order. Thus while various schools of thought would agree on the first three questions, they are likely to differ sharply on the purpose that a given regime is to serve (Haas, 1983:29).

Thirdly, the methodology and concepts that deal specifically with the process of institutionalization are guided by the following key questions:

(a) Is there hydrological data that has been institutionalized?

(b) Is this data uncontested and therefore seen as a legitimate basis for future agreements between the respective riparian states?

(c) Are there agreed-upon rules and procedures? If so, have they been formalized, or do they exist only as a loose arrangement?

(d) Is there a dedicated conflict resolution mechanism as part of the overall institutional arrangement? If so, has it been used and what has been the outcome?

(e) Has there been a re-definition of the core management problem away from perceiving water scarcity in an absolute sense, to perceiving water scarcity in a relative sense? To what extent has water demand management become one of the institutional objectives? Is there any evidence of inter-sectoral allocative efficiency being a policy objective?

(f) Is there a mechanism to sanction a non-compliant actor? If so, has it been used and what has been the outcome?

(g) Has there been any redistribution of water resources between the various riparian states directly as the result of the regime? If so what has been the outcome?

(h) Is there any evidence of regime resilience?

(i) Is there any evidence of regime robustness?

(j) Is there any evidence of regime effectiveness?

(k) Is there any evidence of the growth and development of institutional knowledge or institutional learning as the result of the regime? If so, to what extent has this become a confidence-building and unifying factor?

(l) Can the existing water management arrangements within the international river basin in question be called a regime?

(m) What is the likelihood that the regime will evolve into an institution over time?

1.7 Structure of the Study

Due to the fact that hydropolitics is a relatively new discipline, there is a general paucity of theory. To this end Wolf (2003:1) refers to "the almost total lack of theory about the *problematique* of international water", going on to say that "with the exceptions of [Tony] Allan and his colleagues at the London School of Oriental and African Studies (SOAS) ... [Allan and] Turton ... continued to be a lone voice in the theoretical wilderness for years ... [with] the dialogue [being] almost devoid of any theoretical underpinnings". Allan (2000:191-191) supports this by referring to the evolution of almost identical concepts in different academic disciplines, all of which are relevant to hydropolitics, but none of which have been integrated or harmonized in any useful way. This poses a distinct challenge for the study, because in essence it means that theory first needs to be developed in a systematic way before it can be applied to the actual South African case study. For this reason a clear distinction needs to be drawn between the *theoretical* and the *practical* sections of this study, the layout of which has posed a distinct challenge to the author. This challenge has arisen because it is impossible to have a purely theoretical section, followed by a separate practical section in which that theory is applied to a specific case study, as would be the normal procedure for an endeavour of this nature. In order to resolve this problem, the theoretical elements needed are synthesized through a review of available literature from a variety of sources, with one distinct aspect of this being a case study of the Jordan River basin. That case study has been necessary in order to develop the theory needed to evaluate the consequences of basin closure (first sub-problem) and the resultant increasing levels of insecurity arising from basin closure (second sub-problem).

In order to meet the 2 stated objectives of this study - firstly to assist with the negotiation of agreements in international river basins by generating useable knowledge, and secondly to contribute to the literature by integrating concepts and existing theories as appropriate to hydropolitics (irrespective of how incomplete those theories might be or from which discipline they are originally sourced) - it is therefore structured around 4 logical sections each laid out as follows:

The first section deals with the *preliminaries* relating to the development of the analytical framework based on: the background to the problem; the fundamental research question including the sub-problems and hypotheses; the delimitation of the study; the definition of key concepts; the importance of the study and the research design and methodology;

all of which are presented in Chapter 1. This provides the specific analytical framework that structures the rest of the study, particularly with respect to the final evaluation in the fourth section.

The second section is focused specifically on the *selected theoretical dimensions* needed to analyze the South African case study. Clustered around Chapter 2 and Chapter 3, this section reviews the available literature on the five sub-problems and in essence presents the theory that is needed for the subsequent practical application of the study to the South African case as delimited in Chapter 1. This theory is developed as necessary where it is scant. A key component of this is a case study of the Jordan River basin that is presented in Chapter 2, which deals exclusively with the dynamics of the securitization of water resource management as applicable to the first and second sub-problems. This chapter synthesizes the theory needed in the third section from a variety of sources, but mostly as it applies to the Jordan River basin, which was selected because it is the best possible example of basin closure and the consequences of increasing levels of insecurity. The Jordan River basin is thus an extreme example of a worst-case scenario. Chapter 3 deals exclusively with the dynamics of the desecuritization of water resource management as applicable to the third, fourth and fifth sub-problems. Given the fact that the literature on this aspect is more of a mainstream nature, there is no need for a specific case study from which to distil the necessary theory, but where relevant the Jordan River basin is used. This literature is sourced from a range of disciplines wider than the normal scope of international relations, so this chapter also synthesizes the theory needed for the third section in an appropriate fashion.

The third section consists of the *practical applications of the theory* that were presented (and where necessary developed) in the previous section. Chapter 4 is a descriptive overview and analysis of the South African case study. This is followed in Chapter 5 by the analysis of key hydropolitical processes, which are evident in the South African case study, by means of the specific analytical framework that was developed in the first section.

The fourth section consists of an *evaluation of the South African case study* in terms of the analytical framework that was presented in Chapter 1. Contained in Chapter 6, this seeks as a minimum to evaluate the veracity of the hypotheses, and where appropriate (and empirically possible) to validate them. This chapter also contains the conclusion and a comprehensive bibliography, thereby rounding off the study in a formal sense.

Chapter 2

THE SECURITIZATION OF WATER RESOURCE MANAGEMENT: A LITERATURE REVIEW

2.1 Introduction

Barry Buzan, a leading scholar in broadening the meaning of security within the field of international relations, notes that the state has three component parts. These are the "idea" of the state, the "physical base" of the state and the "institutional expression" of the state (Buzan, 1991:65). Significantly, the physical base of the state is also the area in which states share the most similarities in relation to security (Buzan, 1991:91). The threats to the physical base of the state are common in all types of state, due to the similarity in the physical objects involved (Buzan, 1991:91), so such threats form the logical focus of either inter-state cooperation or conflict. Water is within the scope of Buzan's thinking as it is an important natural resource on which stable economic development is based, forming a fundamental component of the "physical base" of the state, particularly under conditions of aridity.

Ohlsson (1995a:4) contends that globally the point has been reached where water scarcity is increasingly being perceived as an *imminent threat* to development. Other commentators take this further by calling water scarcity the *ultimate limit* to development, prosperity, health and even national security (Falkenmark *et al.*, 1990; Myers, 1989; Myers, 1993). While it is predicted that conflict surrounding water will intensify, so too will conflict resolution. Regime creation is a manifestation of this tendency. To this end Ohlsson (1995a:26) notes that there are five important aspects to consider with regard to the escalating water crisis. Firstly, it will be local in effect, but regional in its political and security-related implications. Secondly, it will affect those countries in arid and semi-arid areas with a high population growth rate. Thirdly, it will be a multifaceted crisis in the Third World, affecting human health, food insecurity, lost export incomes and the development of the industrial base of the economy. Fourthly, the transition from a situation of earlier relative water sufficiency to rising and conflicting demands on a now increasingly scarce resource will mean great social changes, placing enormous strain on the capability of states to manage the resultant internal conflicts. Finally, there will be no way to accurately predict the exact form that these conflicts will take in future.

This is a compelling argument to improve the basis of international relations, political science and hydropolitics theory. In fact most SADC member states comply largely with these aspects, specifically regarding two critical components - aridity is the norm for many states, and almost everywhere there is a rapidly growing population base. Specifically however, South Africa is approaching the point where water deficit is the dominant condition, with basin closure being a stark reality. This is also happening in three riparian states that share various international river basins with South Africa - Botswana, Namibia and Zimbabwe - all of which also happen to be the most economically developed states in the SADC region. The significance of this in strategic terms becomes apparent when contextualized within the recent global study, which indicated that of the seventeen international river basins that are considered to be "at risk", one third of the global total occur in the SADC region (Incomati, Kunene, Limpopo, Okavango, Orange & Zambezi), with the 4 most economically developed states in that region (South Africa, Botswana, Namibia and Zimbabwe) being riparian to all of these rivers in one form or another (Wolf *et al.*, 2003:47).

In the hydropolitical context of South Africa, two important issues converge within the scope of this study. Firstly, the country is reaching the limits of its readily available supply, with all surface water projected to be have been mobilized within the next decade (Ashton, 2000a; Ashton & Haasbroek, 2002:190). Secondly, approximately two thirds of the South African surface area falls within international river basins (Gleick, 1989: 337). There is thus a situation in South Africa where water resource managers are being confronted with increasing levels of water deficit, and the majority of the surface water that is available is found in international river basins, being shared with countries that are also facing similar water scarcity problems. Some of these river basins are facing closure, so competition for water is becoming high, particularly during times of drought. The key question that needs to be answered is what are the consequences of basin closure? Flowing from that, the next question that needs to be answered is to what extent does the securitization of water resource management arise from these consequences? These two questions consequently form the focal point of this chapter.

Significantly, South Africa has been involved with the creation of a number of regimes within various international river basins as will subsequently be discussed. There is thus a wealth of information available from within South Africa with which to develop a deeper understanding of the process of the securitization of water resource management, and the

role of regime creation as a potential element of desecuritization, as an alternative approach to the water war school of thought.

2.2 The Consequences of Basin Closure: The Jordan River as a Classic Case

"The Middle East as a region ran out of water in the 1970s" (Allan, 2000:5).

The hydropolitical literature is littered with ill-conceived terminology that is based on the notion of a region "running out of water". What is needed for the purposes of this study is to gain greater conceptual clarity on what "running out of water" means in factual terms, because this is the starting point of the train of logic that has been used to order this study. The first aspect that needs to be clarified is what is actually meant when commentators refer to a country or region as "running out of water"? Once this has been established, the second element of the core argument that needs to be established is to what extent "running out of water" is linked to the growth in perceptions of insecurity in different riparian states? The best example of this is the Jordan River basin, which is significant because it is a closed river basin, and it lies at the heart of the region's strategic security sub-system - the Palestine/Israel conflict and peace process (Buzan *et al.*, 1998 cited by Allan, 2000:60-61). This gives an insight into the hydropolitical dynamics of securitization that will be applied to the South African case study.

2.2.1 Basin Closure as a Concept

The concept of basin closure was first coined by Seckler (1996) when he used the term to characterize river basins with no utilizable outflow. In other words, basin closure implies that the abstraction, transfer and use of water upstream within a given river basin renders that water unavailable for further use downstream. One of the results of basin closure is that water has to be mobilized from elsewhere. This usually takes the form of IBTs, where water is taken from a donor basin and transferred to a recipient basin in an attempt to balance out the prevailing water scarcity in the recipient basin. An undesirable and unavoidable element of this mobilization of water is the possibility of resource capture, which is evident in many of the large river basins globally. This is consistent with what Johan Galtung refers to as "structural violence", or the existence of "exploitative relations between groups in general and societies in particular", which are one of the causes of insecurity in international relations (Galtung, 1980:64 in Doughman, 2002:193).

2.2.2 Jordan River Basin: Classic Case of Water Scarcity and Political Insecurity

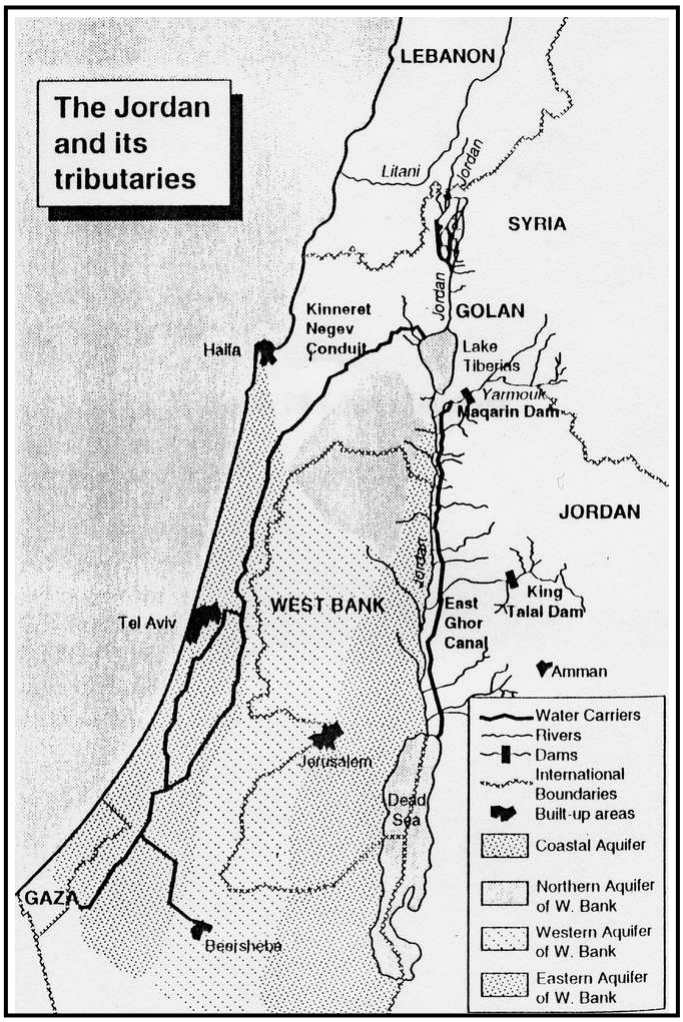
> "The Jordan River [b]asin, including the upper Jordan and the Yarmouk, provides 60 per cent of Israel's water and 75 per cent of Jordan's. At the same time, only 3 per cent of the Jordan basin area ... is situated within the borders of the pre-1967 Israel (Anderson, 1988:7). The Jordan basin ... is the smallest river in the Middle Eastern region, and runs through hotly debated territories"(Lindholm, 1995:58).

Ever since the early days of Zionism, water scarcity has been of great concern to Zionist planners, and later to the Israeli government. As early as 1916, the World Zionist Organization spoke of having the Jordan River system included in Palestine, with the Litani River delimiting the northern border (Nijim, 1990:317; Lindholm, 1995:60). As the First World War drew to an end, Emir Faisal, the son of Hussein the Sharif of Mecca, moved to Damascus in anticipation of ruling Syria. From here he wrote a letter to Chaim Weizmann, a key Zionist negotiator, trying to get a common agreement before the Paris Peace Conference at which the territory of the Ottoman Empire was to be redistributed (Trottier, 1999:40). This was not to be however, because in terms of the Sykes-Picot Agreement that was concluded between France and Great Britain during the First World War, it was envisaged that the French would take control over the Litani River and Upper Jordan Basin; Lake Tiberias would fall into both an international and French zone; both the French and British would take control of the Yarmouk Valley; the present day West Bank would become an international zone; and the British would take control over present day Jordan (then known as Transjordan) (Trottier, 1999:40).

At the Paris Peace Conference in 1919, Chaim Weizmann stated that the boundaries of Palestine were to include the headwaters of the Jordan River, the lower Litani in what is now modern day Lebanon, and the lower Yarmouk in what is now modern day Jordan. It was also considered important by Weizmann to control the very sources of water flows, thus emphasizing Mount Hermon and the drainage of the Jordan River (Weisgal, 1977 as cited by Lindholm, 1995:60). Weizmann subsequently wrote a letter to British Prime Minister Lloyd George stating that the whole economic future of Palestine depended on water for irrigation and electric power, and this water must come largely from the foothills of the Jordan and the waters of the Litani (Jaber, 1989:67). In essence, the British agreed with the Zionists on the delimitation of the state of Israel at that time (Lindholm, 1995:61). The final agreement emerging from the Paris Peace Conference was signed in London on 4 December 1920, but the French delegation had managed to

counter the British proposal on the delimitation of the state of Israel that would have included access to water from the Jordan and Litani rivers, promising instead that Jewish settlements could use water freely from the Upper Jordan and Yarmouk Rivers, but that they would remain under French control along with the Litani River (Trottier, 1999:42). Sovereignty over the resource was thus left firmly in French control, but on the understanding that the Jewish settlers could have access to the water.

Map 1. The Jordan River Basin.



Source: Lindholm 1995:56.

France and Britain signed a bilateral treaty on 23 December 1920 - what became known as the Franco-British Agreement - becoming a key treaty in the determination of water use in the Jordan River basin (Trottier, 1999:42). The same treaty determined the control regimes of the Yarmouk, Tigris, Euphrates and Jordan Rivers in keeping with the

territorial division that had just taken place. There were to be two principles involved. Article 8 stipulated that the needs of the French mandated[1] territories would receive "prior satisfaction". Furthermore, the French government would give "the most liberal instructions concerning the use of the surplus of these waters for the advantage of Palestine" (Trottier, 1999:42-43). The Franco-British Agreement located the Banyas River (one of the main tributaries of the Jordan) inside the mandated[2] territory of Palestine.

Jews started to acquire land in some of the most fertile parts of the British mandated territory of Palestine between 1920 and 1939. This became the genesis of the creation of a social class of landless Arab peasants, which is a significant factor in the hydropolitical equation to this day (Trottier, 1999:44). In 1922 Britain officially declared that its policy concerning Jewish immigration towards the Palestine Mandate would be governed by what it called the "absorptive capacity" of the region. This resulted in emphasis being placed on the agricultural sector, which became one of the elements of subsequent Zionist ideology (Trottier, 1999:43). This emerging ideology saw water becoming a key factor in determining the absorptive capacity of a future Jewish state, thereby contributing to the birth of the subsequent Israeli hydraulic mission.

The border with the French mandated territory of Syria was demarcated in 1923 under the Anglo-French Agreement. This left the Banyas River 1-km inside Syria, thereby becoming the genesis of future conflict[3] because the two main tributaries of the Jordan River were now located outside the future state of Israel (Trottier, 1999:43). Violent social clashes between Arabs and Jews occurred in the Palestine Mandate during 1929. The Shaw Commission was set up to investigate the incident and identified the source of violence as being the growing fear by Arabs of Jewish immigration and land acquisition (Trottier, 1999:44). A report by the Irrigation Committee that was also published in 1929 noted a dangerous drop in the hydrostatic level around Haifa and Tel Aviv, stating that salinization was taking place, thereby introducing groundwater into the overall hydropolitical equation (Trottier, 1999:45). The report also deplored the undefined nature of water rights in Palestine.

[1] Under the League of Nations, mandates were given to France to administer Syria and Lebanon.
[2] Under the League of Nations, mandates were given to Britain to administer Transjordan and Palestine.
[3] These borders become the basis for the subsequent 1947 UN decision to create the state of Israel (Shuval, 2000:45-6).

Hope-Simpson, a technocrat commissioned by the British government, was sent to investigate the immigration aspects of the Palestine Mandate in 1930. He wrote a report saying that intensive agriculture should be promoted along with the use of irrigation, as this would allow the Mandate to fulfil its obligations to both Jews and Arabs (Trottier, 1999:44). The Jewish Agency responded positively to this report because irrigation would increase the absorptive capacity of the future Jewish state. The Jewish Agency offered to set up an irrigation and colonization company in Palestine in return for part of the land. The Arab Revolt broke out in 1936, subsequently disrupting the settlement of water rights (Trottier, 1999:47).

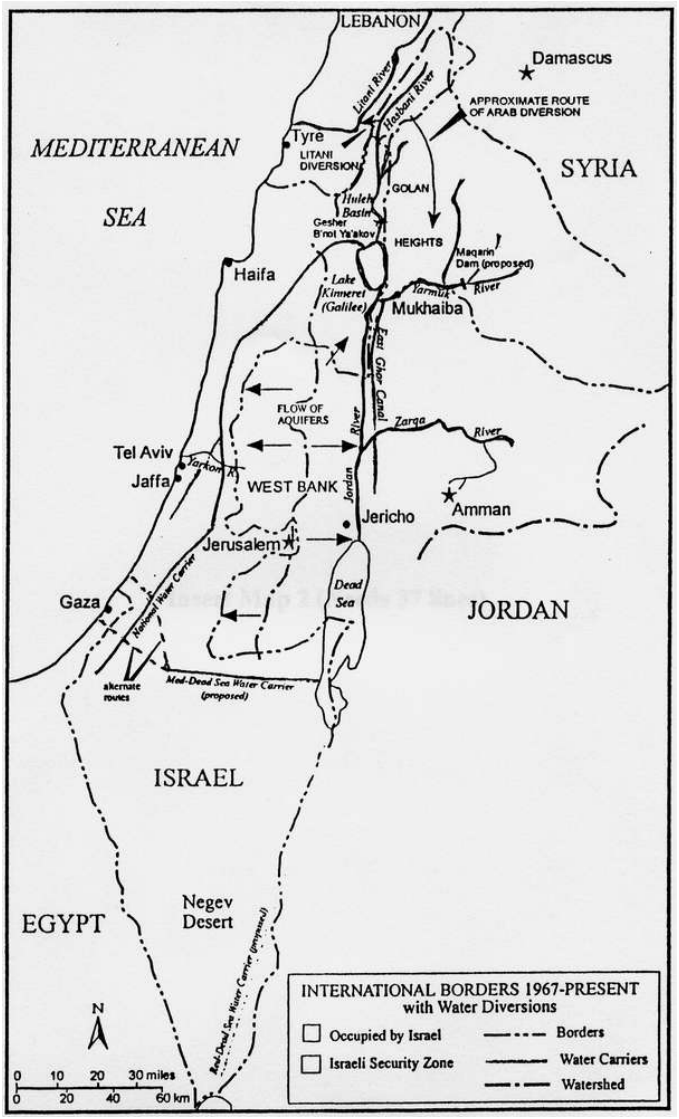
Harris, an irrigation consultant in Palestine, succeeded in acquiring an ordinance that submitted the drilling of a well to the prior granting of a permit in zones called "public water supply areas", by means of which the government was given the right to drill boreholes in order to carry out hydrographic studies (Trottier, 1999:47). A series of boreholes were drilled in the Jordan Valley in order to instruct the department responsible for the Partition Plan. The unrest from the 1936 Arab Revolt still hindered the settlement of water rights however, and the subsequent Second World War and Israel War of Independence meant that the issue could not be settled satisfactorily at that time.

The United Nations (UN) General Assembly adopted Resolution 181 on the Partition of Palestine during November 1947, with the official borders as defined in the 1923 Syrian[4] and Palestine Mandates becoming the basis on which the border demarcation took place (Shuval, 2000:45). This gave Israel control of the 10-m wide strip along the eastern fringe of Lake Tiberias, and the Hamat Gader (El Hama) Springs area contiguous to the Yarmouk River (Shuval, 2000:45). This led to the eventual displacement of 700,000 Palestinians, leaving only 150,000 Arabs inside the state of Israel at the end of the War of Independence (Trottier, 1999:53). Chaim Weizmann became the first President of Israel in 1948 (Lindholm, 1995:60), bringing with him strongly held views about the linkage between access to water and state security. Almost immediately, extensive water subsidies were introduced to protect the newly established *kibbutzim* (Lindholm, 1995:63). This implied that there was no incentive to save water, so water use by the Jewish settlers started to take off under the Israeli hydraulic mission, which sought to make the desert bloom as part of a Zionist vision of self-sufficiency and increased absorptive capacity. This trend can be seen in Figure 2.

[4] Syria became independent in 1946.

During 1946, a water engineer from the Tennessee Valley Authority (TVA) in the United States of America (USA) by the name of Hays, began working on a strategic water plan, at the invitation of the Zionist Organization of America (Trottier, 1999:53). The Hays Plan was published in 1948 as part of the establishment[5] of the state of Israel. This proposed a canal between the Mediterranean Sea and the Dead Sea - referred to as the Med-Dead Canal - and a diversion of water to the Negev Desert (Trottier, 1999:53) (see Map 2).

Map 2. Various Water Diversions in Israel.



Source: Wolf 1998.

[5] The state of Israel was established by proclamation on 14 May 1948 when the British Mandate in Palestine came to an end.

The Arab riparian states were immediately opposed to this diversion into the Negev Desert, as it meant less water in the lower Jordan Basin. On the day after the establishment of the state of Israel, Egypt, Iraq, Jordan, Lebanon and Syria invaded it. The newly independent state of Israel thus went to war between 1948-9 in what became known as the War of Independence, with the outbreak coinciding roughly with the publication of the Hays Plan. There was no direct linkage between these two events however. Arab forces cut off the water supply to West Jerusalem during the war as part of a well-established doctrine in which water was used as a weapon (Gleick, 1998:128).

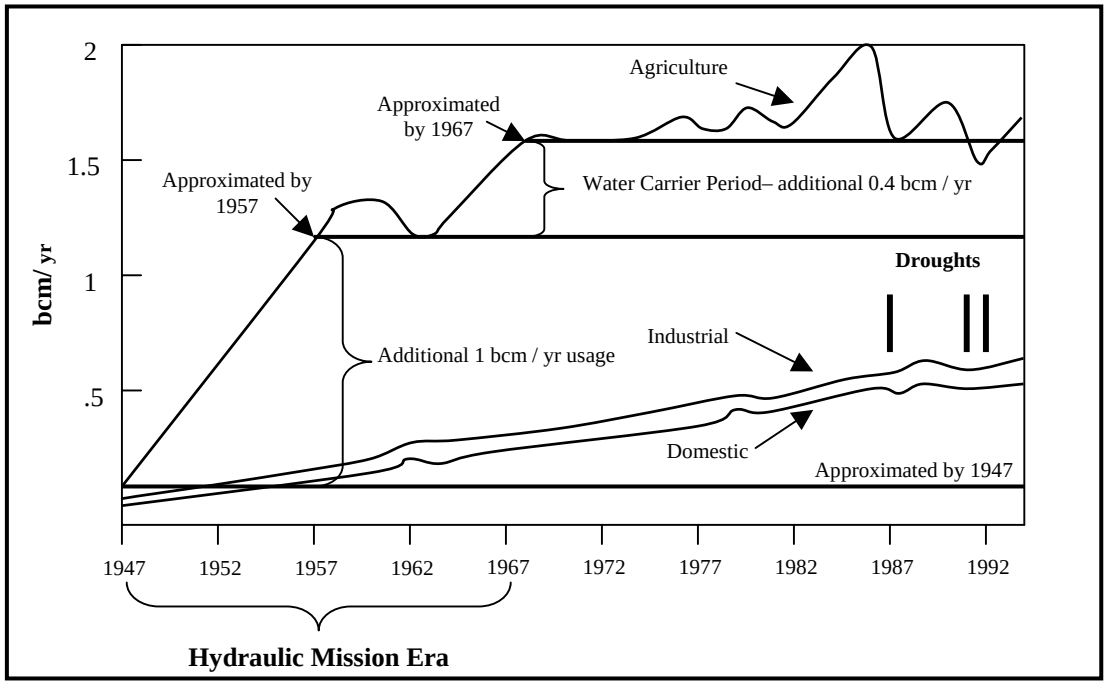
The borders of the new state of Israel were thus changed within days of independence, and were determined by the 1949 Armistice Agreement (Trottier, 1999:49). The so-called "green line" between Israel and Jordan had been negotiated before the armed struggle and gave important aquifers to Jordan. It also gave most of the Jordan River downstream of Lake Tiberias to Jordan, which now occupied both banks (Trottier, 1999:50). The 1949 Armistice Agreement included a 10-m wide strip of land along the eastern fringe of Lake Tiberias as being under Israeli control, along with the Hamat Gader (El Hamat) Spring's area contiguous to the Yarmouk River. The Syrian Army was unhappy with this fact, so they occupied these areas by force after the Armistice Agreement had been signed, in direct contravention of that agreement[6]. Israel occupied a small territory around Al-Baqura and Naharayim, thereby allowing control over the Jordan and Yarmouk River to be exercised (Trottier, 1999:51). The 1949 Armistice Agreement between Syria and Israel stipulated that a strip of land 100 metres east of the Jordan River between Lake Tiberias and Huhleh Lake was to be transformed into a demilitarized zone controlled by Syria. The same was to apply to a 10-m wide strip of land along the East shore of Lake Tiberias, which had previously belonged to the Palestine Mandate according to the 1923 Anglo-French Agreement (Trottier, 1999:51). The subsequent Israeli/Jordanian Peace Accord in October 1994 indicated that the sole motivation for this occupation was control over water resources during the 1948-9 war. During this time, Israel also gained control over two large aquifers - the coastal aquifer that stretches from Mount Carmel to Gaza, (see Map 1) with a maximum yield of 280 x $10^6 m^3 yr^{-1}$; and the Yarkon-Taninim aquifer that stretches from Mount Carmel to Beersheva, which is fed by water that comes from west of the green line (Trottier, 1999:51-52).

[6] As a result these lines were never clearly established, leading to different interpretations in the Shepherd's Town negotiations that were subsequently held in February 2000 (Shuval, 2000:45).

2.2.3 The Israeli Hydraulic Mission

In pre-1967 Israel, the National Water Carrier Project became the most ambitious development project ever undertaken, becoming a fundamental component of the Israeli hydraulic mission. The significance of this is evident in Figure 2 as a rapid growth in water consumption from 1947 to 1967. Part of that hydraulic mission was the centralized control over water resources, under the management of Mekorot, the state water company, administered by the Israeli Water Commission. This was under the authority of the Ministry of Agriculture, giving the agricultural sector priority of use. Water was mobilized in order to develop agricultural settlements in various parts of the country, partly to create employment opportunities for Jewish settlers; partly to fulfil the earlier Zionist ideological ideal; and partly for national security reasons. The dominance of the agricultural sectoral water use is shown in Figure 2. The water, economic development and national security nexus thus started to emerge as a dominant feature of the hydropolitical dynamics of the Jordan River basin between 1947 and 1967.

Figure 2. Israeli Water Consumption from 1947-1993.



Source: Allan 1996c:85; Allan 2000:249.

Immediately after the 1948-9 War of Independence, construction was started on the Israeli National Water Carrier Project (Lindholm, 1995:67). This project was designed to

take a 2.7-m diameter pipeline for a distance of 300-km from the Jordan River to the Negev Desert. It drew water from the Upper Jordan and the main storage reservoir (Sea of Galilee) and distributed it over the entire country all the way into the Negev Desert in order to sustain new settlements (Lindholm, 1995:64). The extent of the project can be seen on Maps 1 & 2. The Syrians objected to the abstraction point at Gesher B'not Ya'akov on the Jordan River, which was then in the Demilitarized Zone that had been established in the 1949 Armistice Agreement between Syria and Israel. Syrian tanks fired at Israeli construction workers and equipment (Shuval, 2000:42), becoming one of the often-cited examples of water as a cause of war (Gleick, 1998:128; Wolf, 1995; Wolf, 1997; Samson & Charrier, 1997).

A military *coup d'état* took place in Syria during 1949 making Husni Zaïm the new leader. Zaïm offered Israel half of Lake Tiberias and he also undertook to permanently resettle 300,000 Palestinian refugees in an attempt to make the offer attractive (Trottier, 1999:50). It was rejected however, and a subsequent hearing by the Foreign Affairs and Security Committee of the Knesset revealed that the reason for this was the desire by Israel to control the one shore of Lake Tiberias, the East Bank of the Jordan River and the Mey Marom (Trottier, 1999:50). The Syrian Army was evacuated from the parts of Palestine that were demarcated in the 1947 Partition, and which had been occupied by Israel as the result of the 1948-9 War of Independence (Lindholm, 1995:67). Syria claimed that Israel may not foster any changes to the occupied area, but Israel insisted on her right to develop the agricultural potential of the occupied area, in keeping with the prevailing hydraulic mission. The United States (US) State Department identified the issue of Palestinian refugees as a major obstacle to future peace**.** On the strength of this assessment, the State Department pressurized Israel to accept a separate peace with Syria in terms of the Zaïm proposal (Trottier, 1999:57). Israel steadfastly refused to accept the offer despite the attraction of the Palestinian refugee issue because access to water was seen to be more strategically relevant at the time.

During the ensuing period of uneasy peace, Syria claimed that all of the water in the Jordan River is derived from rainfall in Syria and Lebanon. As such, according to this logic, the Jordan River consists of "Arab Water" that belongs to the two upstream countries (Shuval, 2000:48). Under this rationalization, the maximum Syrian claim might include the entire flow of the Banyas River at 120 x $10^6 m^3 yr^{-1}$ and the flow of 30 x $10^6 m^3 yr^{-1}$ from the Golan Heights, as well as the entire flow of the Hasbani River of 150 x $10^6 m^3 yr^{-1}$ for Lebanese use. This totals some 300 x $10^6 m^3 yr^{-1}$. Israel countered this

claim by stating that for the past fifty years neither Syria nor Lebanon actually used this water, so it belongs to Israel by virtue of the principle[7] of prior use (Shuval, 2000:48).

During the same period of time, Israel established the first settlements in the demilitarized zone to the north (Lindholm, 1995:67). The Absentee Property Law was promulgated in Israel during 1950 (Lindholm, 1995:81). This stated that all Palestinian Arab displaced persons and refugees from the 1948 War of Independence were declared absentees, which implied that they were denied all rights to subsequent Israeli citizenship, rights to their former lands and rights to other property that they may have previously owned in Israel (Davis, 1987:17). This gave impetus to the phenomenon of the landless, and now stateless, Palestinian Arab, which has persisted into present times.

During 1951 Jordan made its plan to irrigate the Jordan Valley public. This plan had as a central component, the diversion of the Yarmouk River. Israel responded by commencing with the drainage of the Huhleh swamps that were located in the demilitarized zone between Israel and Syria. Yigal Allon, a commentator on Israeli strategic affairs, advocated that any "Syrian attempt to thwart Israeli development projects in the Huhleh area and/or concerning the utilization of the water of the Jordan River" should be considered as a reason to go to war (Yaniv, 1987:82). A series of border skirmishes ensued between Israel and Syria as a result of this. Syria responded by occupying the Al-Hamma strip, giving them control over the Yarmouk River (Trottier, 1999:52). After the exchange of sporadic gunfire between Israel and Syria, Israel finally moved its water intake to the Sea of Galilee (Wolf, 1998:256; Gleick, 1998:128). Some commentators call this a water war (Gleick, 1998:129; Starr, 1991; Wolf, 1995; Wolf, 1997). This period of tensions ultimately led to Israel abandoning the first attempt to deviate water from Lake Tiberias at the site of Jacob's Daughters' Bridge, but Israel finally drained the Huhleh swamps and resettled them with people (Lindholm, 1995:67; Samson & Charrier, 1997; Trottier, 1999:52; Wolf, 1997).

During 1953 Israeli plans to divert Jordan River water from north of the Sea of Galilee in the demilitarized zone on the Syrian border were again initiated, this time at a position that was less favorable in technical terms, but that was safer from Syrian artillery fire (Trottier, 1999:52). Israel also announced plans for an irrigation canal through the demilitarized zone that would separate Syria from the demilitarized zone (Lindholm,

[7] This provides a classic example of the use of legal interpretations to justify hegemonic control over water resources in contested international river basins.

1995:67-8). The ensuing dissention between Israel, Syria and Jordan resulted in American President Dwight Eisenhower calling for a cease-fire and appointing Eric Johnston as his personal envoy and roving ambassador with the mandate to find a comprehensive programme to develop the Jordan River on a regional basis (Shuval, 2000:43). This was based on the TVA model in America and aimed at the equitable distribution of water from the Jordan and Yarmouk Rivers. The Johnston United Water Plan was significant because it was the first attempt at developing a basin-wide plan for the entire Jordan River. Israel, Jordan and Lebanon initially approved of the Johnston United Water Plan, but Syria did not. This in turn hindered Jordan and Lebanon from endorsing it. The Arab League also came out in opposition to the Johnston United Water Plan, so it was never implemented, but it became the foundation on which subsequent water sharing principles were to be developed. The Israeli National Water Carrier Project was cited as one of the main reasons for Syrian hostilities towards the Johnston United Water Plan (Lindholm, 1995:68; Wolf, 1998:128).

As part of this exchange of hostilities with Israel, Syria first mooted the idea of developing the Maqarein Dam on the Yarmouk River (Lindholm, 1995:71) (see Maps 1 & 2). Jordan and Syria agreed to share the water, but Israel lodged a protest. Because of this, Jordan was forced to reach an agreement with Israel in order to implement the project (Lindholm, 1995:72). On 11 October 1955, the Technical Committee of the Arab League announced their support of the Johnston United Water Plan, but it again failed to gain the necessary approval because of fears that "their agreement would imply indirect recognition… [of Israel]" (Shuval, 2000:44). The Johnston United Water Plan thus broke down, leaving both Syria and Lebanon with almost total control over the major sources of supply to the Jordan River basin, which gave rise to intense feelings of insecurity in Israel. This insecurity was based on a threat perception that had been formed in a broader political setting and subsequently became part of the Israeli security doctrine. This feeling of insecurity prevailed until the 1967 Six-Day War when the borders were radically altered, and with that, control over the source of water was again established by Israel (Gleick, 1993a:85; Wolf, 1995; Wolf, 1997; Samson & Charrier, 1997). There were only limited initiatives to utilize these resources at the time however.

In terms of the Johnston United Water Plan, the water allocations presented in Table 1 were envisaged. It is noted by Shuval (2000:43) that the allocations to Syria and Lebanon were exactly the amounts requested by the Technical Committee of the Arab League,

which under Egyptian leadership had formulated the so-called "Arab Plan" for allocation of water from the Jordan River basin.

Table 1. Volume of the Jordan River that was Apportioned in the Johnston United Water Plan.

Riparian State	Allocation	Comments
Jordan	480 x $10^6 m^3 yr^{-1}$	
Syria	132 x $10^6 m^3 yr^{-1}$	42 x $10^6 m^3 yr^{-1}$ from the Banyas and Jordan
Lebanon	35 x $10^6 m^3 yr^{-1}$	
Israel	466 x $10^6 m^3 yr^{-1}$	
Total Annual Flow	1113 x $10^6 m^3 yr^{-1}$	

Source: Stevens 1965 as cited by Shuval 2000:43.

After the breakdown of the Johnston United Water Plan, an informal agreement between Jordan and Israel became the foundation for the future funding of both the National Water Carrier Project in Israel and the East Ghor Canal in Jordan (Shuval, 2000:44) (see Maps 1 & 2 for details of their location). It was on the basis of this agreement that Israel understood that Jordan would eventually construct the West Ghor Canal as well, in order to supply the Palestinians on the West Bank with 150-200 x $10^6 m^3 yr^{-1}$ (Shuval, 2000:44). The West Ghor construction never took place however, and the East Ghor Canal was destroyed in two Israeli military raids before it could become operational (Gleick, 1998:129; Samson & Charrier, 1997).

Jordan started construction of the East Ghor Canal in 1958 with funding from the USA. The reason for American involvement was to permanently settle the Palestinian refugees from the War of Independence (Trottier, 1999:57). The actual purpose of the canal was to provide water to Amman however, and to support irrigation activities within Jordan. In order to guarantee continuous flow, two dams had been proposed on the Yarmouk River (Haftendorn, 2000:61). This took water from the Yarmouk River 69-km along the Jordan Valley, but Israel viewed this as a potential threat because the Yarmouk is the most important tributary of the Jordan River (Trottier, 1999:56) (see Map 2). Only the East Ghor Canal was completed by the time the 1967 Six-Day War broke out, and Israeli forces destroyed this during the opening hours of the armed conflict (Gleick, 1998:129).

Syria managed to get the water issue onto the agenda of the Arab League Summit during 1959 again. As a build-up to this, Israel told the USA that the Johnston United Water Plan should be continued. In the meantime, Jordan applied to the World Bank for an

irrigation project with the Maqarein Dam on the Yarmouk River as a component. Israel objected, claiming that this would undermine the Johnston United Water Plan. Syrian fears were escalated by the perception that she was being left out of the emerging water arrangements. It was this fear that formed the basis of the renewed request for Arab League support (Lindholm, 1995:68). The 1959 Arab League Summit decided to endorse the proposed diversion of the Jordan River in order to counter the strategic value of the Israeli National Water Carrier Project. Details of this proposed diversion are shown on Map 2. This is an example of the use of water as a weapon of war, which is possible in closed river basins simply because few other alternatives exist. The whole scheme was intended to divert the Hasbani, the Dan and the Banyas to the Yarmouk River and was consequently seen by Israel as being a direct threat to its national security in keeping with the prevailing threat perceptions (Lindholm, 1995:69). The final decision to actually implement these plans was only taken in 1961 however. Even then it was only in 1964 that Syria actually gave the go ahead. One commentator (Yaniv, 1987:105) interprets this as the reluctance by Nasser, who was the head of the Arab League at the time, to actually implement the project, for fear of escalating existing tensions.

Israel drafted Law No. 5719[8] on 3 August 1959 (Trottier, 1999:53). This unified the water laws in the occupied area under Israeli control, enshrining some of the principles that were originally advocated by the British through the activities of Harris (Trottier, 1999:46), thereby countering the *laissez faire* attitude of the Ottoman Empire that left each village with its own set of customary water laws. This new Israeli law withdrew water from the domain of private ownership in response to Jewish agricultural development (Trottier, 1999:54). The phenomenon of the landless Arab was thus given an additional boost at this time (Trottier, 1999:47).

Between 1959 and 1965 agricultural production in the Jordan valley doubled (Lindholm, 1995:72). It was for this reason that the East Ghor Canal and Maqarein Dam were needed according to Syria. Israel perceived the proposed Arab League diversion as a potential threat, which could divert as much as 300 x $10^6 m^3 yr^{-1}$ away from Israel. Consequently Israel objected to the UN that these proposed diversions were a violation of international law, infringing on her sovereign rights as a downstream riparian (Shuval, 2000:44-5). All role-players did not share this threat perception however, and as the National Water Carrier was nearing completion in Israel, Arab fears of an impending loss of water also started to increase. This provides empirical evidence of increasing perceptions of

[8] This became known as the 1959 Water Law (Trottier, 1999:53-55).

insecurity as the result of basin closure when in the presence of a strongly articulated threat perception that views water as an instrument of power and potential political control. Syria called for a military struggle with Israel at the Cairo Summit during December. Nasser intervened and the motion was not accepted (Trottier, 1999:58).

Shimon Peres, in his capacity as Deputy Defence Minister, announced in 1962 that one of the issues that could bring about another Arab-Israeli war was "if Israel seizes waters that are not its own - according to its neighbor's" (Yaniv, 1987:86; Lindholm, 1995:69). At the same time, the Israeli Prime Minister Levy Eshkol said that water could be regarded as a *casus belli* because "the water is like the blood in our veins", providing an example of the ideological dimension of water, closely linking it to the issue of national security yet again (Lindholm, 1995:69). This shows how the Israeli hydraulic mission was based on a deeply felt political ideology, which held water as an essential element for survival and consequently a legitimate target during times of hostility.

2.2.4 Water as a Potential *Casus Belli* in the Jordan River Basin

Despite repeated statements by Israeli spokesmen that water was a *casus belli*, and that Israel would restrict her policy to one of "flexible response", the Syrians continued to escalate their military activities. Israel thus resorted to "massive retaliation" (Yaniv, 1987:106) and bombed the Syrian diversion installations for the East Ghor Canal two months prior to the outbreak of the 1967 Six-Day War. Israel decided to take these military steps to stop construction of the East Ghor Canal when the Arab League attempted to divert the Banyas and Hasbani, two important tributaries of the Jordan River, which in terms of the prevailing threat perception, was seen to result in potential Israeli insecurity (Gleick, 1998:129; Haftendorn, 2000:60-1; Shuval, 2000:44-5; Wolf, 1998:256). Construction of the Syrian diversion stopped in July 1966 (Wolf, 1998:256; Gleick, 1998:129). A gradual escalation of troop deployments occurred, and a number of skirmishes took place. Syria, using belligerent rhetoric, threatened large-scale war and could not subsequently back down without losing face, even when Arab League support was reduced. Syria also started to use the Palestinian guerilla movement *Al Fatah* to carry out clandestine attacks against the Israeli National Water Carrier Project. Water infrastructure thus increasingly became a target of war in keeping with the prevailing political ideology that was already based on the belief that water provided sustenance and should thus be denied to the enemy (Lindholm, 1995:69). The die was consequently cast

for the next period of war, with the respective riparian states seemingly locked into an inevitable political showdown, with access to water as a central strategic element.

Israel subsequently occupied the West Bank and Gaza in the 1967 Six-Day War, which gave access to, and control over, a number of strategically important aquifers[9] (Lindholm, 1995:55). The location and relevance of these can be seen on both Maps 1 & 2.

The control over West Bank water was managed by military rule[10] from that time on until 1982 (Lindholm, 1995:78). Palestinian water scarcity on the West Bank consequently became a fact of daily life, and Palestinian agriculture became dependent on the water allocation system that was established by the military occupation in the Six-Day War (Lindholm, 1995:82). This is further evidence of systematic policies of resource capture that were all designed to increase Israeli hegemony in the basin. Only one of the dams on the Yarmouk River had been completed by 1967, but it was totally destroyed by Israeli forces in the Six-Day War, which altered the entire hydropolitical balance of power with the subsequent occupation of the Golan Heights and the establishment of a Security Zone in South Lebanon (Haftendorn, 2000:61). The occupation of the West Bank meant that Israel now had unlimited access to the key underground aquifers located there - thereby consolidating its hydrostrategic territory (Wolf, 1996; Haftendorn, 2000:61). Israel also gained control of the Banyas River during the Six-Day War (Trottier, 1999:61).

Israel issued Military Order No. 158 after the Six-Day War, imposing control over the future development of groundwater (Rowley, 1990:39; Lindholm, 1995:80; Trottier, 1999:60). This law established that no person was allowed to own or administer a water institution without an official permit; it was permissible to deny an applicant a permit, revoke or amend a license, without giving any explanation; the appropriate authorities may search and confiscate any water resource infrastructure for which no permit existed, even if the owner had not been convicted. In addition to this, no Palestinian well was allowed to exceed a depth of 140-m, while Jewish wells were allowed to go below 800-m in depth, further entrenching insecurity of supply for the Palestinian people (Lindholm, 1995:80). Yet again this provides empirical evidence of a systematic policy of resource

[9] This is what Wolf (1996) refers to as "hydrostrategic territory".
[10] Law No. 5719 unified all water law in the occupied territories where it had been a previously fragmented system based on local customary rights, differing from village to village. Other military laws followed, for example Law No. 5716 on water metering, and Law No. 5718 on drainage and flood control (see Trottier, 1999:52-55).

capture and induced scarcity in order to ensure political and economic hegemony by Israel.

The outcome of the Six-Day War was that Israel had established access to fresh water resources from the Golan Heights, control of the Sea of Galilee, and control over the groundwater aquifers along the West Bank - what Wolf (1996) calls "hydrostrategic territory" (see Maps 1 & 2). Groundwater is a strategically important resource, with the Mountain Aquifer Complex containing three separate aquifers of note (Lindholm, 1995:77). These are the West Bank and the Northern Aquifer that flows towards the Jordan River; the Eastern Aquifer that flows towards the Jordan River; and the Western Aquifer that flows towards the Mediterranean Sea - called the Yarqon-Taninim Aquifer in Israel, which was shared by both Palestinian and Jew before the 1967 Six-Day War.

It becomes instructive to ask the question to what extent the Six-Day War was motivated by the Israeli desire to gain access to, and control over, water resources? Some insight is offered from a speech that was made by David Ben-Gurion in 1973 in which he said that:

> "It is necessary that the water sources, upon which the future of the Land depends, should not be outside the borders of the future Jewish homeland. … For this reason we have always demanded that the Land of Israel include the southern banks of the Litani River, the headwaters of the Jordan, and the Hauran Region from the El Aujua spring south of Damascus. All the rivers run from east to west or from north to south. This explains the importance of the Upper Galilee and the Hauran for the entire country. The most important rivers of the Land of Israel are the Jordan and the Yarmouk. The Land needs this water. Moreover [it needs] the development of industry on water power for the generation of electricity" (cited by Cohen, 1986:122 in Lindholm, 1995:61).

In the same vein Yehuda Litani, a correspondent for the newspaper *Ha'aretz*, indicated that the "incorrect application" of drilling in the West Bank, outside Israeli control, could lead to salinization of the water resources. Litani stated that "it is possible that this is the true reason, so far unknown, for the eruption of the Six-Day War" (Davis *et al*., 1980:4). Litani's argument suggests that Israel's dependency on West Bank water, together with the Israeli perception that combined Palestinian and Jordanian "incorrect drilling applications" would seriously affect Israeli aquifers, was one of the main reasons behind the 1967 Six-Day War, particularly with respect to the occupation of the West Bank and Gaza (Lindholm, 1995:71). It is therefore argued that while water was not the main issue, it certainly was one of the major driving forces behind the 1967 Six-Day War (Lindholm,

1995:70). In this regard, the statement by Ariel Sharon, in his capacity as Chief of Staff of the Northern Command of the Israeli Army, offers an insight (Bullock & Darwish, 1993:50).

> "People generally regard 5 June 1967 as the day the Six-Day War began. This is the official date. But in reality the Six-Day War started two and a half years earlier, on the day Israel decided to act against the diversion (initiated by upstream Arab states) of the Jordan".

Wolf (1996) refers to the water in the aquifers under the occupied West Bank as being what he calls "hydrostrategic territory", which he claims is a reason why Israel is continuing to hold this ground (Allan, 2000:39-40).

Altering the West Bank enhanced the dispute over the Johnston United Water Plan however, and the issue as to whom the Yarmouk River quotas actually belonged became pertinent at this time (Lindholm, 1995:71). Between 1974 and 1987, Jordan started to divert more water from the Yarmouk River (and various aquifers) than the Johnston United Water Plan had allowed for (Shuval, 2000:47). The basic question was who has ultimate sovereignty over the West Bank and the Jordan River? Jordan and Syria argued that the Johnston United Water Plan was linked to "specific destinations", or state sovereignty. Israel in turn argued that it was administering the western Jordan valley, and by virtue of the occupation of Jewish settlers, Israel had the rights to pursue claims on the Yarmouk and West Bank waters, including the right to higher water quotas because Israel now administered the Golan Heights and the West Bank as well (Nijim, 1990:321; Lindholm, 1995:71). Israel thus sought to lay claim to the West Bank water by means of prior or historic use, which is a basic principle in international water law, even though this is now becoming less acceptable (Akweenda, 2002:97). By so doing, Israel established the right to be a party to the Jordanian water project involving the Maqarein Dam as well as the various irrigation projects of the Ghor. This has led Morris (1997:1) to conclude that "water ownership, management, and use are among the most critical problems confronting the modern Middle East. These water problems have become interwoven with deep-seated political, demographic, economic, and even religious conflicts, making it difficult to isolate technological and legal issues that, on their own, might be equitably resolved."

2.2.5 The Strategic Significance of Israeli Resource Capture

> "The water shortage on the occupied West Bank of the Jordan River offers a similar example of how population growth and excessive resource consumption can promote resource capture. While figures vary, Israel's average annual supply of renewable fresh water is about 1,950 million cubic meters (mcm). Current Israeli demand, including that of settlements in the occupied territories and Golan Heights, exceeds this supply by about ten percent. The deficit is covered by overpumping [sic] aquifers. As a result, water tables in some parts of Israel and the West Bank have dropped. This can cause the exhaustion of wells and the infiltration of sea water [sic] from the Mediterranean. Israel's population growth in the next thirty years, even without major immigration from the former Soviet Union, will probably cause the country's water demand to outstrip supply by at least forty percent. ... [I]t seems reasonable to conclude that water scarcity and its consequent economic effects contributed to the grievances behind the *intifada* both on the West Bank and in Gaza" (Homer-Dixon, 1994:13-14).

In order to assess the significance of Israeli resource capture in the absence of credible data (which is a feature of closed and contested river basins), a number of proxy indicators can be used.

- Palestinian agriculture for the period 1968-70 represented 37.4% of the gross domestic product (GDP) on the West Bank and 28.8% of the GDP in Gaza (Kahan, 1987:14-7; Lindholm, 1995:82-5). This figure dropped to 15.9% in 1983 as military rule impacted on the water allocation to Palestinians.

- In the period 1983-5, Palestinian agriculture represented 25.4% of GDP on the West Bank (which was a reduction from 37.4% in 1968-70), and 15.9% in Gaza (which was a reduction from 28.8% in 1968-70) (Kahan, 1987:14-7; Lindholm, 1995:82-5).

- The potential Palestinian demand for irrigation water was 345 x $10^6 m^3 yr^{-1}$ according to Kahan (1987:164), but only 180 x $10^6 m^3 yr^{-1}$ was made available according to Kally (1991:10).

- Jewish settlers on the West Bank exceeded their water quotas by 36.4% during 1986, because they were not subordinated to Military Order No. 158, and were free to drill wells as they saw fit (Lindholm, 1995:82). The Palestinians paid twice

the price of water compared to the Jewish settlers during that time. Mekorot had worked to develop water resources primarily for the Jewish settlers, supported by a heavy subsidy system, as part of the Israeli hydraulic mission (Lindholm, 1995:82; Tamimi, 1991:7). Water was thus used as a form of political tool, with the balance of hydropolitical privilege being in favour of the Jewish settlers, and specifically in order to expand the absorptive capacity of the Israeli state.

- Jewish settlers constituted about 10% of the total population of the West Bank in 1987, contributing around 35% of the GDP (Lindholm, 1995:81). Jewish settlers in turn were allocated about 22-33% of the water consumed on the West Bank (Lowi, 1992:42).

- Field crops and vegetables utilized most of the irrigated land on the West Bank, with 30% of the land being used by fruit trees (Lindholm, 1995:83). Most of this land was under Jewish settler control. The soil conditions and topography of the West Bank make it unsuitable for irrigation however, but the water was mobilized in order to establish viable settlements as a security consideration, rather than for purely agricultural production (Heller, 1983:130).

- Lowi calculated the water consumption in the West Bank for 1990 (see Table 2) (Lowi, 1993:189 in Trottier, 1999:66). It is evident from these data that Israelis are in a favourable position, again illustrating the effect of resource capture in closed river basins with rapidly expanding populations.

Table 2. Percentage of Water Consumption in the West Bank during 1990.

	Palestinians	Israelis	Settlers
Western Aquifer	5%	95%	
Northeast Aquifer	15%	85%	
Southeast Aquifer	64%	-	28%

Source: Lowi 1993:189 as cited by Trottier 1999:66.

- In other occupied territories a similar trend is evident. For example, the population density in the Gaza Strip is amongst the highest in the world, being around 700,000 in 1991. These figures are projected to rise to 1.48 million by 2010 (Lindholm, 1995:84). The impact on water resources is profound, but Israel

keeps control in order to prevent salt-water intrusion into the over-abstracted groundwater aquifers that lie under the Gaza Strip.

- By 1993 there were already 97,500 Jewish settlers on the West Bank, with 3,500 in the Gaza Strip and 120,000 in East Jerusalem (Lindholm, 1995:81). This added a new dimension to the water competition, with Palestinians competing firstly against the Israeli state, and secondly against the Jewish settlers. A newspaper report in the Jordan Times noted that water consumption in the Gaza Strip was 44 l/p/d, which is much less than the World Health Organization's (WHO) minimum *emergency* ration of 50 l/p/d (Lindholm, 1995:84). Yet again this provides evidence of the profound impact of resource capture and resultant structural scarcity in closed river basins that are highly contested.

- By 1985 around 50% of the total cultivated area in Israel was under irrigation (Lindholm, 1995:63). This represented a 30% growth in irrigated crops since 1965. This was only possible as a direct result of the Israeli hydraulic mission, which greatly improved the security of supply for Israel, but at the direct expense of their Palestinian and Arab neighbours in the Jordan River basin.

Control over water on the West Bank was transferred from the military to Mekorot during 1982, with the purpose of integrating it into the overall Israeli National Water Carrier Project on the instruction of the Minister of Defence, Ariel Sharon (Lindholm, 1995:78). The fact that this instruction came from the military shows to what extent water was regarded as being a strategic asset. In fact, the West Bank aquifer supplied between 25-40% of the overall Israeli supply at that time[11] (Starr, 1991:24). Lindholm (1995:81), noting that while figures are contested and differ widely from author to author, concludes that "there is a highly unequal distribution of water, to the disadvantage of the Palestinians". This also illustrates another important aspect of basin closure and the securitization of water resource management. One element of securitization is the classification of hydrological data. In this case the hydrological data has been classified as secret, which effectively removes it from the public domain (Lesch, 1992:148; Warner, 1996). It also means that independent verification is impossible, so no firm conclusions can be drawn on this issue. The secret nature of hydrological data is a

[11] Lindholm (1995:78), who suggests that the lower of the two estimates appears to be more accurate, disputes this figure. Falkenmark (1989a:350) concurs by saying that it is "possibly as much as one fourth". Lowi (1992:40), supporting the upper end of this scale, states that about 40% of the "groundwater upon which Israel is dependent" originates from the joint Israel-West Bank aquifer system.

manifestation of the securitization of water resource management in closed river basins that are deeply contested such as in the case of the Jordan River basin (Warner, 1996 in Buzan *et al.*, 1998:90).

2.2.6 The Lebanon Invasion and Resource Capture

Despite aggressive resource capture by Israel in the occupied territories, water deficit still remained a factor limiting Israeli economic growth potential, providing a strong stimulus to seek alternative sources of supply. This became patently evident during 1977 when the Israeli Water Commissioner, Menahem Cantor, started to regard the Litani River in Lebanon as an option for increasing Israel's water supply (Lindholm, 1995:75; Nijim, 1990:320). This implied the diversion of the Litani River to Israel. In 1978 Israel established a security zone in Lebanon after the Israel-Lebanon War. This was expanded in 1982 to include the Litani, Hasbani and Wazzani Rivers (Lindholm, 1995:75). Arab commentators link this with the Water Commissioner's remarks citing this as the cause for the establishment of the security zone. Israel prohibited Lebanese farmers from pumping any water or digging any wells in the security zone without the express permission from the Israel Department of Defence (Lindholm, 1995:76). Tamini (1991:23) states that the Litani water added at least 800 x $10^6 m^3 yr^{-1}$ to the Israeli resources, or about 50% of the Israeli total.

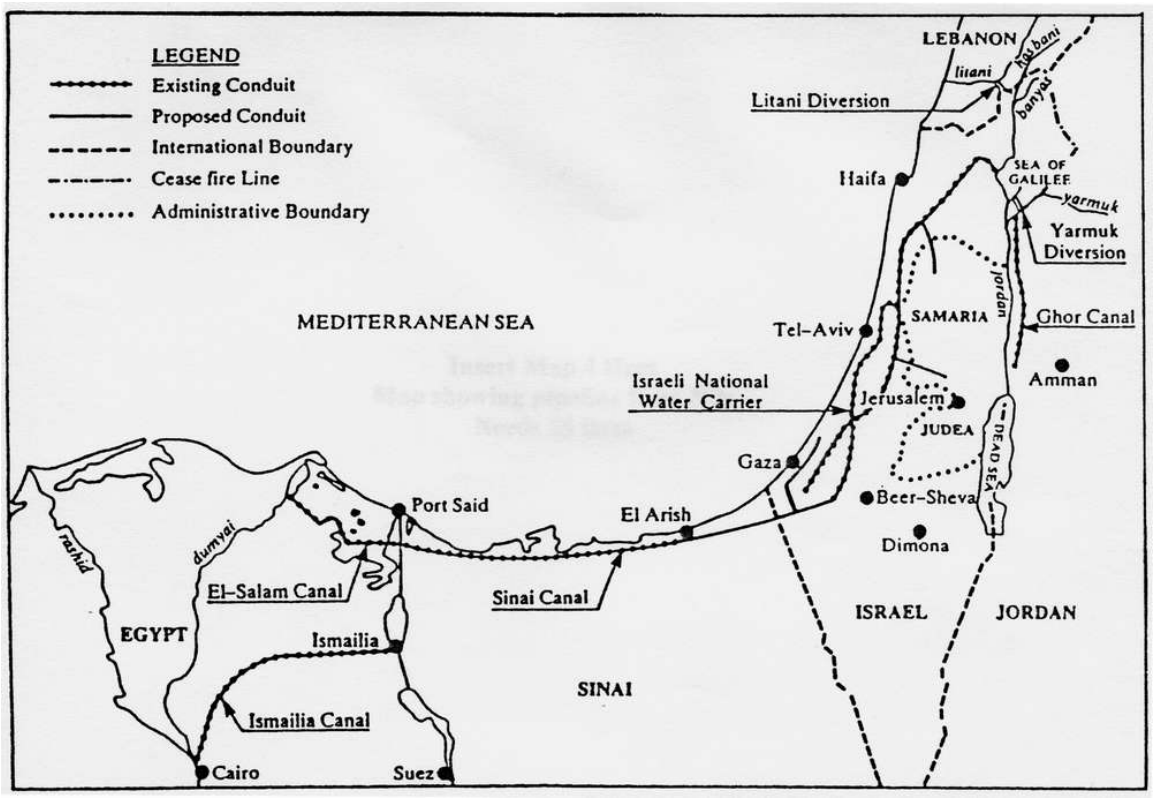
It is clear that the Israeli annexation of the Golan Heights in 1981 consolidated its control over the headwaters of the Jordan River, as strategic a resource as the groundwater under the West Bank (Cooley, 1984:15; Lindholm, 1995:58). This also gave Israel strategic control over the East Ghor Canal (Trottier, 1999:59). An important reason for annexation was related to the prevailing military doctrine of defence in depth, but it can also be argued that strategic access to water resources was part of this security equation because through the control of the Golan, Israel could guard against any diversions of the upper Jordan River as well (Lindholm, 1995:70). After the occupation of the Golan Heights, around 35% of the total water supply in Israel now came from that region, illustrating the strategic significance of water as an element of national security in this particular case (Trottier, 1999:59). Under such conditions, the stimulus for resource capture is obviously high. This is only relevant in a closed river basin, showing how water deficit can result in insecurity in the presence of a broader threat perception that sees water as a strategic resource.

During 1982 Israel expanded the Lebanese security zone to include the Litani, Hasbani and Wazzani Rivers (Lindholm, 1995:75). Both Nijim (1990) and Jaber (1989) put forward the hypothesis that the Lebanon invasions of 1978 and 1982, which resulted in an expanded security zone, were caused by a combination of the need to destroy the Palestine Liberation Organization (PLO) bases as well as improving Israel's water security (Lindholm, 1995:75). Israeli forces cut off the water supply to Beirut during a siege of that city (Gleick, 1998:129), again providing evidence of the use of water as a strategic weapon. The Lebanese government lodged a protest at the UN in 1984 concerning Israel's hydropolitics in southern Lebanon, accusing Israel of planning to divert the Litani River. The protest also referred to a similar diversion on the Hasbani and Wazzani Rivers (Lindholm, 1995:76). Israel denied these allegations.

2.2.7 Expanding Horizons: Inter-basin Transfers as a Solution to Basin Closure

For various reasons, Israel slowly started to realize that a remedy for its debilitating water deficit might be sought outside of its borders through IBTs (Lindholm, 1995:75).

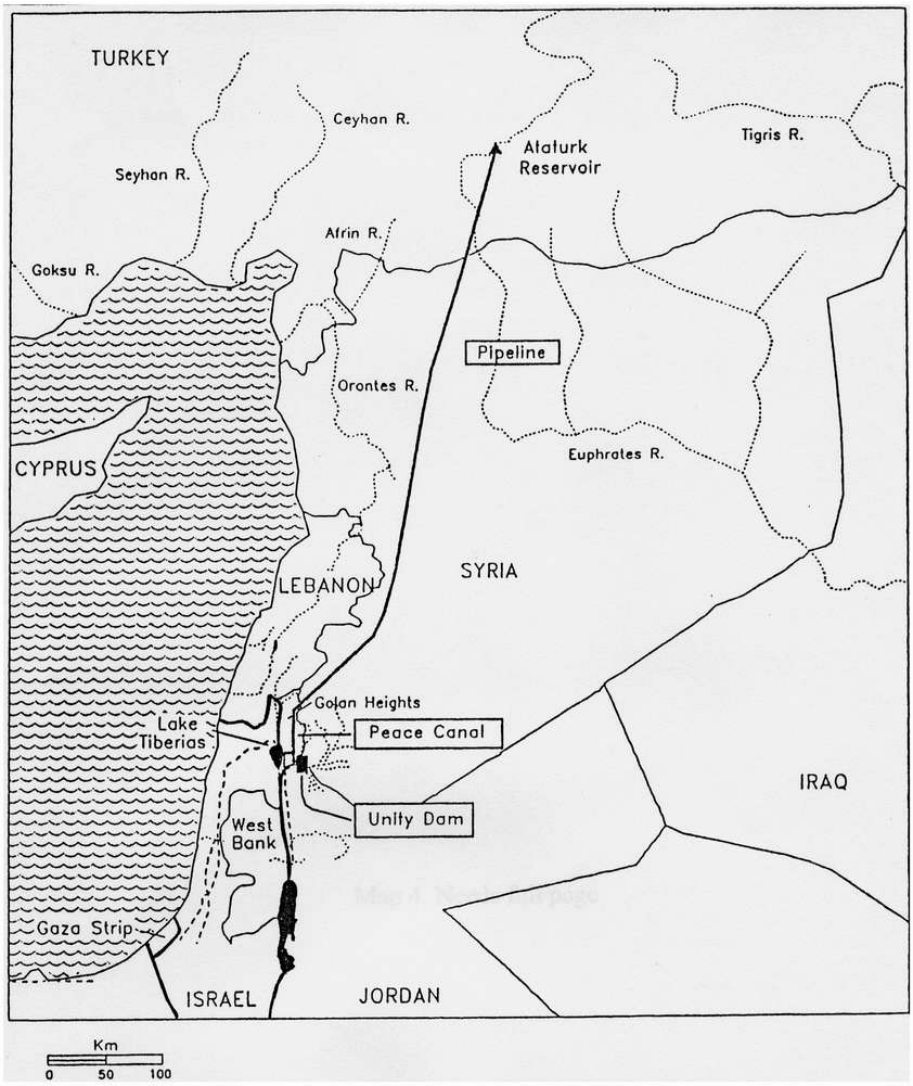
Map 3. Potential Inter-basin Transfer from the Nile to the Jordan River Basin.



Source: Wolf 1998.

This was consistent with the prevailing supply-sided management approach, which was dominant at the time. For example, during the 1978 Camp David Accords a proposal was tabled to sell Nile water to Israel as shown on Map 3. The project could not be implemented however, due to internal resistance in both Egypt and Ethiopia (Lindholm, 1995:86). This water would have gone to the Gaza Strip and parts of the West Bank (Lindholm, 1995:86). Another version of the same theme saw the development of a complex IBT that became known as the "Peace Canal" between Turkey and Israel (Wolf, 1989), which is shown on Map 4.

Map 4. The Peace Canal between Turkey and Israel.



Source: Wolf 1998.

This would have seen Turkey emerge as a regional power, using its abundant water resource-base as a political lever. In reality, this would merely have cascaded Israeli hydropolitical insecurity downstream on the Euphrates River into Iraq. The sheer magnitude of these projects shows the degree of desperation that was being experienced by the various riparian states. At the time of writing, none of these projects have been started and they remain unlikely to happen in the near future (if ever). Significantly, it also shows what happens when the core water management problem is defined only in terms of water as a finite resource.

2.2.8 The Significance of Emblematic Events in the Jordan River Basin

Emblematic events (Hajer, 1996), or windows of opportunity (Kingdon, 1984), play an important role in hydropolitics, becoming what may be described as a trigger event that serves to change the hydropolitical dynamics in a fundamental way. The Jordan River basin provides a number of examples of this.

During the latter part of the 1980s and early 1990s, an emblematic event took the form of massive immigration flows from Russia (Lindholm, 1995:61). These exerted additional pressure on the already stretched water resources of the Jordan River basin and associated groundwater aquifers, becoming a new form of hydropolitical driver. This took place at a time when the effects of a growing economic crisis were entering the public arena. This was centered on the long-term impacts of lenient and excessive government lending policy, which was originally established to encourage agricultural self-sufficiency, but that had attracted too many people to the agricultural sector, resulting in overproduction and inefficiency (Lindholm, 1995:63). For the first time in modern history, sectoral water efficiency (SWE) issues started to become relevant for Israel, with low cost water for agriculture coming under scrutiny (Arlosoroff, 1996). This saw a change in Israeli technology to drip irrigation in order to reduce water consumption and lower the risk of salinization (Lindholm, 1995:65). It also saw the export of this technology, which in turn represented a more efficient use of water as the irrigation components were often made by industrializing *kibbutzim* that had previously been using water to irrigate their lands. There was a shift away from agricultural to industrial processes - an example of an inter-sectoral allocation policy - with a resultant improvement in the SWE at national level. More significantly however, it created a public debate, allowing the water sector reform that was introduced in the late 1980s, to be consolidated and moved forward (Allan, 2000:190).

In order to try and alter elements of the prevailing political ideology, which equated water as an element of national survival, the Israeli authorities seized this window of opportunity. In its place came a policy that was aimed at changing water use to a higher SWE by means of inter-sectoral allocative efficiency policies (Allan, 2000:136) and the monetization[12] of water (Feitelson, 1999). In this regard, the 1990s reform built on the effects of the 1986 water crisis, which led to a significant re-allocation of water as the result of increases in the water price, which in turn had a significant impact on water productivity (Arlosoroff, 1996).

The significance of this becomes relevant when one examines the distribution of water in Israel over time. For example, the Israeli water distribution in 1987 was as follows (Lindholm, 1995:62):

- 447 x $10^6 m^3 yr^{-1}$ for domestic use.
- 123 x $10^6 m^3 yr^{-1}$ for industrial use.
- 1,179 x $10^6 m^3 yr^{-1}$ for agricultural use.

The Israeli Bureau of Statistics reported in 1987 that agriculture was draining 67% of the total water budget (Lindholm, 1995:62). Table 3 shows the consumption of water by the Israeli agricultural sector during 1987-8.

Table 3. Agricultural Consumption of Water in Israel 1987/88.

	Volume ($10^6 m^3$)	**Distribution (%)**
Urban localities	59	5
*Moshavot**	58	5
*Moshavim**	392	33
*Kibbutzim**	484	41
Institutions/farms	24	2
Non-Jewish villages	27	2
Other	135	11
Total	1,179	99
Note: **Moshavot* and *Moshavim* are both small cooperative farms combined with private means of ownership. *Kibbutzim* are larger, exclusively collective farms.		

Source: Central Bureau of Statistics as cited by Lindholm 1995:62.

[12] This implies the acceptance by the public that water has purely a monetary rather than an ideological value.

In contrast to this, the consumption of water by Palestinian villages represented only 2% of Israel's total water consumption during 1987, even though the Palestinian population stood at 19% of the total population in Israel at that time (Lindholm, 1995:63). The distribution of water thus had a major impact on the geography of unequal economic development along ethnic cleavage lines and is one of the pertinent factors that indicate the ethnic power structure in Israel (Ghazi, 1990:331). Yet again this shows the impact of resource capture in closed river basins, because control over such a strategically important resource can be translated into wealth, health and prosperity. Control over, and access to water, thus became directly linked to political power under conditions of basin closure.

In 1986 Israeli policy was initiated to reduce water consumption by the agricultural sector for the first time (Lindholm, 1995:62). In response to a regional water crisis, Israel declared a policy of recycling in 1986, with the stated goal being the re-use of 80% of wastewater by the year 2000 with around 35% of Israeli municipal wastewater being recycled to agriculture and industry (Arlosoroff, 1996; Lindholm, 1995:65). The Israeli re-use is the highest in the world, and water recycling has proved the most cost-effective alternative (Shuval, 1987:186).

Another example of the significance of an emblematic event impacted during a period of Jordanian rhetoric and hydropolitical sabre rattling. King Hussein issued some hostile statements against Israel that were related to a Jordanian application for funding for the Wahda Dam on the upper Yarmouk River for the supply of water to industry around Amman (Lindholm, 1995:73). Israel opposed this request knowing that the World Bank only funds projects where basin-wide agreements have been reached (Starr, 1991:23). The Israeli reluctance exacerbated the Jordanian frustration in light of the increasing levels of water scarcity that were being experienced in the Jordan River basin. Jordan responded by drilling deeper wells instead, thereby seeking to gain access to the aquifers that Israel relied on. The stage was thus set for a rapid escalation in hydropolitical conflict between Israel and Jordan.

During this exchange of hostile rhetoric, Israel experienced an extraordinarily dry summer, followed by a dry winter in 1990/1. This was the driest in 70 years and water supply to farmers was reduced by 20% in Israel, and a national water emergency was announced (see Figure 2) (Lindholm, 1995:57). This tended to dampen the conflict

potential as the strategic significance of debilitating water deficit, in what by now was a closed river basin, fell under the spotlight in both countries. Again this focussed the public debate on water sector reform, opening the door further to changes in the hydropolitical ideology by supporting the monetization of water as an essential element of enduring peace (Feitelson, 1999).

As another example of the impact of an emblematic event, the US State Department launched the Middle East Peace Conference in Madrid during October 1991, following the Gulf War (Lindholm, 1995:88). This Conference established five parallel commissions, with one being dedicated solely to water (Trottier, 1999:63). The process got off to a shaky start and finally stalled, partly because Syria and Lebanon refused to participate in the multilateral talks. In an attempt to resuscitate the initiative, secret talks were held in Oslo between Palestinians and Israelis in order to lay the foundation for the Declaration of Principles (DOP) on 13 September 1993.

During 1992 the Middle East Peace Conference held a multilateral session in Vienna. Israel, Jordan and the Palestinians agreed to cooperate on hydrological data sharing, which had previously been withheld from the Palestinians (Lindholm, 1995:88). This represented the first tangible attempt at generating uncontested and shared hydrological data for the entire Jordan River basin. This data became the foundation of consensus building, illustrating its importance as an element of regime creation. (The relevance of this will be examined in Chapter 3). As part of this emerging peace initiative, Hilel Shuval (1992:139; 1993) tried to revive the so-called “Regional Water for Peace Plan” in the Middle East that would have Nile water transferred to the Gaza Strip (Lindholm, 1995:86) (see Map 3). Jordan also signed an agreement with Iraq for water from the Euphrates River (Falkenmark, 1989a: 350; Starr & Stoll, 1988:145).

So how important have these emblematic events been on water resource management in a closed river basin such as the Jordan? The Israeli Bureau of Statistics reported that agriculture was still draining 62% of the total water budget during the early 1990s (Lindholm, 1995:62). Although high, it is a significant improvement on the 1987 figures however, showing the impact that the changing water discourse was starting to have. The Israeli water distribution during 1992 was as follows (Lindholm, 1995:62):

- 479 x $10^6 m^3 yr^{-1}$ for domestic use.
- 107 x $10^6 m^3 yr^{-1}$ for industrial use.
- 941 x $10^6 m^3 yr^{-1}$ for agricultural use.

The Likud-led coalition government lost power to the Labour-led coalition in June 1992 (Lindholm, 1995:82). Despite the fact that there was an increase in precipitation in Israel at the same time (see Figure 2), this political factor aggravated the West Bank water deficit (Allan, 2000:191; Lindholm, 1995:57). The situation had now changed so much that Israel could no longer survive without the West Bank aquifers, such was the extent of basin closure, and Palestinian independence was perceived as a direct threat to Israel's water security. This can also be seen as being a new form of emblematic event because it has significant hydropolitical ramifications in a closed river basin where alternative sources of supply seem to remain politically unattainable.

This placed the issue of water insecurity high on the national security agenda yet again, providing further evidence of the results of basin closure and the resultant securitization of water resource management. During the third round of the Middle East Peace Conference that was held in Geneva, some progress on water issues was reported (Lindholm, 1995:88). For example, the DOP that were signed between Israelis and Palestinians on 13 September 1993 contained a commitment to cooperate on water issues (Lindholm, 1995:55 & 88-9). One of these issues was the quantification of "equitable utilization" and the establishment of a Water Development Programme. Water was specifically mentioned in Article 7, Annex III, Annex IV of the DOP (Trottier, 1999:63). Annex II specified that regional development would consist of a Mediterranean Sea (Gaza) - Dead Sea Canal (the so-called Med-Dead Canal previously alluded to). It also identifies regional desalination and other water development projects. The principle of "equitable utilization" was accepted in Annex IV. In this regard equitable does not mean equal according to Trottier (1999:64), so the interpretation of this concept is likely to be contested in future. The significance of this new form of contestation is that it is increasingly becoming institutionalized and therefore more predictable, which is clearly a desirable state of affairs.

2.2.9 Emergence of a Tentative Water Regime

The fourth round of multilateral talks was held in Oman during April 1994 during which the parties agreed to establish a Palestinian Water Authority (PWA) to manage water resources in both Gaza and Jericho (Lindholm, 1995:88). What later became known as the Cairo Agreement, was in fact an extension of the 1993 Declaration of Principles, showing the incremental nature of confidence building measures (Trottier, 1999:64). This

is relevant to a deeper understanding of regime creation and will be dealt with in due course (see Chapter 3). The autonomy of Gaza and Jericho was implemented in May 1994 (Lindholm, 1995:84). The only source of water in Gaza is groundwater from sandstone aquifers, with limited surface water found in Wadis. Around 60 x $10^6 m^3 yr^{-1}$ of renewable water resources are available in Gaza, but 95 x $10^6 m^3 yr^{-1}$ is used annually through over-abstraction (Wolf & Ross, 1992:925). This is clearly unsustainable over time. During 1995 the water table dropped by around 15-20 cm/yr and saltwater intrusion was a problem, already being evident some 1.5-km into the aquifer (Lindholm, 1995:85). Palestinians accused the Israelis of inducing this by pumping water close to the borders. The Israelis in turn accused the Palestinians of causing the problem from over-pumping prior to the Six-Day War (Shuval, 1993:65). The lack of sewerage facilities has led to groundwater contamination affecting health (Lindholm, 1995:85). This provides empirical evidence of what Homer-Dixon (1994:10) calls the ecological marginalization of people, and what Ohlsson (1998:4) calls structural scarcity, as a result of resource capture in closed river basins, which in turn becomes a fundamental driver of conflict. The relationship between these different concepts is shown in Figure 3.

The Israeli/Jordanian Peace Accords signed on 26 October 1994 contained elements of an attempt to resolve disputes over water allocation (Lindholm, 1995:55). This Israeli/Jordanian Peace Accord saw the division of the transboundary waters being contractually defined for the first time in history (Haftendorn, 2000:61). This is the first discernable element of a regime, the relevance of which will be discussed in due course (see Chapter 3). The issue of water takes up a large portion of the text, so any subsequent regime is likely to have water as a key element (Lindholm, 1995:74). Amongst other issues, agreement was reached over the distribution of the Yarmouk River water, and it was agreed that Israel would divert water from the Upper Jordan basin to the state of Jordan during the summer months. The entitlements of both Israel and Jordan were also agreed to. Article 6 of the Israeli/Jordanian Peace Accord was devoted entirely to water. Of particular significance are the clauses that acknowledge water scarcity as being endemic, with the need to cooperate to jointly develop the resource base. This notes that the need to augment supply is a high priority, opening the door to regional cooperation. It also acknowledged that water development by one party may not harm the interests of another party in the same body of water in keeping with principles of international water law (Trottier, 1999:68). Of significance, no mention is made of water quality in the Yarmouk River. This makes it possible for Israel to substitute polluted water in Lake

Tiberias with better quality water from the Yarmouk, which it is sometimes accused of doing (Allan, 2000 personal communication).

The Taba Agreement was signed in Washington on 28 September 1995. Annex 10 of this agreement listed the volumes of water from each of the three West Bank aquifers that would be used by Israelis and Palestinians during the interim period. Of this 82% would go to the Jewish settlers whereas 18% would be allocated to the Palestinians. This merely made the *de facto* situation caused by Israeli occupation legal, again showing the effect of resource capture in closed river basins, as well as the now institutionalized structural scarcity within the Palestinian community (Trottier, 1999:66). The volume of water that was left for additional Palestinian use (78 x $10^6 m^3 yr^{-1}$) was contested by the PWA however. This means that a reduction in the water available for Palestinian use may be inevitable (Trottier, 1999:67).

Table 4. Water Consumption in Terms of Article 40 of the Taba Agreement.

Source of Supply	Palestinians	Israelis
Western Aquifer	6%	94%
Northeast Aquifer	29%	71%
Eastern Aquifer	57.4%	42.6%

Source: Trottier 1999:66.

The 1996 Taba Agreement was seen as a political breakthrough in the water conflict because Israel recognized the Palestinian rights to water found in their territory for the first time. This is relevant in terms of regime creation, and will be discussed in more detail in Chapter 3. The establishment of the PWA transferred some of the control over drilling and the development of new water resources out of Israeli hands. For example, Israel granted the Palestinians 60 x $10^6 m^3 yr^{-1}$ of the Eastern Mountain Aquifer in the West Bank (Haftendorn, 2000:61). The Taba Agreement also saw Israel using its dominant position to contractually secure its current use of the Jordan water supply, while the Jordanians and Palestinians were only allowed to obtain the surplus of future water resources and the offer of technical and financial assistance (Haftendorn, 2000:64).

2.2.10 Changing the Sanctioned Discourse: The Monetization of Water

The concept of the monetization of water is often referred to in the literature on the Jordan River basin. It therefore becomes instructive to consider this issue. Research by

the Harvard Middle East Water Project (HMEWP) showed that the economic value of Jordan River water for agriculture in Israel was $\$0.20/m^3$ in 1991. In contrast to this, the $80 \times 10^6 m^3 yr^{-1}$ that can be replaced by desalination in the south of Israel based on current technology costs around $\$0.70/m^3$. Thus the predicted replacement cost of water for Israel by desalination will amount to US$ 56 million *per annum* (Shuval, 2000:49). This is not high when one considers the cost of going to war as an alternative approach (Fisher, 1996). The monetization[13] of water can thus be regarded as an essential component in the shifting hydropolitical ideology (or sanctioned discourse) of the Israeli-Palestinian conflict. This seeks to reduce the emotional content of denying water to the enemy, and changes the structure of the hydropolitical rationale of water being a low price to pay for potential peace (Feitelson, 1999 personal communication). In essence the discursive elites in this process are trying to gather enough support to legitimize (and therefore sanction) a new discourse on water resource management that differs fundamentally from the old approach, which was so intimately linked to the hydraulic mission era of the Israeli National Water Carrier Project.

Another element of this is related to the changing international water resource management paradigm that is based on the Dublin Principles (ICWE, 1992) and World Water Vision (Cosgrove & Rijsberman, 2000), which see water as an economic good with monetary value if the management thereof is to become sustainable over time. This long-term sustainability is particularly relevant in a closed basin such as the Jordan River. During 1997 Jordan also began a radical transformation of the water sector, raising prices closer to real costs, initiating privatization of the water supply and distribution system in Amman, and pressurizing water users to pay for services. Efforts were also launched to reduce losses in the water supply system, which were reported to be as high as 50% (Gleick, 1998:117). These changes are the result of the agreement with Israel that removed some of the uncertainties in water supply, showing the value of regimes as confidence-building mechanisms (see Chapter 3). One of the sensitive issues is the siting of a diversion dam on the Yarmouk River near Adassiyah to divert flow to Jordanian agricultural projects, for which some agreement has now been reached. This provides evidence of the value of uncontested rules and procedures as fundamental components of regimes (see Chapter 3).

Associated with this was the 1997 UN approved version of the International Law Commission (ILC) report that gives priority to the rights of historical or prior use, and

[13] This is what Feitelson (1999) refers to as the "commodification" of water.

considers depriving a downstream riparian state that currently uses the water for economic and social purposes as unacceptable since it will result in "appreciable damage" to the current user (Eckstein, 2002:85; Shuval, 2000:48). This gives some degree of assurance to downstream riparian states like Israel that there is recourse to legal solutions if needed. At least it suggests that during negotiations on the issue, the moral high ground will be given to those arguments that are couched in legally acceptable principles.

The election of Ehud Barak as the Israeli Prime Minister in 1999 gave the peace talks a boost at a time when the normative basis of the management of international river basins was starting to change at the global level. This was in conjunction with Syrian President Hafas El Assad's statement that it is Syria's strategic goal to achieve peace with Israel based on the principle that "territories taken by force in war should be returned as a condition for peace". US President Bill Clinton underscored these initiatives during December 1999 (Shuval, 2000:40). The subsequent reopening of the peace talks between Syria and Israel raised the issue of water in the upper Jordan basin in a relevant and timely fashion (Shuval, 2000:40). A drought was also experienced in the region (see Figure 2), providing an ideal backdrop to the apparent new desire to cooperate. Until this drought, irrigated agriculture consumed 71% of the water in Jordan, and 66% of the water in Israel (Trottier, 1999:70). This drought started to change the perception that water on its own is a strategic resource, and grain importation policies were considered to be a remedy for the first time, in keeping with the virtual water thesis (Allan, 2000:33). This represents a shift in focus away from first-order issues to second-order issues for the first time in the Jordan River basin, with the monetization of water as a central component to this shift. This virtual water trade has now started to become significant, with Jordan importing 91%, and Israel importing 87% of their respective grain needs (Postel, 1999 as cited by Trottier, 1999:70), meaning that in effect the water deficit in the Jordan River basin is now being balanced through trade rather than by means of the large transfers of water that were envisaged on Maps 3 & 4. It is this trade in virtual water that has prevented a further escalation in the conflict (Allan, 2000:215). Significantly, these strategic alternatives can only be considered when water resource management is no longer perceived as being a national security issue.

2.2.11 Discussion: Basin Closure and Increasing Levels of Insecurity

> "The concept of resource vulnerability has been associated with the inability to sustain economic and social activity commensurate with a region's goals

> … Thus, a nation may be said to be water vulnerable if its capacity both to sustain its aquatic ecosystem and to provide its population with a desired level of economic and social development, is compromised by the nature of the hydrologic system, its water resources infrastructure or its water management system" (Raskins, 1997:22).

It can be seen from the Jordan River case study that access to water was one of the factors that were considered in defining the state borders of Israel, but not the only factor (Lindholm, 1995:60; Medzini, 2001:193). Salmi (1997:15) goes further than this by concluding that one of the critical elements in the overall problem surrounding water and conflict in the occupied Palestinian territory (and broader Middle East) is the "limited water resources themselves, which, in this semiarid region, are vital for development and impinge on wider security issues for all countries in the region". Güner (1997:105) concurs with this view, adding that "the scarcity of water in the Middle East is a deeply rooted security issue, given the rapid growth of population in the region and global climatic changes".

Because water was one of the major issues that were of concern when the modern state of Israel was being formed, it became a fundamental component of the respective ideologies that are at work in the Arab-Israeli and Israeli-Palestinian conflicts. An element of this was the need to expand the absorptive capacity in order to support the growing immigrant numbers over time. The Israeli need for water for the country's highly advanced agricultural sector, and the joint dependency of Israel and the West Bank on the River Jordan and the groundwater aquifers in the highlands of the West Bank, are crucial factors to the Israeli occupation (Lindholm, 1995:55-7; Wolf, 1996). The growing population has exerted considerable pressure on natural resources, and the utilization of water has now reached its limit (Lindholm, 1995:57).

Falkenmark (1986:197) has used the Jordan River basin as a benchmark for the development of the concept of the water barrier, because it is such an extreme example. This was done by taking statistical data that provided an indication of water consumption *per capita* from various countries, which revealed the following patterns of water consumption (Falkenmark, 1986:197):

- Iraq uses 4 400 m^3/p/yr
- Pakistan uses 2 200 m^3/p/yr
- Syria uses 1 300 m^3/p/yr

- Egypt uses 1 200 m^3/p/yr
- India uses 800 m^3/p/yr
- Israel uses 500 m^3/p/yr

Taking the case of Israel as an example, Falkenmark (1986:197) concluded that a realistic level for a developing state is 500 m^3/p/yr as this would allow 100 m^3/p/yr for domestic and industrial use leaving the remaining 400 m^3/p/yr (80% of the total) for irrigation. This is considered to be the water barrier beyond which development is not possible under levels of currently available advanced technology. This implies that the water barrier may change as new technologies become available, but these advanced technologies are normally not available to developing states, which will be discussed in more detail in Chapter 3. As such it shows how access to, and control over technology, can become a competitive element in a closed river basin. It also implies that in certain developing countries such as in the Palestinian proto-state, where technological access is low and the population burden is high, a type of threshold may be reached beyond which sustainable development is simply not feasible. It is therefore highly relevant that Falkenmark (1989b) has developed her benchmark of water consumption *per capita* and economic development potential by using the Jordan River basin as a baseline.

Population is therefore a key factor in understanding the hydropolitical dynamics of closed river basins. The population is growing in the Jordan River basin due to a large birth rate in the Arab sectors, as well due to the resettlement of Jews from elsewhere in the world, such as from the former Soviet Union (USSR). A potential Palestinian state will presumably also see the massive influx of refugees from neighbouring states, increasing the population pressure in a short period of time, causing additional difficulties (Lindholm, 1995:80).

The West Bank, Gaza and Jordan have reached the water barrier (Falkenmark, 1990:181). These areas can simply take no more people without drastic measures being taken to secure the availability of potable water. Despite the fact that Israel is exploiting all of its mean annual runoff (MAR), recycling all of the sewerage discharge, and recycling 30% of the urban waste to agriculture, there is still a gap of between 200 - 300 x $10^6 m^3 yr^{-1}$ (Clarke, 1991; Lindholm, 1995:57). This makes water scarcity a fundamental problem of survival in the region, thereby elevating it to the level of a strategic issue for the respective governments, establishing the Jordan River basin as an excellent case study of

the results of basin closure. Tables 5 & 6 indicate the extent of the water scarcity in Israel, Jordan and the West Bank.

Table 5. Expected Water Shortage in 2010 Based on the 1991/2 Israeli Drought Data.

Israel	Jordan	West Bank
375 x $10^6 m^3/yr$	175 x $10^6 m^3 yr^{-1}$	135 x $10^6 m^3 yr^{-1}$

Source: Kally 1991:11 as cited by Lindholm 1995:58.

Table 6. Water Supply and Demand, Present and Future ($10^6 m^3 yr^{-1}$).

	Israel	Jordan	West Bank
Water Supply			
1987 - 1991			
Under normal conditions	1,950	900	650
Under drought conditions	1,600	700-750	450-550
Water Demand			
1987 - 1991	2,100*	800	125†
2020	2,800	1,800	530
Notes: * Including settlements in the occupied territories and the Golan Heights. † The Arab population of the West Bank.			

Source: Lowi 1992:34 as cited by Lindholm 1995:59.

From Tables 5 & 6 it is evident that projected demand is in excess of supply and that the Jordan River basin is closed.

Due to the heavy reliance on groundwater in the region, there is also salt-water intrusion into the aquifers. Given the fact that the salinity of the static water belts is in principle higher than the salinity of the sea, these salinization processes are irreversible (Lindholm, 1995:66). This is an example of a threshold effect in water resource management. These various aquifers are so interconnected, that they cannot realistically be managed as individual entities, establishing a permanent linkage between the respective communities (see Maps 1 & 2). One aspect of this issue is about which social grouping exercises control over the aquifers? Excessive drilling on the West Bank can cause irreversible salinization of the Israeli water system. A Palestinian state on the West Bank is thus considered to be a serious threat to the water security of Israel, and excessive drilling may be a *casus belli* for Israel (Lindholm, 1995:66). This is one of the reasons why control over the West Bank is so hotly contested. In this regard, because the West Bank is a

future Palestinian homeland, and because it is perched above an aquifer that is strategically important for Israel, a bilateral agreement and joint management of the aquifer is an absolute necessity (Lindholm, 1995:84; Wolf, 1996). Current Palestinian water scarcity is a direct result of Israeli military occupation and has characterized all facets of life on the West Bank since the Six-Day War. Furthermore, Palestinian agriculture has been made dependent on the Israeli-controlled water allocation system that was established by military occupation (Lindholm, 1995:82).

This has led Amery (1997:95) to conclude that the desire to secure water use and supply from the West Bank aquifers and from the Jordan River and its tributaries, contributed to Israel's decision to occupy the West Bank and Golan Heights during the 1967 Six-Day War, and the security zone in south Lebanon during the 1978 invasion of that country. This is consequently an extreme example of the results of basin closure, from which a number of lessons may be learned. One lesson is the fact that the Israeli economy has grown in an arid environment without any significant oil revenue (Allan, 2000:79). This was only achieved through the aggressive application of resource capture policies, leading ultimately to the institutionalization of structural scarcity, the securitization of water and the classification of hydrological data, all of which simply cascaded perceptions of increasing insecurity elsewhere in the river basin (Lesch, 1992:148 in Lindholm, 1995:89; Warner, 1996 in Buzan *et al.*, 1998:90).

The Dead Sea is a source of bromine and potassium, and as such forms a strategically significant part of the Israeli industrial complex. Due to the heavy over-abstraction of water from the Jordan River basin upstream of the Dead Sea, the level has fallen, resulting in the collapse of ecosystems. This threshold effect has introduced an ecological dimension into the overall security equation of the Jordan River basin, raising serious questions about sustainability over time. This poses a threat to Israel, and is one of the reasons why the canal between the Mediterranean and the Dead Sea (the so-called Med-Dead Canal) was planned in the late 1970s (Lindholm, 1995:72-3). This will generate hydroelectric power that will be used to power the desalination plants at Ashod. This in turn provoked Jordanian fears that their agricultural production would be damaged by the influx of seawater, heightening their desire to gain direct control over a jointly shared resource.

2.2.12 Conclusion Regarding the Consequences of Basin Closure

From this overview, a tentative model that shows the interrelationship of the various concepts and drivers can be developed (see Figure 3). The Jordan River basin case study provides an insight into some of the hydropolitical dynamics related to basin closure, which can be distilled into a number of distinct issues.

Arguably the central issue is that of insecurity which results from basin closure. In this regard it is more accurate to conclude that perceptions of insecurity are really more important than actual insecurity, because it is these perceptions that drive political decision-making. Central to this whole process of increasing levels of insecurity is the aspect of threat perception. It can be said that threat perceptions are forged from a wider set of political experiences that converge to create a specific way in which the relevance of water deficit is interpreted by gate-keeping elites. Insecurity is also caused by competing demands on a limited and dwindling resource-base. In this case powerful gate-keeping political elites translate this perception of insecurity into an active policy of resource capture. As security of supply is assured to one group of people (or state) in a closed river basin, insecurity is merely cascaded downstream to other potential users of the same scarce resource-base. Under these conditions the most likely result of this set of hydropolitical dynamics is a zero-sum outcome, when downstream riparians interpret events through their own prevailing threat perception, and translate this into a perceived national security concern, which in turn results in a high conflict potential.

Resulting directly from perceptions of insecurity, the process of securitization starts to unfold. This has a number of key elements to it.

(a) One key element is technology, where a riparian state will mobilize the best available technology in order to improve its position as much as possible in a given closed river basin.

(b) This can be manifest in what can be described as a first-order (hardware) approach where major water infrastructure is developed as a form of supply-sided management approach to the perceived problem. The Jordan River basin has elements of this in the form of the Israeli National Water Carrier Project, the Jordanian East Ghor Canal, the mooted 1959 Arab League Diversion Plan and the planned Israeli diversion of the Litani River in Lebanon.

(c) This is also manifest in what can be described as a second-order (institutional) approach where hydrological data becomes the key focal point. In the Jordan River basin this saw the classification of key hydrological data by the Israeli government (Lesch, 1992:148 in Lindholm, 1995:89; Warner, 1996 in Buzan *et al.*, 1998:90). Data therefore becomes a focal point of conflict in closed river basins, where a technologically advanced riparian will gather, interpret and use data to their advantage, while deliberately withholding it from their hydropolitical rivals. Under these conditions, knowledge is power, and it is wielded like a weapon to achieve and maintain hegemonic control.

The results of the first two issues noted above act as a fundamental driver for the third key issue that manifests itself in closed river basins. Resource capture is one of the main responses by the hegemonic power within the closed river basin. The Jordan River basin case study reveals the systematic use of resource capture. Some of these examples are:

(a) The phenomenon of the landless Arab peasant that started to emerge as early as 1920 before the state of Israel even existed. In this case the resource being captured was land, but land without water has limited value.

(b) The Absentee Property Law that was promulgated in 1950 reinforced this early form of land-based resource capture.

(c) The 1959 Water Law saw water becoming the main focus of resource capture, now that the land-based resource had already been captured. It is after all water that gives land its value.

(d) Military Order No. 158, imposed after the Six-Day War, consolidated control over the development of groundwater, thereby strengthening the water-related resource capture in the Occupied Territories, tipping the hydropolitical balance of power firmly in favour of Israel.

The fourth key issue is related to population growth. In the Jordan River basin it is evident that rapidly growing populations from various riparian states and stakeholders, formed separate political constituencies. These growing populations need to be fed, housed and given jobs, all of which places a severe and escalating strain on a dwindling

water resource-base in a closed river basin. This results, over a period of time, in water becoming a strategic issue, as the economic relevance of water is realized by the decision-making elites.

Due to the strategic significance of access to, and control over water resources in a closed river basin, there is a strong impulse to develop and articulate a hydraulic mission in society. This hydraulic mission becomes the manifestation of a form of hydropolitical ideology that is underpinned by a strongly articulated sanctioned discourse. It therefore starts to act as a fundamental driver in its own right, simply because it results in institutional development, legal development and other related long-term outcomes, or what might be called revenge effects. This hydraulic mission, as manifest in the Jordan River basin case study, has a number of distinct elements to it.

(a) There is an ideological dimension to it in the strictly political sense of the word. An example of this is the basic Zionist ideal of settling the land again as a symbolic return of the Jewish Diaspora, and making the desert bloom as a manifestation of that resettlement.

(b) There is also a security element to it. In the case of Israel, the defence doctrine was based on notions of depth, which was simply not possible with the limited land that was available to the new state of Israel in 1948. Another element was the use of water to sustain Jewish settlements in the otherwise inhospitable Negev Desert in order to provide security outposts.

(c) There is also an economic element to it. In the Jordan River basin case study, control over water resources is a foundation for potential economic growth and prosperity, in a region where economic growth is generally stagnant, and where population growth is a significant factor.

(d) There is finally a punitive element to it that is based on the use of water as a political tool, or in extreme cases, as a weapon of war. In the Jordan River basin case study, numerous examples can be found, the most notable of which was the 1959 Arab League Diversion Plan, which sought to deliberately deny water to Israel. The deployment of Palestinian *Al Fatah* guerillas by Syria to disrupt the Israeli National Water Carrier Project (Lindholm, 1995:69) occurred along the same lines. The Israeli bombing of the hydraulic works for the proposed Arab

League Diversion of the Jordan River is also a vivid example (Gleick, 1998:129). The different depth of Palestinian and Jewish settler wells in the occupied West Bank as prescribed by law is another harsh example (Lindholm, 1995:80).

Water and sovereignty issues are clearly evident from the Jordan River basin case study, with all riparians claiming sovereignty over the source of water at some point in time.

(a) One of the best examples of this is control over the aquifers that are found under the occupied West Bank, which if left to Palestinian control, would significantly alter the hydropolitical balance of power to the detriment of Israel.

(b) Another example is the rationalization that the water in the Jordan River is in fact "Arab Water" because it falls on Arab soil and merely flows into downstream Israel by virtue of the laws of physics (Shuval, 2000:48).

(c) This raises the significance of endogenous versus exogenous water. A state is highly vulnerable if it depends on exogenous water for its strategic water supply, raising perceptions of insecurity, which are fuelled by the belief that the upstream riparian state can shut off the supply in times of hostility.

The Jordan River basin case reveals some unique features of water in closed river basins. The most notable of these are extremes of:

(a) Water as a *casus belli* with a high pay-off zero-sum outcome.

(b) Water as a weapon of war or a political tool to be wielded with aggression in this zero-sum game.

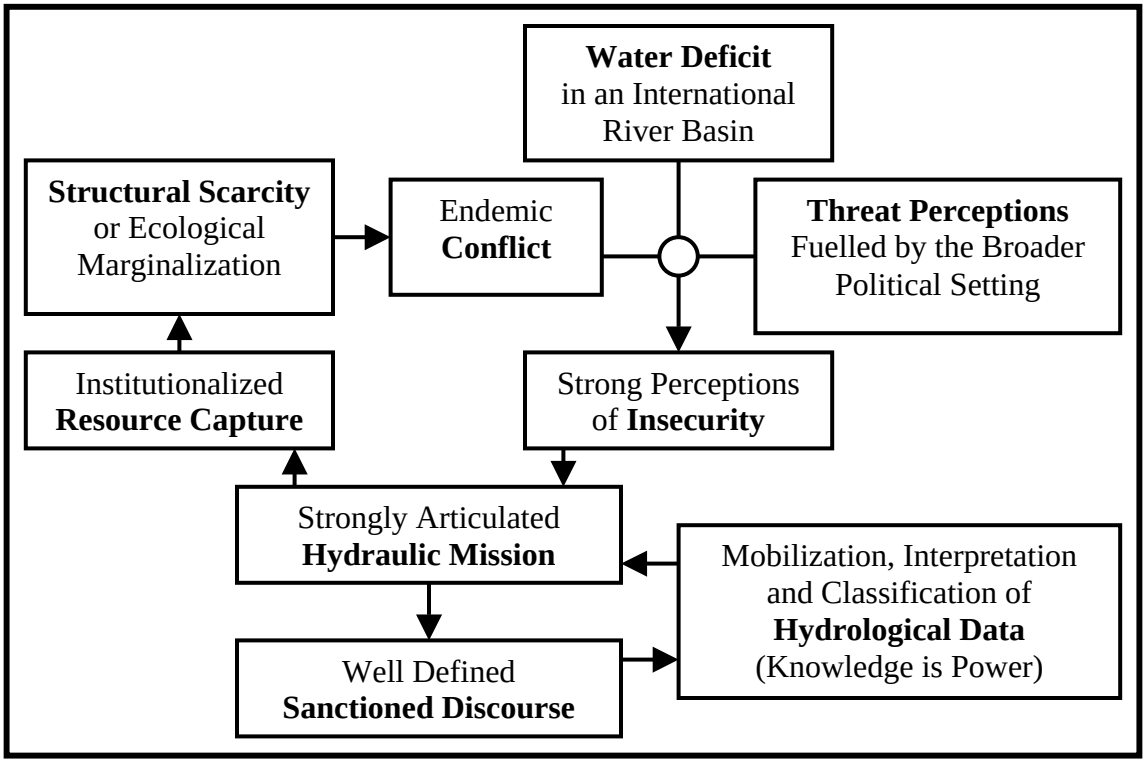
(c) Water as a potential catalyst for peace, as riparian states slowly realize that they are linked to one another by virtue of their interdependence on the resources found in a shared international river basin, for which no other viable alternative can be found, and that their best long-term interests are served by changing the zero-sum political configuration, to one of a plus-sum outcome based on cooperation instead.

(iv) Central to these unique features is the role of emblematic events in enabling the sanctioned discourse to be re-examined, and where appropriate, changed.

Significant to the Jordan River basin case study is the role of basin-wide planning and water sector institutional development as a confidence-building mechanism, in an otherwise extremely hostile political arena, in which the language of compromise is usually seen as a sign of weakness. Central to this is the role that uncontested hydrological data can play as both a confidence-building mechanism, and a central element for the de-escalation of perceptions of insecurity in a highly contested, closed international river basin.

Finally, it can be concluded that the economically most developed state, with the greatest technical capacity, tends to monopolize access to the resource base in a closed river basin, in an attempt to improve their own security of supply. Such a state will tend to become hegemonic, resulting in the cascading of insecurity elsewhere in the closed river basin. This can be regarded as being one of the most fundamental outcomes of river basin closure, namely the rise in perceptions of insecurity, and in particular those experienced by lower-order riparian states, over time.

Figure 3. Securitization Model.



2.3 Securitization as a Consequence of Increasing Levels of Insecurity

One of the fundamental outcomes of river basin closure is an escalation in the level of insecurity as perceived by the various riparian states as shown in the review of the literature relevant to the Jordan River basin. It therefore becomes necessary to understand the hydropolitical dynamics that are at work under such conditions. Central to this is an understanding of the processes of securitization and potential desecuritization of issues, which is possible by means of security complex theory (SCT) that is being developed by Buzan (1988; 1991; 1994), Buzan *et al* (1998) and Buzan & Wæver (forthcoming).

2.3.1 Introduction to Security Complex Theory

When the Berlin wall fell and the Cold War ground to a halt, a new wave of optimism engulfed the entire planet. It seemed, at least for a moment in time, that there was cause for a new optimism, and for some that history itself had reached its logical end (Fukuyama, 1992). This short-lived optimism quickly saw a scramble for post-Cold War political hegemony, and a new global agenda started to emerge. In this process, two things occurred. The first was the expansion of the notion of security (Buzan, 1991; Buzan *et al.*, 1998; Buzan & Wæver, forthcoming) that brought with it the central concepts of securitization, securitizing actors, referent objects and security complexes. The second was the birth of a globalizing discourse with a number of key ramifications, one of which is the emergence of, "environmental issues [which] symbolize … the most salient features of the post-Cold War world" (Rodal, 1996). One subset of these environmental issues is the emergence of a powerful global discourse for the management of water resources (Agence de l'Eau, 2000; Cosgrove & Rijsberman, 2000; van Hofwegen & Svendsen, 2000). This has become linked with national security, for as Du Plessis (2000:13-14) notes:

> "[T]he water discourse is concerned with, and inextricably linked to, the concept of security. This concern extends to environmental security in general, and to water security in particular. This latter focus, and its collateral theoretical conceptualizations, are forced upon the scene by specifically linking the water discourse … to the war/peace and conflict/cooperation [*problematique*], and by considering water to be a potential source or cause of (violent) conflict. ... The result is the emergence of a new strategic imperative expressed by the term environmental security. This addresses the environmental factors behind potentially violent

> conflicts, and the impact of global environmental degradation on the well being of societies and economies (Porter, 1998:215). This development is, in part, the result of the 'new' security paradigm that has broadened and deepened the security agenda by including non-military ('low-politics') threats, as well as non-state, security stakeholders at all levels of society. Hence, it is also linked to the notion of common security, which has as its foundation common interests that, at a minimum, requires a shared interest in survival (Butfoy, 1997:126). Irrespective of the fact that post-1989 security has acquired a wider meaning than protection from military threat, its broader conceptualization has paradoxically contributed to the securitization and militarization of water as a traditional non-military concern".

Growing public awareness of environmental concerns has not only shifted our awareness of the environment, but also how we perceive the world of capital (Fine, 2001:27). In fact, the rise of the environmental movement contributed fundamentally to a widening of the concept of security (Buzan *et al.,* 1998:2), to the point of being seen by some as the "ultimate security" (Myers, 1993). In short, from a water sector perspective, the environment and related issues are becoming securitized, which is particularly true in closed (or closing) river basins (Gebramendhin, 1991; Hjort af Ornas & Salih, 1989; Mathews, 1989; Myers, 1986; Myers, 1989; Myers, 1993). This literature review seeks to examine some of the ramifications of this, using SCT as an analytical tool.

2.3.2 An Overview of Security Complex Theory

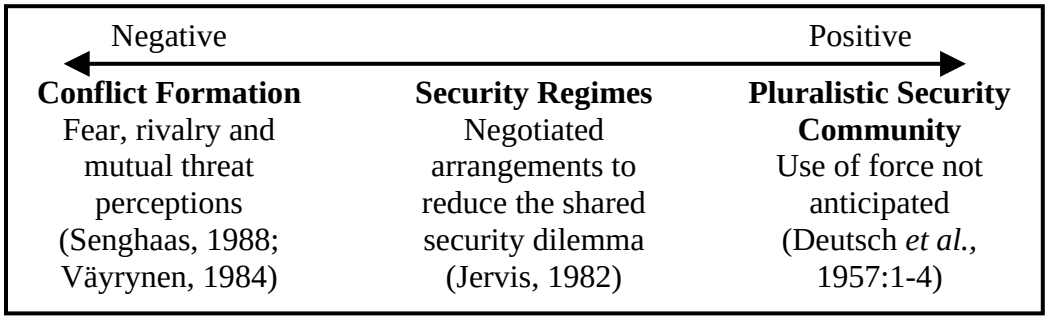
The fact that the Cold War was won by accelerating the arms race, rather than by the actual use of those arms, emphasized the importance of expanding the concept of security (Allan, 2000:244). Buzan *et al* (1998:2) note that the rise of a globalized environmental movement, along with other transnational issues such as crime, have also contributed to the widening of the concept of security. However, security is a relational phenomenon, so consequently one cannot understand the national security of any given state without understanding the international pattern of security interdependence in which it is embedded (Buzan, 1991:187). Comprehensive security analysis calls for focus on how the regional level of political interaction mediates the interplay between states and the international system as a whole (Buzan, 1991:188). This has meant that regional political interactions are only now starting to become manifest in the post-Cold War era.

The idea of a regional system has been historically linked to Europe and its inherent balance of power dynamics (Buzan, 1991:188). Even the massive process of

decolonisation, which should have caused attention to be given to emerging regional security sub-systems, was unfortunately overshadowed by the global superpower rivalry. By focusing on regional subsystems, two important levels of analysis between system and the state are possible: the subsystem itself; and the pattern of relationships among the various units that make up that subsystem (Buzan, 1991:188).

Consequently, Buzan *et al* (1998:201) have developed the concept of a security complex that embraces these key levels of analysis. While securitization of water is not necessarily a desirable outcome of water resource management, the concept does help us to understand political linkages between states in shared international river basins. In particular, the concept allows an understanding of the process of securitization arising from basin closure to be developed. Security complexes emphasize the interdependence of both rivalries and shared interests that can be depicted as a spectrum of possible relationships as shown schematically in Figure 4.

Figure 4. The Security Complex Spectrum.

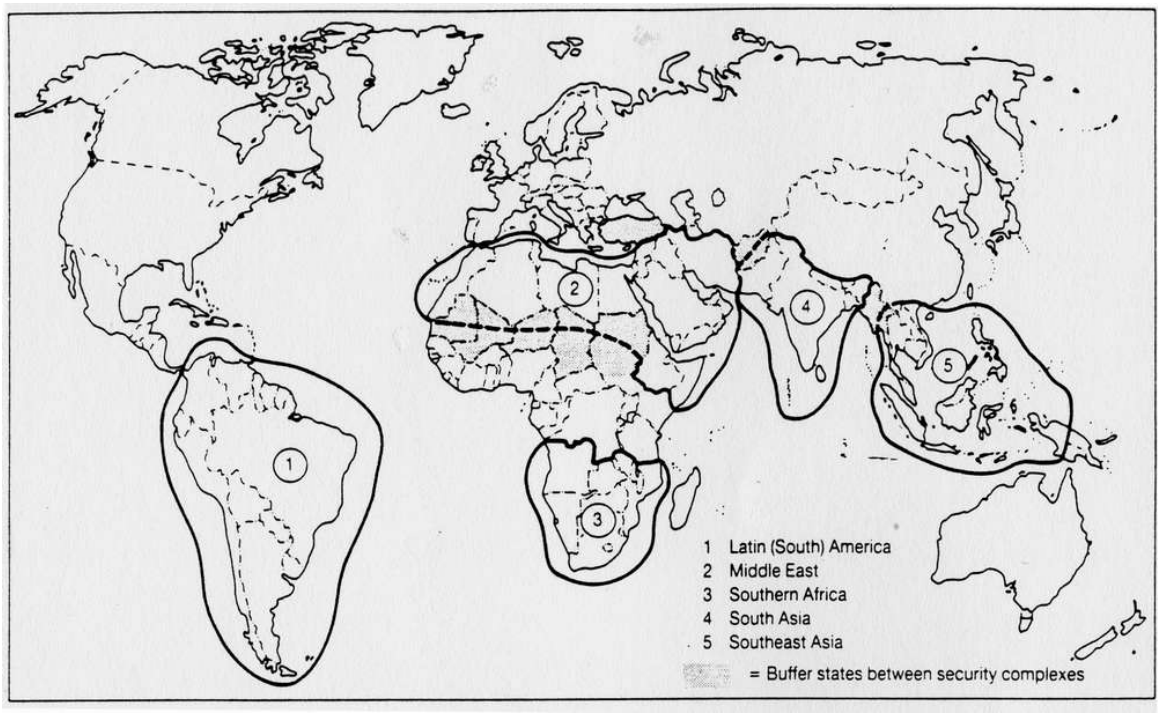


Source: Adapted from Buzan *et al.*, 1998:12.

Significantly, security complexes are merely analytical devices, being an empirical phenomenon with both historic and geopolitical roots. In fact, security complexes do not require that their members think in terms of this concept - as such they are not actor-defined conditions - but rather analytical tools (Buzan *et al.*, 1998:20). Due to the fact that threats are greater over shorter distances, security interactions with neighbours tend to assume a higher priority. Therefore, seen from the top down, security complexes are generated by the interaction of anarchy and geography, where the political structure of anarchy confronts all states with a security dilemma (such as that resulting from water deficit in a closed international river basin as demonstrated in the Jordan River case study), but this is almost always mediated by the effects of geography (Buzan, 1991:191). The reality of security complexes can be found more in the patterns of amity and enmity

between states, than in the notion of self-awareness. Like the balance of power, a security complex can exist regardless of whether the individual actors recognize or acknowledge its existence (Buzan, 1991:192). A security complex occurs where a set of security relationships stands out from the general background by virtue of its relatively strong, inward looking character, as well as by its relatively weak outward security interactions with its neighbours. The boundaries between security complexes are defined by relative indifference towards security perceptions and interactions (Buzan, 1991:193).

Map 5. Security Complexes in the Third World.



Source: Buzan 1991:210.

A central feature of the emergence of security complexes is the impact of what is known as overlay, which is that condition that prevails when the direct presence of outside powers in a region is strong enough to suppress the normal operation of security dynamics among the local states (Buzan, 1991:198). Overlay thus subordinates local security dynamics, which once removed, tends to become a transforming experience, unleashing new interactions over time. As such, overlay has had a major impact on regional security complexes, most notably the result of European and Japanese colonialism in the Third World. The process of colonialism ended at about the same time that superpower rivalry emerged after the Second World War, meaning that one form of overlay was merely replaced by another, thereby continuing to suppress the emergence of

more visible local security dynamics. This means that overlay has had a significant impact on the study of security relationships, particularly in the developing world. With the demise of the Cold War, a number of regional security complexes are starting to emerge (Buzan, 1991:202-209). This led to early attempts to identify security complexes that were emerging in the Third World, such as the Latin American Security Complex; the Middle East Security Complex; the Southern African Security Complex; the South Asian Security Complex; and the Southeast Asian Security Complex (see Map 5) (Buzan, 1991:210).

Security is about understanding political interactions in a wider context. Therefore, international security is about relationships between threats and vulnerabilities, which are most marked in a regional setting. The rather unique case of rising perceptions of insecurity that can occur in closing international river basins provides one such setting, as demonstrated in the Jordan River case study. Consequently, and in an attempt to accommodate this issue of proximity on security perceptions, Classical Security Complex Theory (CSCT) (Buzan, 1991:186-229) posits the existence of regional sub-systems as objects of security analysis and offers a framework for dealing with this (Buzan *et al.*, 1998:10-11). While CSCT had the advantage of drawing attention away from the extremes of national and global security by focussing attention on mediating regional political interaction, it is still incomplete as an analytical approach (Buzan, 1991:186-229; Buzan *et al.*, 1998:14). For this reason Buzan *et al.*, (1998) move beyond CSCT, because that specific approach is too narrow in focus (states only), with a bias towards military and nuclear threats and threat perceptions. Instead they make the case for widening the conceptual net in order to increase the range of issues and sectors that can be analyzed in a meaningful way. In this process of widening, they distinguish two generic types of security complexes (Buzan *et al.*, 1998:16). These are *homogenous security complexes* such as studies of power rivalries among states using terminology such as “military complex”; and *heterogeneous security complexes* such as studies focusing on states, nations, transnational corporations and confederations interacting across the political, economic and societal sector.

Due to the fact that heterogeneous security complexes have the advantage of linking across sectors, the analyst is able to build up a more detailed understanding of complex political dynamics by identifying linkages between sectors (military, economic, societal, environmental etc.), units (states, nations, multinational corporations etc.) and levels (local, national, regional and global). In order to achieve this, scientific discipline is

obviously needed, for without it, "the security of each is related to the security of all, [so] nothing can be fully understood without understanding everything" (Buzan, 1991:187). By taking a social constructivist approach to the understanding of the processes of securitization, Buzan *et al* (1998:19) move beyond this dilemma. Central to this is the way in which two key questions are answered:

- How to identify what is (and what is not) a security issue?
- How to identify and distinguish security actors and referent objects?

This wider approach to security achieves two things (Buzan *et al.,* 1998:4). Firstly, the wider agenda extends a call for state mobilization to a broader range of issues. This can have undesirable or unintended consequences however, as the case for the securitization of water resource management at the global level shows (Wester & Warner, 2002:61). Secondly, the wider agenda elevates security to a common good. Wæver (1995) warns that this may be dangerous, calling for the desecuritization of issues wherever possible and appropriate. However, there is a clear set of criteria for something to be considered as a security issue. Buzan *et al* (1998:5) state explicitly that certain criteria distinguish normal political issues from security issues. For something to become relevant in a security context, the issues must be staged as an existential threat; this threat must be posed to a referent object; a securitizing actor must perform this securitizing action; and the intention must be to generate endorsements of emergency measures beyond rules that would otherwise bind.

Table 7. Types of Units Involved in Security Complex Analysis.

Unit as envisaged by Buzan *et al* (1998:36)	**Use in Study**
Referent Objects - things that are seen to be existentially threatened that have a legitimate claim to survival.	Perceptions of economic and social stability by the political elite of a specific riparian state (e.g. South Africa, Namibia, Botswana, Swaziland, Mozambique, Lesotho, Zimbabwe).
Securitizing Actors - actors who securitize issues by declaring a referent object as being existentially threatened.	Affected riparian state in a given international river basin, or a lead actor that is not a riparian state.
Functional Actors - actors who affect the dynamics of a sector without being the referent object or securitizing actor.	Non-affected riparian state (often in a high order riparian position in a given basin, or an interested third party).

Source: Adapted from Buzan *et al*., 1998:36.

Table 7 presents the types of units involved in SCT, along with an indication of the relationship between key concepts and the way that these will be applied to the South African case study (see Chapters 4 & 5).

Seen in this light, security complexes become sub-systems or mini-anarchies in their own right (Buzan *et al.,* 1998:13). However, because they are durable manifestations of inter-state behavior, seeing them as sub-systems with their own pattern of interaction provides a useful benchmark against which changes in the security patterns can be identified over time. Having established the fact that security complexes are useful objects of analysis, Buzan *et al* (1998:13-14) identify the three main components of the essential structure of any given security complex. Essential structure is the standard by which change can be measured in a given security complex (Buzan, 1991:211). The main components of essential structure are the arrangement of units and the differentiation between them; the patterns of amity and enmity that exist between those units over time; and the distribution of power between the principle units (Buzan *et al.,* 1998:13-14).

Changes bearing on any given security complex are numerous and continuous. For this reason, the key analytical question to ask is how such changes work to either sustain or alter the essential structure of the security complex, of which four main structural options are evident (Buzan, 1991:216-220; Buzan *et al.,* 1998:13-14):

(a) Maintenance of the *status quo* means that the essential structure of a given security complex remains fundamentally intact over time. This does not mean that change does not occur, but it does mean that those changes tend to support rather than undermine the prevailing structure.

(b) Internal transformation of a given security complex occurs when the essential structure changes within the context of the existing outer boundary. This can occur as the result of regional political integration, changes in the distribution of power or changes to the pattern of amity and enmity.

(c) External transformation of a given security complex occurs when the essential structure shows change in the existing outer boundary. This can occur when major states join or leave the complex, or the overall distribution of power, amity and enmity is evident.

(d) Overlay can be the cause of change within a given security complex when one or more external powers move directly into, or out of that complex. This situation is distinct from the normal process of great power intervention.

Security complexes can be treated as objects for policy in the sense that problems can only be resolved within the context of the relevant security complex as a whole (Buzan, 1991:225). This introduces the valuable notion of proximity, or stated differently, geographic focus, which is clearly relevant in an international river basin in which rising perceptions of insecurity are manifest among some (or all) of the riparian states (Buzan *et al.,* 1998:11). This is evident in the Jordan River basin case study.

The collapse of bipolarity that was associated with the Cold War means that the focus has shifted from the global level (international system) to the regional level (international sub-system) (Buzan *et al.,* 1998:9). It is argued that by identifying the mechanism that forms a region, this dynamic can provide a useful subsystem level of analysis in its own right (Buzan *et al.,* 1998:10). Once the regional level has been established, the range of layers in the given analytical framework can be developed. The method for analysis is to first understand the distinctive security dynamic that works at each layer and then to determine the respective security interactions between layers (Buzan *et al.,* 1998:14). This has obvious implications for a study of changing perceptions of insecurity that may be found in a closing international river basin.

This in turn raises the notion of different levels of analysis. Security Complex Theory allows attention to be given to the macro, middle and micro levels of political interaction (Buzan, 1991:222). In the study of international relations, there are five commonly used levels of analysis (Buzan *et al.,* 1998:5-6):

(a) The international system comprises the largest conglomerate of interacting or independent units that have no system level above them.

(b) The international sub-system comprises groups of units within the international system that can be distinguished by the particular nature or intensity of their interactions or interdependence on one another. Examples are the Organization of Petroleum Exporting Countries (OPEC), the African Union (AU) (formerly the Organization of African Unity - OAU) and the Southern African Development Community (SADC).

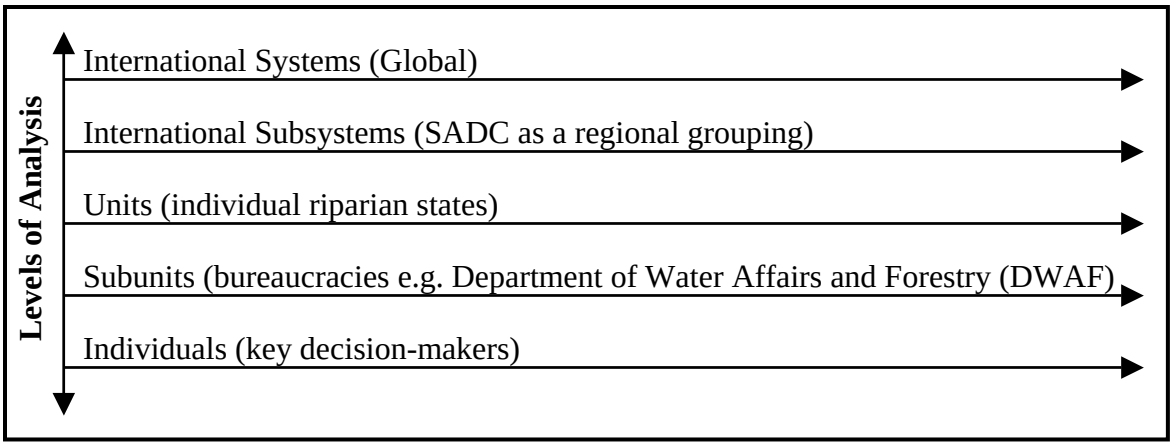
(c) Units such as states, nations and transnational corporations.

(d) Sub-units comprise organized groups of individuals within units that seek to affect the behavior of the unit. Examples are bureaucracies and the lobbies of special interest groups.

(e) Individuals are the lowest levels of analysis in most social sciences.

This is shown schematically in Figure 5.

Figure 5. Levels of Analysis.



Source: Adapted from Buzan *et al*., 1998:5-6.

It is noted that the criteria for assigning levels to a given analytical framework is essentially a political issue, focusing on what constellation of actors forms on any given issue (Buzan *et al.*, 1998:18). The cause and effect relationship can be an indicator of the appropriate level. For example, an issue like water scarcity can become securitized at the global level, but the major focus will most likely be regional in nature. This in turn can unleash political dynamics such as upstream/downstream concerns, which are likely to play into other rivalries within a given regional setting, thereby becoming tied to a more general regional security complex. The main aspect to focus on is where the security dynamics are principally located. Two considerations will affect the answer to this question (Buzan *et al.*, 1998:17). Firstly, *the cause-effect nature of the issues around which securitization is taking place* needs to be considered. For example, water pollution occurs world wide, but it remains a local or regional issue. At best water pollution is a

parallel regional issue. Secondly, *the process of the securitization of any given issue* needs to be assessed.

The most important aspect of these two considerations is the level of the issue, rather than the level of its securitization (Buzan *et al.*, 1998:17-18). Central to this aspect is identifying the actors that are linked, and how that linkage plays out. In this regard the work that has been done by Mouritzen (1995; 1997) is highly relevant according to Buzan *et al* (1998:9-10). Mouritzen (1980:172-180) argues that because units are non-mobile, each unit will be a component of a relatively stable regional political environment, consisting of the major units in its geographical proximity. This means that river basins are highly relevant focal points for analysis, given the fact that the riparian positions are fixed, and that each unit is locked into a given relationship with the other riparian states over which they have essentially no direct control. For as Buzan *et al* (1998:18) note,

> "a water shortage could become securitized at the global level, but the major battles will most likely be regional. Upstream and downstream powers and other potential beneficiaries from a particular river or lake will see each other as both threats and potential allies, which might play into other rivalries and constellations in the region and thus become tied into a more general regional security complex".

Building on this, Buzan *et al* (1998:18-19) develop three key concepts, namely the region; the sub-region; and the micro-region, all of which are defined in Chapter 1. Table 8 lists more details of these concepts, and in particular how they will be applied to the South African case study (see Chapters 4 & 5).

Table 8. Instruments of Measurement.

	Use in Study	
Instrument of Measurement (as envisaged by Buzan *et al.*, 1998:18-19)	**Organizing Level**	**Unit or Instrument**
Region - spatially coherent territory composed of two or more states.	SADC	SADC Water Protocol
Subregion - part of a region involving more than one state, but fewer than all the states in the region.	International river basin	River basin organization or regime
Microregion - the subunit level within the boundaries of a state.	Catchment or sub-basin	Catchment management agency

Source: Adapted from Buzan *et al.*, 1998:18-19.

In short, the issues arising from international river basins facing closure can become one of the drivers of any set of regional political dynamics, if the respective units are highly dependent on the water resources found therein. Significantly, the notion of the non-mobility of units is not part of the analytical schema that is found in contemporary mainstream international relations theory. Buzan *et al* (1998:10) note for example that Hollis and Smith (1990:7-9) make no mention of this fact. Associated with this approach is the potential role played by different sectors in any given analysis. If a multisectoral approach to security studies is to be meaningful, referent objects other than the state must be allowed to enter the overall analysis. As such, sectors serve to desegregate a larger whole for purposes of analysis, of which five exist (Buzan *et al.*, 1998:7-8). These are respectively the military sector; political sector; economic sector; societal sector; and the environmental sector. Details of these different sectors are presented in Table 9.

Table 9. Sectors within a Security Complex.

Sector (as envisaged by Buzan *et al*., (1998:7)	**Relationship**
Military	Forceful coercion
Political	Authority, governing status & recognition
Economic	Trade, production & finance
Societal	Collective identity
Environmental sector	Human relationship with planetary biosphere

Source: Adapted from Buzan *et al*., 1998:7.

It is evident from the Jordan River basin case study, that water deficit, and in particular perceptions of insecurity that emerge from this condition, impact on a variety of sectors. For example, the desire to gain access to, and control over, strategically important water resources such as those found in the Golan Heights and West Bank aquifer systems; as well as diversion works for the Israeli National Water Carrier Project and East Ghor Canal in Jordan, have been directly related to military action at one time or another. Aggressive policies of Israeli resource capture have also ensured that economic prosperity can be enjoyed by a select group of people, impacting directly on the economic sector of all the hydropolitical role-players concerned. Similarly, the Israeli hydraulic mission has strong linkages to perceptions about the societal sector, and in particular about deeply held Zionist beliefs surrounding the return of Jewish settlers to the land. This has impacted directly on the political sector because water resource

management has become so deeply politicized in the Jordan River basin. Finally, there is also an impact on the environmental sector because of salt-water intrusion into various aquifer systems, as well as the economic results of collapsing ecosystems in the Dead Sea area caused by the over-abstraction of water from the upper Jordan River. In other words, it can be argued that the study of rising levels of insecurity in closed river basins such as the Jordan, can be studied by means of SCT, by virtue of the fact that securitization of water resource management under such conditions impacts on all five sectors.

2.3.3 Hydropolitical Security Complexes as a Distinct Form of Security Complex

The expanded approach to security as promoted by Buzan *et al* (1998) argues that it is necessary to raise awareness in order to generate the political will needed to deal with the insecurities stemming from environmental, social and political vulnerability, such as occurs during basin closure (Allan, 2000:244-245). For threats and vulnerabilities to count as security issues however, they have to be staged as existential threats, thereby endorsing emergency measures beyond the reach of normal rules that would otherwise bind actors (Buzan *et al.*, 1998:5). Significantly, contemporary water literature reflects this tendency (Turton, 2001a; Turton, 2002a:13-15; Wester & Warner, 2002:61), seeking to galvanize support by focussing on water and crisis (Bulloch & Darwish, 1993; Clarke, 1991; Falkenmark, 1989a; Falkenmark, 1989b; Falkenmark, 1995a; Falkenmark, 1995b; Falkenmark & Lundqvist, 1995; Falkenmark *et al.*, 1990; Gleick, 1992; Gleick, 1993a; Gleick, 1993b; Gleick, 1994; Gruen, 1992; Haftendorn, 2000; Pearce, 1992; Redclift, 1994; Saeijs & van Berkel, 1997; Starr, 1991).

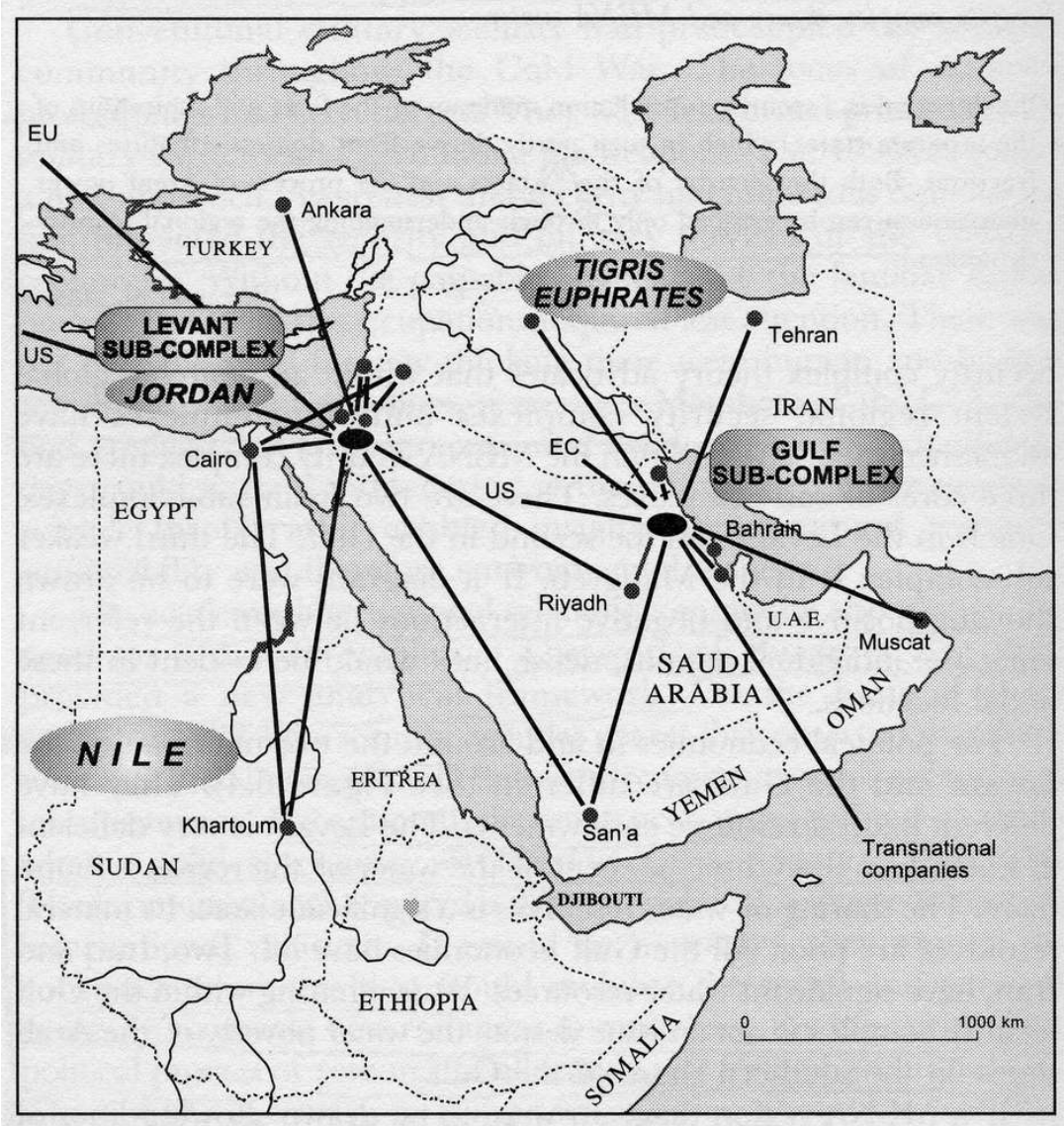
As enduring evidence of the securitization of water and the environment, the American Central Intelligence Agency (CIA) had established a number of hubs to collect environmental intelligence by the late 1990s, with plans to increase this capacity (Ohlsson, 1999:26) along the lines suggested by Rodal (1996) in the near future. In addition to this, the CIA established the State Failure Task Force in order to determine what environmental linkages could be contributing factors to political instability, largely in response to the genocide in Rwanda that was seen to be environmentally related (Homer-Dixon, 2000:298-301). This has renewed relevance in the post-World Trade Centre attack era, where one of the reasons for Afghan political decay and the subsequent emergence of radical political groups such as *Al Qaeda*, can possibly be linked to environmental scarcities and the persistence of high levels of undevelopment in parts of the water-scarce Muslim world. Similarly, in a security review of situations in which the

USA may be required to intervene, the CIA focussed on a possible war between Syria and Turkey in which water might play a role (Bulloch & Darwish, 1993:16). Other intelligence agencies are bound to follow this lead, not wanting to be left out of this new form of international relations, so the spiral of securitization is probably set to escalate dramatically.

Concepts of resource scarcity and sustainability have successfully mobilized public support, which some offer as evidence of securitizing moves, but not necessary of full securitization (Buzan *et al.,* 1998:74). In order to achieve full securitization, an issue must be presented as being urgent and existential, and so important that it should not be exposed to the normal haggling of politics, being dealt with instead by top leaders as a matter of priority (Buzan *et al.,* 1998:29; Allan, 2000:244). It can be argued that while the existing water management discourse tends to raise the issue as an emergency or crisis, it has failed to become one of the top priorities confronting the governments of developing countries. In other words, the water sector is not yet securitized, but there are clearly discernable attempts to securitize the management of ecosystems as evidenced in the rhetoric surrounding some events such as the various World Water Fora and the World Summit on Sustainable Development (WSSD). This is healthy, because full securitization is the result of failure to deal with the issues in the normal political framework (Buzan *et al.,* 1998:29). By creating a sense of urgency, the water scarcity discourse seeks to justify a new set of water reforms, but this is narrow and flawed (Wester & Warner, 2002:62).

While securitization of water is not necessarily a desirable outcome of water resource management, the concept does help us to understand political linkages between states in international river basins, and in particular those facing closure (Leather, 2001:131). Central to this is the concept of a security complex as noted above. Schultz (1995:97) takes this further by developing the concept of a hydropolitical security complex as a specific form (or element) of a regional security complex. As such this is a useful scientific tool that has enabled some analysts to develop a deeper understanding of the political dynamics in various international river basins where water scarcity is a salient feature (Allan, 2000: 245-262; Schulz, 1995; van Wyk, 2000).

Map 6. Security Complexes of the Middle East North Africa Region.



Source: Allan 2000:246.

In establishing a case for a hydropolitical security complex as a special form of security complex, Schulz (1995:92) starts off by arguing that the shortage of water has made hydropolitics, as a form of ecopolitics, a major issue for a number of Middle Eastern states like Turkey and Iraq. As such, the water issue links the various national security concerns of the respective states in the region (Schulz, 1995:92). Buzan & Rizvi (1986), Buzan (1988), Buzan (1991:105-115) and Buzan *et al* (1998:12) suggest the use of a regional security complex under conditions where states are linked by common security-related issues (Schulz, 1995:92). Allan (2000:242-262) generally supports this notion by

identifying a security complex in the Middle East North Africa (MENA) region in which water is one of the key issues. In fact, Allan (2000:246) supports the existence of three separate hydropolitical security complexes in the MENA region - the Nile Basin Complex, the Jordan Basin Complex and the Tigris & Euphrates Basin Complex - with two distinct but linked sub-complexes, which he calls the Levant Sub-Complex, and the Gulf Sub-Complex (see Map 6). This is in keeping with SCT as suggested by Buzan *et al* (1998).

Significantly, Buzan *et al* (1998:90) acknowledge the existence of environmentally-related security complexes. These authors go on to say that,

> "Other examples can be given in regard to hydropolitics. In the mid-1990s, there are many unresolved international water issues. The most quoted examples are located in the Middle East: Iraq, Syria, and Turkey form a water security complex because of their disputes over sharing the Euphrates and Tigris Rivers. Their security interdependence involves the issue of dams, reduced water flow, salinization, and hydroelectricity. The Jordan, Yarmuk [sic], Litani, and West Bank aquifer links Israel, Jordan, Syria, Lebanon, and West Bank Palestinians in another hydro security complex, with conflicts occurring over the allotment of water (Ohlsson, 1995a). It is typical that some charts of the Jordan aquifer are qualified [classified] as top secret by the Israeli army (Warner, 1996). Other examples of emergent water security complexes include Egypt, Ethiopia, and Sudan (over the Nile); India and Pakistan (over the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej Rivers); Burma and China (over the Salween); Kampuchea, Laos, Thailand, and Vietnam (over flooding, irrigation, and hydroelectricity in the Mekong): and various others (Ohlsson, 1995a:21)".

Building on this, Schulz (1995:93) states that the risk of future water shortages constitutes one of the most strategically important security issues for Turkey, Syria and Iraq. The fact that Turkey has a Minister of Energy, Iraq has a Minister of Irrigation and Syria a Minister for the Euphrates Dam, proves the high priority given to the Tigris-Euphrates River basin argues Schulz (1995:93), who goes on to say that the traditional definition of national security is thus questioned under such conditions. The fact that the CIA is also of the opinion that water will have implications for regional security in the Middle East is an additional factor used by Schulz (1995:94) in developing his argument for a hydropolitical security complex in that region. In addition to this, the joint dependency on shared river systems decreases the possibility of implementing national development strategies that fail to consider co-dependency on shared water as a strategic

issue (Schulz, 1995:121). Consequently, the case of the Tigris-Euphrates hydropolitical security complex indicates the importance of including the water dimension to security studies in regions where water deficit, or a high level of co-dependence on shared river basins, is a salient feature of international relations (Schulz, 1995:120).

A valuable element of Schulz's (1995) concept of a hydropolitical security complex is the fact that it allows various linkages to be identified. He notes the existence of both horizontal and vertical linkages within the Tigris & Euphrates hydropolitical security complex (Schulz, 1995:97). An example of a horizontal linkage is the Palestinian and Israeli conflict (Schulz, 1995:113), which would become particularly relevant if the proposed Peace Canal were to be implemented (see Map 4). Another example is the ecological dimension of sustainable development within the whole Middle East region (Schulz, 1995:115-117). Examples of vertical linkages are the Kurdish issue that ties the political interaction of Turkey, Syria, Iraq, Iran and the former USSR (Schulz, 1995:107-110). Another vertical linkage is the fact that various governments constantly try to discredit each other over using water from the Euphrates River on the grounds of Alawi-Baath versus Sunni-Baath political cleavages (Schulz, 1995:110-112).

As a result of these various dynamics and linkages, Schulz (1995:102) concurs with Widstrand (1980) that water conflict can be identified under five headings, namely upstream/downstream conflicts between states; conflicts between governments and farmers; conflicts between individual farmers; conflicts between donors; and ecological conflicts. In addition to this, Schulz (1995:102) has identified two more conflict dimensions, which has only been possible by using the conceptual lens of a hydropolitical security complex that has enabled horizontal and vertical linkages to be isolated. These include conflicts between the state and ethno-religious groups; and conflicts within and between various ethno-religious groups.

Having noted this, Allan (2000:238) argues that there has been no overt link between water security and state security in some cases, largely because of the invisible and politically silent trade in water-rich products such as cereals, which has enabled the security implications of water deficit to be de-emphasized. Significantly, Allan (2000:238) makes a case for the international trade in water-rich cereals - what he calls virtual water - as being one of the invisible but strategically important linkages that drive the hydropolitical dynamics within any given complex. In fact, Allan (2000:233) goes so far as to criticize international relations theorists like Buzan *et al* (1998) and Homer-

Dixon (1991; 1994) for failing to recognize the conflict-dampening effect of virtual water trade as an element of a security complex. As such, a central component of Allan's (2000) thesis is that this trade is an important external linkage into any given hydropolitical security complex. In this regard Allan (2000:233-234) says the following:

> "The problem of using an idea which is invisible to a discipline is compounded by the conspiracy of silence which surrounds the practice of economies themselves. These blind spots and the deficiencies in the analytical tools have seriously impaired the role played by international relations theorists. … Turton (1998) has attempted to deploy international relations theory in analyzing the potential for cooperation over water in the Zambezi River basin. His analysis is different from other international theorists in that he has incorporated the concept of virtual water. His approach is of general relevance to water short regions because he attempts to marshal theory as it might affect water relations."

2.3.4 The Securitization of Water Resource Management in Closed River Basins

The Jordan River basin case has shown that it has reached the point of closure, with a number of important ramifications arising from this fact. One of these is that over time, as basin closure is approached, water takes on a strategic significance and begins to be securitized. When water has been elevated to a national security concern, projects promoting water development become undebatable, with the strongly articulated sanctioned discourse that is driven by gate-keeping elites becoming unquestionable (Leather, 2001:131). As such, from an analytical perspective, this can result in the emergence of a hydropolitical security complex in which the patterns of amity and enmity within the closed river basin are linked with, and probably exacerbated by, the strategic implications of water resource management to the political economies of the respective riparian states. Lowi's (1990:364) argument is that state survival depends on water security being achieved in the Jordan River basin for example. Allan (2000:238) adds that in terms of this argument, if hydrologically-based water security is impossible for all MENA states except Turkey, Lebanon and arguably for Syria and Iraq, then state security based on such water security is also unattainable. In fact national leaders like Anwar Sadat of Egypt and King Hussein of Jordan; the UN Secretary General Boutros Boutros-Ghali and the World Bank Vice President Ismael Serageldin, all referred to the subject of water insecurity during the 1970's and 1980s, prompting the anticipation of water wars in the MENA region.

The Jordan River basin case study reveals that there are two important elements to this securitization of water resource management. Arguably *the most important element is the political one*, which in this case is deeply embedded in a long history of bitter rivalry and bloody conflict. It is argued that this specific factor makes the Jordan River basin somewhat unique, because few other river basins, and in particular none found in Southern Africa, have this as a distinct feature. Still, the Jordan River basin is an excellent case study because it serves to illustrate what the outcome is when a deeply contested political environment forms the overall backdrop against which water resource management is being practiced in a closed (or closing) international river basin. What can be said with some confidence is that when access to, and control over water, becomes strategically important - which it does when the economic growth and stability of a state depends on it - then water resource management can be securitized. In this regard Warner (2000:254-255) offers the following insight:

> "Something is deemed a strategic/security good when it is essential to (personal or state) survival: oil, food, and water are examples. Buzan *et al* (1998) have come up with the word securitization to describe this process. It can become a strategic (state) interest that transcends politics. For example, in the Middle East, water is considered of such strategic importance that it is securitized: it is elevated to the level of the undebatable and takes on a 'pre-political immediacy' - in other words, it is *depoliticized*. Importantly, there is always an 'absolute' element involved that renders the issue area well nigh non-negotiable. Thus, when we say that a resource is *securitizable* [sic] we are ... invoking a justification for the release of 'necessary' monetary amounts to, for example, the arms industry (Red Scare), coastal defence (water scare) and even literacy programs for backward children in the 1950s under the Defence Act. An example of tagging an issue on to (inter)national security is the legitimization of intervention, e.g. securitizing oil to legitimize intervention in Iraq. Basically, securitization is a way of 'jumping the queue of political priority' (Buzan, *et al.*, 1998)" (emphasis in original).

The *second element is the technological one*, which is an extremely important aspect of water resource management. In fact this is the normal domain of engineers, who seek to ensure security of supply by building water-related infrastructure such as storage dams, transfer schemes and treatment plants. In essence, what engineers are doing in this case is securitizing water from a management perspective - by increasing the guaranteed assurance of supply from low levels (one in five year assurance levels) to increasingly higher levels (one in a hundred year assurance levels). Typically when engineers engage in this activity, which can be interpreted as being a manifestation of the hydraulic mission

of society, they are not overtly aware that they are engaging in an activity that has political ramifications. Given the fact that water is a relatively finite resource (if seen as water in the hydrological cycle within a given river system) however, this act of building infrastructure has two sub-dimensions to it:

(a) *Technological sub-dimension:* It becomes a form of technological race in which the state or social entity that can mobilize the best technology and expertise, slowly starts tipping the balance of hydrological security of supply in their own favour over time. An important component of this technological drive is related to hydrological data, where knowledge is seen as power and is consequently securitized by being classified as secret. Other riparian states, or social entities such as the Palestinians, who are unable to match this level of expertise, are slowly left behind and become ecologically marginalized over time as the resource base is systematically captured. This is a dramatic feature of the Jordan River basin case study.

(b) *Perception sub-dimension:* This technological response starts to cascade the perceptions of insecurity elsewhere in the river basin, usually downstream. This was the case when the Israeli National Water Carrier Project was developed, which would have increased the security of supply for Israel, but would have made the lower Jordan River basin more insecure. The same holds true for the East Ghor Canal and planned Arab League Diversion, which would have increased the security of supply for Jordan, but would have made Israel more hydrologically insecure. Clearly, there is a high probability of a zero-sum outcome under such conditions.

There are consequently two distinct elements to the increasing levels of insecurity in closed (or closing) international river basins - the political and the technological - both of which manifest as drivers for the securitization of water resource management. Significantly, Buzan *et al* (1998:44) note that threat perceptions tend to act as an amplifying factor, thereby pushing an issue (such as perceptions of insecurity originating from increasing levels of water deficit) across the security threshold. Threat perceptions consequently need to be factored into any analysis of hydropolitical insecurity.

2.3.5 Conclusion Regarding the Consequence of Increasing Levels of Insecurity

The most important conclusion regarding the possible consequences of increasing levels of insecurity within a closed (or closing) international river basin is that these

hydrological factors start to be interpreted through the prevailing threat perception by gate-keeping elites, and manifest themselves as political decision-making outputs. Hydrological security therefore becomes linked to perceptions of national security under these conditions. If this threat perception interprets possible risks to the future security of the state, or to any of the sectors (military, political, economic, societal or environmental) as the result of water deficit, then those decision-making outputs are likely to act as a stimulus for the securitization of water resource management over time. This securitization starts to regard water as a strategic resource upon which the future economic growth potential of a state (or given social entity) depends, and as such decisions on the management of this resource start to "jump the queue of political priority" (in a Buzanian sense). Resource capture under these conditions is highly likely, as the hegemonic power seeks to maximize their claim to the dwindling resource-base, which in turn increases the difference between the advantaged and the disadvantaged riparian states (or social entities). This process becomes a new driver of hydropolitical tension in its own right.

One of the strategies available to the hegemonic power is to accumulate as much hydrologically-relevant data as possible, and to use those data as part of the competitive edge that they enjoy over their other hydropolitical rivals. This results in the classification of data as secret under extreme conditions such as occurred in Israel (Lesch, 1992:148 in Lindholm, 1995:89; Warner, 1996 in Buzan *et al.*, 1998:90). This can consequently be regarded as being an empirically verifiable indicator of the securitization of water resource management in closed river basins.

This inevitably launches the quest to improve the security of supply through engineering solutions in what can be called the hydraulic mission of society, which can be regarded as being a type of "arms race" (what some call "heroic engineering") in a hydropolitical game that ultimately has a zero-sum outcome. This rapid escalation in the development of hydraulic installations by the hegemonic power is perceived by other riparians as being a direct threat to their own interests, and so the perception of insecurity is cascaded downstream. The disadvantaged riparians respond by developing a hydraulic mission of their own, but are unable to compete in this costly game of water infrastructural development, so they slowly lag behind. This simply fuels perceptions of their own insecurity even further, raising the conflict potential in the international river basin even more.

It must be noted that political decisions are often made under conditions of incomplete knowledge about the capacity and intentions of other riparian states, meaning that such decisions tend to adopt the worst case scenario as being probable, thereby eliciting an appropriate response. This is invariably driven by the precautionary principle, which means that the response has to cater for the worst-case outcome, which in turn simply escalates the conflict potential because it in turn is viewed by other riparian states as being a threat to their own interests. Under extreme cases (such as those found in the Jordan River basin) armed conflict is a possibility if this insecurity becomes linked to other issues of a high politics nature.

Another outcome of this set of hydropolitical dynamics is stunted institutional development at the basin level, as this suits the interests of the hegemon, because an institutional setting may strengthen the hand of the weaker hydropolitical rival. (This aspect will be analyzed in greater detail in Chapter 3). Ironically, this lack of institutional development merely exacerbates the conflict potential within the basin, because the true intentions of the competing riparian states cannot be made known in an open and transparent manner, due to the escalating threat perception, and the lack of an appropriate inter-governmental forum.

2.4 Conclusion

A number of conclusions can be drawn from the Jordan River basin case study. When using the concepts that are made available through SCT as it is being propagated by Buzan *et al* (1998) and Buzan & Wæver (forthcoming), deeper insight can be developed into the hydropolitical dynamics of securitization that are at work under conditions of basin closure.

Returning now to elements of the general statement of the problem - how can the zero-sum outcome of basin closure be transformed into a plus-sum outcome - two sets of conclusions can be drawn at this stage.

The *first subproblem* asks what are the possible consequences of basin closure in an international river basin? An analysis of this question from the perspective of theory shows that:

(a) Increasing levels of insecurity result from basin closure, which can translate into a fundamental national security concern when the economic growth potential of the state depends on secure access to that water.

(b) The Jordan River basin has shown that this is indeed the case in the Middle East, but this is also related to various other factors, which are extremely complex and probably unique to that basin.

(c) Central to this rising level of insecurity is the prevailing threat perception that is fueled by the broader political setting.

(d) From this a simple model was developed that was presented (see Figure 3).

The *second subproblem* asks what are the possible consequences of increasing levels of insecurity within a closed (or closing) international river basin? An analysis of this question from the perspective of theory shows that:

(a) The securitization of water resource management is a likely outcome. More specifically, there are securitization moves by key actors, but not necessarily the existence of full securitization in the formal sense of the concept. These securitization moves are linked to the broader patterns of amity and enmity in that exist between the riparian states, so each international river basin is somewhat unique and specific.

(b) This has been the case in the Jordan River basin, where the classification of hydrological data as secret is a manifestation of securitization. There are other manifestations as well, all of which are centered on the desire to control water for a variety of strategic reasons.

(c) It has been shown that under certain conditions, perceptions of water insecurity can become linked to national security concerns of the state. This has been the case in certain Middle Eastern international river basins. Some authors (Schulz, 1995; Allan, 2000) have identified the existence of hydropolitical security complexes in that region due to this factor. A zero-sum outcome occurs under these conditions, which can rapidly escalate the conflict potential within the international river basin concerned.

Chapter 3

THE DESECURITIZATION OF WATER RESOURCE MANAGEMENT: A LITERATURE REVIEW

3.1 Introduction

In the previous chapter, the dynamics of the securitization of water resource management were examined in some detail. By using an extreme example - the Jordan River basin - in order to illustrate the probable outcome of basin closure, it was shown that even within the process of securitization, elements of the desecuritization dynamic could also be found. In fact, the elements of a water regime can be found in the midst of the other high politics that is characteristic of the Jordan River basin. This chapter will examine the dynamics of desecuritization of water resource management in closed river basins in more detail, by focusing on regimes as critical components of a confidence-building measure. This will be followed by a critical assessment of the role of second-order resources in establishing regimes and appropriate water management institutions.

3.2 Alternatives to the Securitization of Water Resource Management

As indicated from the literature review related to the securitization of water resource management (see Chapter 2), basin closure triggers rising perceptions of insecurity, which can lead to the systematic securitization of water resource management and the classification of hydrological data as secret. This in turn stunts institutional development, which merely exacerbates the threat perception, and so the conflict potential rises exponentially.

Salmi (1997:15) has concluded that one of the main elements of the Middle Eastern hydropolitical problem is derived from the "consequent political uncertainty … that prevents joint management of, and accountability for, largely shared water resources". Therefore, if the most likely outcome of basin closure is an escalation of conflict potential, the stunting of institutional development and the debilitating effects of a zero-sum outcome because of: the securitization of water resource management; the classification of hydrological data; and a strongly articulated hydraulic mission that is underscored by a well-defined sanctioned discourse; then one needs to ask what alternatives to the securitization of water resource management exist?

It therefore becomes potentially fruitful to examine what role regime creation can play in the desecuritization (and consequent politicization) of the problems related to the management of water resources in closed international river basins. In this regard politicization can lead to the development of durable institutions that function at the inter-state level, thereby attenuating conflict potential and changing the dynamics of a zero-sum outcome, into those of a plus-sum outcome. In his study of institutions, Putnam (1993:177) found that:

> "Norms of generalized reciprocity and networks of civic engagement encourage social trust and cooperation because they reduce incentives to defect, *reduce uncertainty*, and provide models for future cooperation. *Trust itself is an emergent property of the social system*, as much as a personal attribute. Individuals are able to be trusting (and not merely gullible) because of the social norms and networks within which their actions are embedded. … Stocks of social capital, such as trust, norms and networks, tend to be self-reinforcing and cumulative. Virtuous circles result in social equilibria with high levels of cooperation, trust, reciprocity, civic engagement, and collective well-being (emphasis added)."

So if networks of civic engagement foster norms of reciprocity, it is illuminating to know that when applied to the hydropolitical relations within the international political system, regime theory appears to be a relevant tool in the analysis of how one might find compromise solutions (Du Plessis, 2000 in Jägerskog, 2002:74; Putnam, 1993:173).

3.2.1 Introduction to Regime Theory

A central hypothesis of regime theory is that the chances of a successful regime formation are higher the more limited and well defined the issue is (Gupta *et al.*, 1993:13). This makes it very relevant to the international dimension of the South African water sector. Gupta *et al* (1993:1) note that the central questions to regime theory are:

- Why do countries cooperate with each other on different issues?
- What constitutes sufficient common interest of all the participating countries to engage in the process of cooperation?
- What are the reasons that bring countries together?
- What are the factors and actors that help in the process of cooperation between states?

However, the opportunities for cooperation between states depend on the associations and linkages made by negotiators and actors who represent the different states. This introduces the possibility of another major variable - different actors associate different items with the issue in question, leading to a series of linkages with other issues. These linkages can then either mitigate against, or multiply the chances of the issue being effectively dealt with and resolved. In this regard (Gupta *et al.*, 1993:2) state the following:

> "Since international negotiators negotiate on behalf of their countries, and as countries are complex units having political systems ranging from democratic to dictatorial, their ability to negotiate effectively on a problem is made more complicated by their ability or mandate to negotiate on behalf of their country. *Negotiators are generally only allowed to deal in the range of possibilities, which are acceptable to the ruling party in their country and compatible with the national conditions. In this process they tend to represent the dominant actors in the society.* However, the power of these actors is not static and thus the domestic conditions of a country, as distinct from the so-called 'national interest' of a nation, become important factors in influencing international decision-making" (emphasis added).

This statement is highly relevant to this study, because evidence is starting to emerge that shows regime creation is taking place in some international river basins, including the highly contested Jordan River basin (Jägerskog, 2002:76). So the question is, can regime theory provide an insight into the dynamics of these negotiations? Does regime theory allow for an adequate explanation of the events in question? Does regime theory provide an adequate explanation as to why some negotiations were highly successful, whereas other failed? If so, does regime theory help by showing why failures occurred and therefore highlighting what needs to be done to make these negotiations succeed? Do the structures that these negotiations resulted in constitute regimes?

3.2.2 An Overview of Regime Theory

In order to answer these questions, it is necessary to understand what regime theory is, and to place it among other theories. Regime theory forms part of the upsurge of neo-liberal institutionalism in various social sciences (March & Olsen, 1984; North, 1990; Keck, 1991). This neo-institutionalism starts with the assumption that there are man-made rules, habits, perceptions and expectations that are ingrained within society, and

that these serve to constrain the behavior of specific role-players (Gupta *et al.*, 1993). In this regard, there is an overlap with research into the agent-structure problem that tries to determine whether people, acting as agents, make history; or whether the structures in which these people find themselves determine the actions of the agents in the process of making history (Giddens, 1979; Wendt, 1987; Dessler, 1989). Regimes can be regarded as a specialized category of institutions (Gupta *et al.*, 1993).

According to Gupta *et al* (1993) during the 1980s within the broad discipline of international relations, there were three main streams of theory, some of which are still in evidence. Regime theory plays a role in all three streams of thought, and proponents of each stream make contributions to regime theory although the majority of these contributions come from pluralists (Hollis & Smith, 1990; Viotti & Kauppi, 1993). These three streams were *realism* (including classic realists, neo-realists, utilitarianists and behavioralists); *pluralism* (including interdependence theorists and transnationalists); and *structuralism* (including dependency and world system theorists).

Regime theory has the additional advantage of helping to close the gap between international relations as a component of political science and public international law (Slaughter, 1993:217-222). According to Gupta *et al* (1993) regime theory actually dominates the discourse on international cooperation in the discipline of international relations. In this regard the work done by Haas (1980) and Axelrod (1984) is of great significance. Axelrod's theory is more applicable to the conditions of cooperation between two parties, making it specifically relevant to bilateral regimes. Regime theory was developed at a time when US hegemony was on the decline, and as such it helps to explain how international cooperation can take place in the absence of hegemonic coercion (Gupta *et al.*, 1993).

A fundamental point of departure for regime theory is that power configurations in the international system differ from issue to issue (Gupta *et al.*, 1993). For example, while the OPEC countries are very powerful in the field of international energy policy, they are quite powerless in the field of international technology policy and technology transfers. Therefore regime theory takes it for granted that the conditions for regime creation differ from issue-area to issue-area. Consequently, regime analysis is always issue-specific, with one major field in which it is effectively being applied being international environmental policy of which water is a component. In fact, regime theory has become the dominant theory that has been applied to the analysis of international environmental

politics (List & Rittberger, 1992). One of the reasons for this is related to the fact that threats and vulnerabilities in the environmental sector are issue-specific, and are seldom universal (Buzan *et al.,* 1998:85). Moreover, causes and effects may be located at different levels and in different regions (Buzan *et al.,* 1998:85).

Prior to the development of regime theory, this was the domain of the theory of collective goods and global commons, which tended to predict non-collaboration (Morse, 1977; Hart & Cowhey, 1977; Ruggie, 1972). The development of regime theory is a reaction to the empirical fact that international cooperation has developed to some extent even in fields that have been characterized by "the tragedy of the commons" thinking (Gupta *et al.,* 1993). In addition to this, the discrepancy of localized effects has a major impact on building successful international regimes, to the extent that it may even be better to perceive such acts as being the prevention of the need for securitization, or what may be called desecuritization (Buzan *et al.,* 1998:87).

The term regime was first used by Young in 1973 when he used it to describe a system of governing arrangements for a given social structure or region (Gupta *et al.,* 1993). Young later went on to see resource regimes as a subset of social institutions, and subsequently he used regime theory to explain the nature of international cooperation in the absence of a world government. Krasner (1982:186; 1983:2) eventually went on to provide what became accepted as the most authoritative definition of a regime (see Chapter 1). As such, a regime is characterized by two important components: the *substantive element* consisting of principles, rights, obligations and rules; and the *procedural element* consisting of decision-making procedures, organization and institutions (Gupta *et al.,* 1993).

As such, the establishment of an institution/s to facilitate the discussions, negotiations and implementation of such norms usually accompanies a regime. As Haas (1989:377) notes, regimes "may also serve as important vehicles for international learning that produce convergent state policies". Regimes tend to be issue-specific, function either formally or informally, can be evolutionary or revolutionary and can have a distributive bias (Puchala & Hopkins, 1982). The threshold for recognizing a regime is when the substantive and procedural elements display some degree of durability and effectiveness (Gupta *et al.,* 1993). Details of this are shown in Table 10.

Table 10. Contents of a Regime.

Substantive Element	Procedural Element
- principles - rights and responsibilities - rules	- procedures (including definition of who the actors are) - organization

Source: Tübingen Conference as cited by Gupta *et al.*, 1993.

Gupta *et al* (1993) note that there are some negative aspects of regime theory that need to be considered. The limitations of traditional regime theory are that it concentrates on what has been agreed upon at the cost of what has not been achieved; overemphasizes the static and not the dynamic (Strange, 1982); is inherently conservative with an inflexible value bias; is both state and technocentric (critical theory); reflects the rules and norms rather than the powers and interests (structuralist theory); does not take into account the domestic circumstances that led to the adoption of certain decisions; and tends to be too issue-specific (Junne, 1992). In order to overcome these possible shortcomings, Gupta *et al* (1993) have developed a framework that indicates the visible and less visible elements of a regime (see Table 11). In this regard, these authors note that it is the less visible elements that filter out information and therefore help in the preparation of a national position on a given issue, and ultimately in the negotiation of this national position in an international environment.

Table 11. Visible and Less Visible Components of a Regime.

	Substantive Element	Procedural Element
Visible Component	- goal - principles - rights and responsibilities - rules	- procedural principles - procedures and practices - organization
Less Visible Component	- morals (cultural) - ideology (values, perceptions) - interests - conditions (domestic) - hidden agenda (domestic & regional)	- national procedures & strategy - procedural problems - informal decision-making - networking & influence from other sectors

Source: Adapted from Gupta *et al.*, 1993.

Gupta *et al* (1993) note that regimes tend to form slowly over time. Putnam (1993:184-185) maintains that the periods of time needed may even embrace centuries. In this regard, regime theory has thus far offered no satisfactory explanation for regime creation (Gupta, *et al.*, 1993). Having said this, they conclude that once common interests have developed between role-players, then regime theory does provide an adequate explanation of how these regimes develop further. For regime formation and development to occur, states need to share a common belief or perception of a problem, and then to translate this into a belief in the common proposed solution to that problem. This is highly relevant to water resource management as will be subsequently shown. As such one of the empirically verifiable indicators that have been selected for the South African case study, focuses on the change in definition of the core water management problem (see Chapters 4 & 5). The process of changing the perceptions of the problem is influenced by a variety of other factors. The literature survey that was conducted by Gupta *et al* (1993) reveals a series of factors that influence regime creation. These include the growth of knowledge; the growth of consensus in knowledge; increasing understanding of the issues; growth of functional knowledge; development of common interests; breakdown of negative and conflicting interests among the negotiating parties; the availability of an institutional forum; the growth of international coalitions; the growth of transnational coalitions; the growth of public support; the growth of regimes in neighboring fields; disasters; the likelihood of an international landmark meeting; and the redefinition of strategic interests.

Of these factors, a number are present in the water sector, of which some can be found in the Jordan River basin: those relating to the development of common interests around the shared problem of water deficit; the removal of conflicting interests that the demise of the Cold War heralded in; the redefinition of strategic interests and the role of emblematic events.

Emblematic events are of particular importance, as natural disasters like drought act as a window of opportunity during which the perceptions of role-players are forced to converge around common problems rather than to remain focused on clashing national interests. As such, these natural events become the primary stimulus for regime creation, and can be used to explain why regimes come into being in the first place, given the fact that this aspect is missing from existing regime theory.

Table 12. The Gradual Factors and Actors within Regimes.

Factors	Actors (individual and community specific)
Issue-specific	
- Growth of knowledge, information. - Spread of functional knowledge. - Increase in understanding of the issue, lending itself to the formulation of salient solutions. - Growth of social learning. - Domestic growth of such knowledge.	- Science and social science researchers. - NGOs and epistemic communities. - Journalists & the media. - Policymakers.
Interest -specific	
- Development of common political interest in the issue (international & domestic). - The breakdown of negative & conflicting interests (international & domestic). - Rational anticipation of future benefits.	- Politicians. - Policymakers & negotiators. - NGOs. - Journalists & the media.
Ideology-specific	
- The spread of an ideology (international & domestic). - The dissolving of conflicting ideologies (international & domestic).	- Politicians. - Leaders (social, religious, industrial, philosophers). - NGOs.
Institution and Organization Specific	
- The availability of an appropriate institutional & organizational forum. - Growth of international governmental coalitions. - Growth of transnational coalitions. - Growth of public support. - Growth of regimes in neighbouring fields (demonstrative effect, precedent). - Growth of domestic institutions to facilitate the formulation of a national position.	- Politicians. - Leaders. - International diplomats. - NGOs. - UN.

Source: Adapted from Gupta *et al.*, 1993.

In this regard, Gupta *et al* (1993) note what they consider to be gradual and immediate factors (see Table 13). *Gradual factors* consist of the buildup of knowledge on the issue, its translation into functional knowledge, the recognition of a common problem/situation, its emergence onto the political agenda and the simultaneous public acceptance of the problem (see Table 12). *Immediate factors* consist of those factors that make the quantum leap necessary to move from knowledge about an issue, to political action about the same issue. This can include a natural disaster, charismatic leadership, and recognition of a security risk or the strategic requirements of a hegemon.

Table 13. The Immediate Factors and Actors within Regimes.

Factors	**Actors** (individual and community specific)
Issue -specific	
- Disaster indicating the likelihood of a predicted trend.	- Victims, support groups, relevant officials, journalists etc.
Institution & Organization Specific	
-The coming up of a landmark meeting.	- Organizers, politicians, NGOs, journalists.
Interest-specific	
- Hegemonic redefinition of strategic interest.	- Politicians, advisers.

Source: Adapted from Gupta *et al.*, 1993.

The distinction between the two (immediate and gradual factors) is based on the time taken, and urgency with which the factors influence regime formation and development (Gupta *et al.*, 1993). In addition, these factors do not exist on their own, but are linked to corresponding actors who either create or promote the factors leading to regime creation. Although it is possible to study the factors and actors separately, such a study is less revealing than one, which takes into account when, and how, the actors are in a position to create or promote the factors. Furthermore, a study of the actors in relation to the factors provides a deeper understanding of the ideologies, interests and power of the individual role-players (Gupta *et al.*, 1993). This is particularly relevant in the Jordan River basin case study, as it provides an opportunity to determine to what extent ideologies, interests and the power of the individual negotiators are present in regime formation.

The range of factors evident in the literature relate to various aspects. Gupta *et al* (1993) have summarized and analyzed these, coming up with four main categories (see Tables 12 & 13). These are:

Issue-specific factors that help to understand the issue and the way in which it can be resolved.

Interest-specific factors, in combination with issue-specific factors, become more powerful. Interest factors on their own may lead to political frustration, because although there is a political commitment, if it is unaccompanied by an acceptable solution, measure or instrument, then this may lead to a deadlock in negotiations.

Ideology-specific factors that are driven entirely by specific ideological viewpoints.

Organization-specific factors that are unique to a given institutional structure.

A regime may have a long-term objective that may even be a century away, such as the United Nations Framework Convention on Climate Change (UNFCCC). It therefore becomes necessary to develop indicators of the success of a regime. To this end Gupta *et al* (1993) conclude that there are two distinct aspects that need to be considered. These are:

Quantitative aspects such as the number of participating countries, the sum of resources devoted to the issue, the number of meetings held, and the number of delegates attending such meetings. Pure numbers are not always an indication of success however, because in agreements between sovereign entities the highest/lowest common denominator rule applies. This means that the highest of the common positions between all negotiating parties will provide the content of the agreement.

Qualitative aspects such as the persistence of the commitments and the implementation thereof. This includes the level of agreement reached determined by a factor of national positions and international bargaining (rules, linkages, leadership and probable outcome) and pressures from outside; and the level of implementation determined by a factor of international bargaining and national positions.

For cooperation to be successful, it therefore becomes necessary for all affected countries to become involved. This raises the central question as to why countries cooperate? Is it in their national interest to cooperate? Do they have a common interest in the issue? Do they in fact need to have a common interest in the issue? Can countries with divergent interests cooperate on a particular issue?

Gupta *et al* (1993) respond to these questions by saying that countries cooperate on the basis of an explicitly defined or implicit national position or statement. This is combined with the mandate of the negotiator and his/her personal skills - introducing the concept of second-order resources that will subsequently be examined - ultimately determining the contents of the statement that is presented in an international forum. Therefore the statements made by negotiators represent the aggregated national position on a specific issue, and as such need to be studied in order to identify the motivations, anxieties, interests and vulnerabilities of the individual countries concerned. However, the national position is itself the result of a series of interactions between interest groups at the national level. This level of the process is usually neglected in research on regime formation. To this end it is illuminating to read that:

> "When nations negotiate, often the toughest bargaining is not between nations but within them. The reason is simple: international agreements, no matter how much in the national 'interest' [sic], inevitably have differential effects on the factional concerns. … (E)xperienced negotiators almost invariably insist that the more difficult part of their job consists not in dealing with their adversary across the table but in handling interest groups, bureaucrats and politicians at home" (Mayer, 1992:793).

At a general level, Gupta *et al* (1993) note that cooperative behavior is expected from countries. This encourages reciprocal cooperation from other countries and in other fields. Negotiators therefore use politics symbolically in expressing their cooperation, thus making a symbolic contribution to the future whilst defending present national interests. Furthermore, countries may have an interest in maintaining legal and social stability and the maintenance of the *status quo*, leading to cooperation.

Because international bargaining is concerned with relative gains and the distribution of the costs and benefits of cooperation (neo-realist position), states tend to want to maximize their absolute gains (neo-liberal position). As a result states tend to be positional rather than atomistic actors and they are wary of obligations that may have

negative implications for their relative position (Hurrell, 1991). Some theorists identify the "need to belong to the club" as a dominant motivation for cooperation, providing weak states with external legal recognition (Gupta *et al.,* 1993; Swatuk, 2000:183). This suggests that hegemonic states in a closed river basin may be less willing to negotiate regimes, while weaker states will be more willing to initiate negotiations. The question is then raised as to what thresholds (if any) to the desire to negotiate can be isolated. Structuralists argue that states are socialized into the game of power politics irrespective of their domestic situations (Hurrell, 1991). Cooperation may be the result of international political pressure, and side payments may secure cooperation (Mayer, 1992). These payments can take the form of political support, financial aid and technology transfers in other fields. This is relevant to the strategic level of analysis.

At a more issue-specific level, cooperation may be initiated in recognition of a common problem, although this is not considered to be a necessary condition for regime formation (Young, 1989). Cooperation may also be furthered by the recognition of solutions that are attractive, even if the problem itself is of little real concern to the specific country (Gupta *et al.,* 1993). Cooperative behaviour may also be elicited from the desire by a state concerned to adopt a precautionary principle. Where problems are extremely complex and uncertain, the negotiators tend to cooperate cautiously (Caldwell, 1988). Under these conditions, negotiators tend to focus on key problems and to reconcile the differences in approach (Young & Osherenko, 1991). In addition to this, the desire for cooperation cannot be separated from the negotiators themselves. In this regard they negotiate on behalf of a government, and as such their personal awareness, interest, commitment and negotiating skills may shape the definition of the national position. This again raises the relevance of second-order resources, which will be analyzed in more detail subsequently. Therefore in all cases one is not really dealing with an objective definition of a country position, but rather with the subjective perceptions of the negotiators colored by the institutional setting in which it is made and perpetuated (Gupta *et al*., 1993).

Gupta *et al* (1993) note that it is necessary to analyze the divergent motivations of different countries in the negotiating process because:

- If countries are not sufficiently motivated, the agreements they sign may not be ratified or implemented.
- The reasons for disagreement can be broken down in order to devise a solution to the perceived problem.

- By analyzing the range of motivations for each country, a range of acceptable solutions can be found for each country, or groups of countries.
- Research has shown that when cooperation is based on the symbolic use of politics, countries frequently have negative inclinations about their positive obligations (Caldwell, 1988).

In regime theory, linkage between different issues is generally expected to have a positive impact on regime creation, with two possible permutations (Gupta *et al.*, 1993:13). Firstly, they may induce the different actors to comply with the principles, rules and norms of the regime, even in the absence of a formal compliance mechanism, out of fear that other parties may retaliate in other areas or refuse to cooperate in areas of strong interest to the party concerned. Secondly, they make it possible to come up with package deals and compensation for parties in return for concessions in one field that may result in favourable negotiations in other issue-areas.

Having noted this, it is also important to understand the nature of these linkages to other issue-areas, because they make the negotiations more complex, leading to antagonistic relations between the negotiating parties. To this end, Gupta *et al* (1993) have identified six types of linkages.

Material linkages are linkages that cannot be separated because one is part of another.

Political linkages reflect the dominant preoccupation or "mind set" of the actors concerned.

Bargaining linkages are linkages that are consciously constructed to create bargaining chips for the negotiators.

Organizational linkages result from the specific forum in which an international debate takes place. Because of this, norms and principles that are developed in one issue-area can gain access to another.

Procedural linkages can result from parallel negotiation processes in the same or another forum, which could lead to a specific timing of the negotiations (such as when ministers and conference facilities are available).

Conceptual linkages refers to concepts that are used in one setting that may emerge subsequently in another context, linking the two otherwise unrelated issues together.

For this reason, Gupta *et al* (1993) suggest a research methodology that focuses on three critical aspects.

(a) How do actors define the situation?

(b) What changes do the role-players make in their definitions of the situation and their preference structure?

(c) What vision do governments and all of the other relevant actors have?

3.2.3 The Relevance of Regime Theory to Closed River Basins

Jägerskog (2002:73) has been doing research on the Jordan River basin and has come to the conclusion that despite the high levels of conflict that are endemic to the region, there is some evidence to show that a regime is emerging. More specifically, Jägerskog (2002:75) develops the notion of a water regime as a specific form of regime. He develops his argument by starting off with the focus of contemporary hydropolitical literature. In this regard, the Jordan River basin has often been used as a case for showing that water might indeed lead to conflict and even war (Bulloch & Darwish, 1993; Starr, 1991). Some authors have shown the weakness of this reasoning however (Allan, 1999; Allan, 2000; Isaac, 1995; Wolf & Hamner, 2000). In particular, Allan (1999; 2000) has shown that virtual water - the water embedded in foodstuffs - has played a significant conflict-mitigating role in the region. In addition to this, most authors focusing on the potential for war have tended to neglect that something like a water regime has been in place for some time already. This regime has regulated the hydropolitical relations between Israel and Jordan since the early 1950s. Although Israel and Jordan were embroiled in a state of war for a long period of time, they have in fact had a lot of low-key cooperation on shared water resources. This regime has been remarkably durable in the face of the endemic political conflict, and has provided a means to build trust among the states, and therefore to potentially de-escalate political tensions.

Central to this was the Johnston United Water Plan for the management of the Jordan River basin (Jägerskog, 2002:76). Wolf (1993) notes that this can be seen as a water

regime despite the fact that it was not officially recognized by the respective riparian states. In this regard it has been used as a baseline for hydropolitical relations in the basin. This is significant because unlike an international treaty, in which the rights and obligations of all parties have been codified, a regime is a social institution in which the behavior of the relevant role-players is regulated (List & Rittberger, 1992). A regime can therefore be based on an informal understanding between riparian states, and need not only be in the form of an officially sanctioned document. One might consequently argue that the water agreement between Israel and Jordan, which is a part of the 1994 Israeli/Jordanian Peace Accord, has merely enhanced and formalized the long standing hydropolitical regime that has existed between the two states, and which has continued to function, despite the broader hostilities.

Jägerskog (2002:76) notes that this is in keeping with the findings by various authors on regime theory. For example, Keohane (1984) holds that international regimes should be distinguished from specific interstate agreements. In this regard a major function of regimes is to facilitate the making of subsequent agreements. There are some differing views however. Young (1989) argues that if this were the case, then regime analysis would merely resemble an analysis of explicit bargaining. Young goes on to argue that both normative frameworks (which are not formalized in agreements), and formal agreements, constitute a regime. Jägerskog (2002:76) supports Young's argument and views the Israeli-Jordanian hydropolitical relations as a water regime, for which he accepts the definition that has been developed by Haftendorn (2000) (see Chapter 1).

Jägerskog (2002:76) identifies the need to be able to assess the quality of the water regime presumed to exist between Israel and Jordan. Jägerskog makes use of the conceptual tools that have been provided by Hasenclever *et al* (1997), in which they maintain that one should analyze the effectiveness, robustness and resilience of regimes. In this regard, the *effectiveness* of a regime is dependent on whether its members abide by its norms and rules over time; the *robustness* refers to the durability of a regime in the face of various exogenous challenges; and *resilience* refers to the ability of the regime to adapt itself to changing circumstances.

Jägerskog (2002:77) applies these three criteria to the Jordan River basin case study and concludes that the regime between Israel and Jordan has been somewhat limited in its effectiveness as conflicts (not on water) between the two riparian states have forced them not to abide by the rules of the regime at all times. Having said that, it is apparent in the

1994 Israeli/Jordanian Peace Accord that many of the principles existing at the international level, such as the provision not to cause significant harm, have been incorporated. Furthermore, an institution known as the Joint Water Committee was established in order to implement and monitor the agreed principles. It is positive to see that emphasis has been put on cooperation in the maintenance of the common resource. As water experts have been an integral part of the negotiations leading up to these principles, it is argued that scientific consensus has clearly put its mark on the regime.

Concerning the robustness and resilience of the regime, Jägerskog (2002:77) argues that it is in fact strong. Although it was severely challenged during the 1998-2000 drought, which produced some disagreement over the allocation of water, this was partly due to the fact that no provisions had been made for droughts in the earlier 1994 Israeli/Jordanian Peace Accord. This conflict was amicably resolved, and it can be argued that the norms, rules and principles that were already part of the informal aspect of the water regime, played a significant role in gaining consensus at a time where tensions could easily have escalated. In this regard it is also interesting to analyze the Israeli-Palestinian hydropolitical relations over time. Although still awaiting a final peace agreement between Israel and the Palestinian Authority, an interim agreement exists in which water is an integral part. As in the Israeli-Jordanian case there is also a Joint Water Committee. It is significant to note that even in the midst of the tensions during the *al-Quds Intifada*, which started in the autumn of 2000, the work of the Joint Water Committee has continued. A joint statement from the Israeli and the Palestinian heads of the Joint Water Committee, which was made on 31 January 2001, reaffirmed their commitment, despite exogenous challenges, to continue their cooperation. This is significant and seems to support the functionalist view of regime analysis.

Jägerskog (2002:77) continues his argument by showing that a further aspect in the analysis of this specific regime is to acknowledge the asymmetry in power relations between Israel and Jordan. He cites Keohane and Nye (1989), who argue that an asymmetrical interdependence can be the source of power with which to control resources, as well as having the potential to affect outcomes. In this regard, less dependent actors can have other political or economic resources at their disposal, which means that changes in the regime may prove less costly to them. While Israel has both an economy that is diversified, as well as being the upstream riparian (by virtue of its strategic control over the Golan Heights), Jordan is neither economically strong nor has a good negotiating position in terms of control over water (Allan, 2000:253-255). As a

result of these factors, changes in the relationship may prove more costly to Jordan than to Israel.

Jägerskog (2002:77-78) notes that there are some limitations to the use of regime theory when analysing international river basins. His arguments to this effect revolve around certain key issues. Firstly, while regime theory contributes to our understanding of how water cooperation might come about, it also has some limitations. Functionalist thinking (such as that articulated by Prof. Kader Asmal, in his capacity as the Stockholm Water Prize Laureate, during his acceptance speech to the Stockholm Water Symposium in 2000), is based on the assumption that cooperation over water could be a precursor to cooperation in other, more contentious, issue-areas over time. Jägerskog (2002:77) acknowledges that his own argument tends to lean in this direction, but he states that functionalist regime theory can be blind to the fact that water may be subordinated to other more important areas of dispute as shown by Allan (2000). It is consequently important to isolate and understand the hierarchy of issues in any hydropolitical analysis using regime theory. Jägerskog (2002:77) states that a realist objection to the focus on water experts as important role-players would be that it is the result of the interests of the hegemon that makes regimes come about in the first place, and so the cooperation between Jordan and Israel reflects US strategic interests more than anything else.

Secondly, when considering the focus on experts and epistemic communities, Jägerskog (2002) states that it is debatable whether the experts exert as much influence as the theory actually claims they do (Haas, 1989). In a world where policy-makers increasingly tend to consult scientific expertise, there is also a growing skepticism about the validity of their expertise, especially since complex issues are often characterized by both social and scientific controversy (Corell, 1999). The problems surrounding Bovine Spongiform Encephalopathy (BSE) - also known as Mad Cow Disease - (Hinchliffe, 2001), the global climate change debate (Turton, 2001a), and the handling of the 2001 Foot and Mouth Crisis in Britain, where scientific input is imprecise or divided, are some examples of this phenomenon. While these and other objections appear to be valid, Jägerskog (2002:78) still argues that the formation of cooperative water regimes, through the epistemic communities approach, tells us a great deal about the way that cooperation might be achieved in contested international river basins.

Jägerskog (2002:78) concludes his analysis of the Jordan River basin by saying that:

> "International water regimes might be seen as a mitigating factor in conflict, since they promote basin-wide interstate cooperation and thereby increase water security. An analysis of cooperation around water in the Jordan River basin through the prism of regime theory is helpful in explaining why cooperation has occurred in spite of the strong political conflict. When a convergence of values has occurs within a regime and cooperation is institutionalised, it is conceivably more difficult to reverse or end such cooperation. This is relevant to Southern Africa where there is an apparent desire for states to cooperate with regard to international river basins in the context of the *SADC Protocol on Shared Watercourse Systems*".

3.2.4 Linkage Between Security Complex Theory and Regime Theory

> "In political systems, facts, including those on water, which are judged to have costly political consequences, can be ignored or de-emphasized" (Allan, 2000:5).

Security issues are made so by the act of securitization, or more specifically, by declaring a referent object to be existentially threatened (Buzan *et al.,* 1998:25 & 204). As such, the security of issues like water resource management in a closing international river basin, is a quality that is placed on it by actors. The securitization of water resource management has a number of unintended consequences, such as the elevation of water development projects to the level of the undebatable, and the rapid escalation of conflict potential with a probable zero-sum outcome (Leather, 2001:131). Consequently, the desecuritization of water resource management is desirable wherever possible. Buzan *et al* (1998:209-210) concur with this view by stating that the avoidance of excessive and irrational securitization is a legitimate social, political and economic objective, and should become a long-term political goal.

Buzan *et al* (1998:71) support the view articulated by Haas *et al* (1993) that in international relations studies, the environment (as a sector) seems to be a welcome home for studies in regime theory. In early phases of regime development, scientific actors play an important role in agenda setting (Buzan *et al.,* 1998:73). This provides an important opportunity for the desecuritization of issues such as water resource management in closed international river basins, because this represents the placement of the issue onto the more open political agenda, rather that the inherently closed security agenda. In fact, the extent to which scientific arguments structure the environmental security debate is

exceptional, with the questions of evidence and acceptable proof becoming one of the clearly identifiable organizing *foci* (Buzan *et al.*, 1998:72-73).

It is important to note that concepts such as resource scarcity and sustainability have successfully mobilized public consent over time (Buzan *et al.*, 1998:74). In fact, while there is a lot of evidence that the environment is becoming increasingly politicized, such issues merely represent a sub-agendum within a larger political context. As such, while the environment shows some evidence of dramatic securitizing moves, there has actually been relatively little securitization in the form of extraordinary measures actually being applied (Buzan *et al.*, 1998:74). This view is largely supported by Du Plessis (2000:12-13) where he states that a distinction should be made between environmentalism and green politics. Environmentalism accepts the framework of existing social and political structures and seeks to ameliorate environmental problems within those structures. Green politics, on the other hand, regard those very structures as being the source of the global environmental problems, and contend that they should be challenged and overthrown (Paterson, 1996:252). Stated differently then, activists from the green politics movement seek to securitize the environment, whereas environmentalism activists merely seek to politicize (i.e. desecuritize) the environment in order to remedy the problem.

Having noted that the environment is a potential area of regime creation, it is as yet uncertain what type of political structures environmental concerns will generate (Buzan *et al.*, 1998:71). The extent to which water management regimes and RBOs are desecuritizing agents, at least in the context of South Africa, will be examined subsequently (see Chapters 4 & 5).

A driver for regime creation, and therefore the politicization (rather than securitization) of the given issue, is found in the central question (Buzan *et al.*, 1998:81) - who is responsible for doing something before it is too late? This raises the question about securitizing and desecuritizing actors. To this end, Buzan *et al* (1998:76-79) identify the following:

Lead actors (including states). The lead or veto position taken by any of these actors is usually issue-specific and of a strategic nature.

Veto actors (usually in the form of states and firms, but can also include NGOs that try to play down the impacts of environmental problems such as the US based Global Climate

Coalition (GCC)). The lead or veto position taken by any of these actors is usually issue-specific and of a strategic nature.

Support actors (which are by definition not located in the danger spots, but which can play an important role in generating support for a given issue). Because of the issue-specific nature of these positions, no overall power constellation has yet emerged.

Buzan *et al* (1998:79-80) have isolated three relationships of threat that define the universe of environmental security. These are:

Threats to human civilization that come from the natural environment and which are not caused by human activity such as volcanoes, earthquakes and other natural disasters such as drought.

Threats from human activity to the natural systems or structures of the planet *when the resultant changes do seem to pose an existential threat to civilization*. At the global level an example is ozone depletion, whereas at the regional and local level the effects of natural resource extraction or abstraction provide examples of this. Dam building would fall into this category, where downstream scarcities could potentially result from this human-related activity. Even more importantly, the impacts of IBTs as instruments of resource capture can have a substantial impact on the donor river basin with international consequences if that basin is transboundary in extent.

Threats from human activity to the natural systems or structures of the planet *when the changes made do not seem to pose existential threats to human civilization*. Examples include the depletion of mineral resources, which can conceivably be substituted by technological advancements.

Significant to these is the type of effect that can become manifest, of which Buzan *et al* (1998:83-84) have isolated two, both of which involve different types of securitization. Firstly, *acute disasters* typically involve disaster or crisis management in the early stages, during which time the effects are still being securitized. The floods that hit Mozambique during 2000 are an example of this, where military forces were initially mobilized, but this military response was not sustained over time as the imminent threat receded. Secondly, *creeping disasters* involve a slow but steady deterioration in living conditions, such as those that occur from rising levels of water scarcity or water deficit. Here most of

the effects are open to securitization mainly along non-environmental lines. A feature of this is the fact that securitization focuses on conflicts in other sectors such as the economic or societal.

The effects of these can become a stimulus to regime creation, because such actions are in the realm of politics and can have the effect of resisting securitization. The role that natural disasters play in this regard is highly significant. These become emblematic events in their own right, opening up critically important windows of opportunity during which political debate, public concern and resource flows can become concentrated on specific areas of cooperation. Under such conditions, regime creation at the global or regional level is difficult to label as securitization. As Buzan *et al* (1998:83) note, when crises force the debate to change from one about causes, to one about effects, the focus of securitization tends to move into other sectors. Alcamo (2000:166) builds on this notion by suggesting that research should focus on the relationship between environmental stress and crisis, because crisis can lead to either negative impacts on security such as conflict or violence, or positive impacts such as increased levels of cooperation.

The environmental sector is complicated by the existence of a variety of issues, of which Buzan *et al* (1998:74-75) have isolated some that are highly relevant to this study. Ecosystem disruption includes aspects such as ozone depletion, pollution and desertification. Energy problems include the depletion of natural resources, scarcities of these resources and the maldistribution of these resources. Population problems include unsustainable consumption and the uncontrollable *stimuli* of population migration, either across international borders, or within states in the form of urbanization. Food problems are a complex phenomenon including poverty, famine and water deficit. Economic problems include the protection of unsustainable production modes (such as the heavy reliance on the agricultural sector for job creation or the use of dirty technologies for the same purpose) and the social instability that is inherent in the high economic growth imperative that arises from a rapid population explosion. Civil strife includes war-related environmental damage and violence stemming from environmental degradation and the resultant loss of rural livelihoods.

Due to these complicating factors, some strategic part of the environment such as water resource management, can become the referent object of environmental security, as found in the Jordan River basin. Yet, if one analyses this in more detail, the ultimate referent object of this form of environmental security is the risk of losing achieved levels of

civilization (Buzan *et al.*, 1998:75). Israeli resource capture is an example of this as it seeks to protect Zionist-inspired views about the type of civilization that the Jewish Diaspora are expected to enjoy if they choose to resettle in Israel.

Along similar lines, Buzan *et al* (1998:84) note that if we define environmental security as sustainability, then when it fails, the focus tends to shift elsewhere such as threats to the level of civilization and economic prosperity that are being enjoyed by a given social group, or citizens of a specific country. This tends to mitigate against full securitization and promotes politicization instead, which in turn can provide the stimulus for regime creation under certain conditions.

An analysis of the environmental sector reveals the existence of two distinct kinds of referent objects (Buzan *et al.*, 1998:76-77). These are the environment itself, and the nexus between the environment and civilization. Consensus does not exist on these two *foci*, so they exist in coalition, each representing a specific wing of a broader debate (Buzan *et al.*, 1998:76). This is the subject of an emerging literature on political ecology, which seeks to unravel the political construction of environmental knowledge (Stott & Sullivan, 2000:2).

3.2.5 Conclusion Regarding the Alternatives to the Securitization of Water Resource Management

The Jordan River basin case study illustrated the two possible extremes of basin closure in hydropolitical terms. The one extreme is a clear escalation in conflict potential, to the extent that water is even regarded as a *casus belli*, which catapulted water resource management into the heady heights of high politics with a high probability of a zero-sum outcome. The other extreme is a de-escalation of the conflict potential, as two of the riparian states got together in secret, and started to generate the necessary normative framework on which a future water regime could be based. Significant, as an interceding variable between these two extremes, is the role of emblematic events as windows of opportunity, during which time the dominant sanctioned discourse that drives the prevailing hydraulic mission can be examined, and changed where appropriate.

From this overview, a number of key aspects can be distilled.

One of the core elements relates to the human dimension. The uncertainties resulting from the actions of some riparian states start to be interpreted by other riparian states as being detrimental to their long-term strategic interests. Decision-making at these times normally occurs under conditions of incomplete knowledge about the actions, capacity and intentions of other riparian states, so a rapid escalation to the conflict potential within the closing river basin occurs. This gives rise to a zero-sum dynamic as each riparian seeks to maximize their claim to the dwindling resource-base through an aggressive hydraulic mission, possibly involving institutionalized resource capture.

As the stimulus for the securitization of water resource management starts to occur, the analyst needs to be very aware of the conceptual differentiation between securitizing moves and actual securitization. The latter are the desired objective of green politics activists, whereas the former are the desired objective of environmental politics activists. The interaction of these different actors can play a role in desecuritizing water resource management because they place the discourse on the open political agenda, rather than on the closed security agenda.

Emblematic events play a crucial role by opening a window of opportunity during which various special interest groups can debate the issue in public, thereby raising awareness of the problem of water deficit and basin closure at a broader social level. This can challenge the strongly articulated sanctioned discourse that drives the prevailing hydraulic mission of society, thereby transforming the hostile elite-driven zero-sum approach into a more accommodating and all-inclusive plus-sum approach to water resource management that is appropriate to closed international river basins.

This raises the question about cooperation rather than competition, and the notion of a water regime takes root within the echelons of the hydropolitical elite. Consequently regimes can be regarded as being intervening variables in the overall hydropolitical equation. Regimes can result in the following:

(a) The potential zero-sum outcomes of basin closure can be transformed into plus-sum outcomes as uncertainty and perceptions of insecurity are reduced for all riparian states.

(b) Conflict potential becomes institutionalized through the development of agreed upon rules, procedures and norms.

(c) Negotiations between all riparian states (and possibly even other non-state actors) can generate confidence-building arrangements, thereby contributing to the understanding of the benefits of a plus-sum outcome for all participating parties.

(d) This starts a process of desecuritizing water resource management in closed river basins as water-issues are placed on the more open political agenda.

(e) Synergy starts to occur and a process of institutionalized learning takes place.

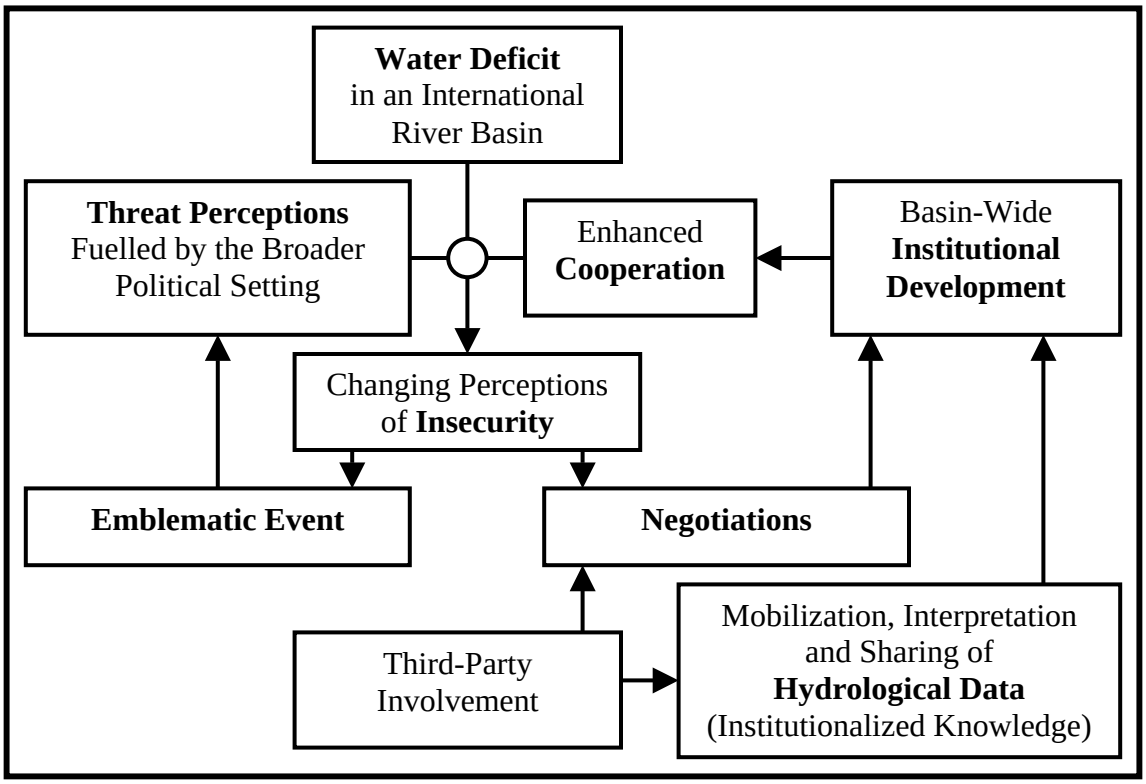
(f) The emerging regime starts to become a central depository of knowledge that is accessible to all of the parties, which in turn increases certainty and mitigates against the possible escalation of perceptions of insecurity.

For a water regime to come into existence, the riparian states need to start developing a shared perspective about the problem of basin closure. The role of emblematic events is therefore important, as they tend to narrow the range of viewpoints about the problem on hand. The role of third parties in facilitating initial contact between the various riparian states is also important. This is clearly evident in the US sponsored Johnston United Water Plan, which was not openly accepted when it was initially presented, but which has subsequently acted as a basis for additional negotiations and the narrowing of expectations to more reasonable levels.

Because third-party involvement is so important in regime creation under certain conditions, the SCT concept of overlay can become relevant. In this regard overlay occurs when an outside power exerts an influence, which has been the case with the US sponsored Johnston United Water Plan. Regimes are the result of negotiations, so the capacity of any riparian state to articulate a given position, and to convince other negotiators of the validity of that position, becomes highly relevant. This raises the issue of second-order resources in the creation and maintenance of water regimes, which will subsequently be analyzed in greater detail. The Jordan River basin case study shows that regimes, even if they exist only as informal entities, are extremely durable. As such they can survive the rigors of high politics, and can provide a setting for confidence building in other more contested political arenas. From this conclusion, the Desecuritization

Model of potential hydropolitical dynamics in closed river basins based on regime creation can be developed (see Figure 6).

Figure 6. Desecuritization Model.



3.3 Critical Elements of Regime Creation

Having established that regimes are a desirable outcome for the management of water resources in closing international river basins, and having noted that they do exist in some form in highly contested closed river basins such as the Jordan, attention is now given to isolating the critical elements of regime creation.

At present, there are four major developments taking place (or recently having taken place) in the international water sector, all of which have implications for regime creation. In this regard:

(a) Developments in international law are laying the legal foundations for regime creation in the water sector.

(b) The *Rio Declaration* and the *Dublin Statement* have become a cornerstone for the development of the normative dimension of water resource management. This has been seized by various international organizations and is now being articulated by them as a desirable set of norms and values that could be embraced in any given water regime.

(c) The Second World Water Forum (WWF) developed the so-called *World Water Vision* (WWV) that was agreed upon by many governments as reflected in the *Ministerial Declaration* (WWC, 2000a; WWC, 2000b: 64-152; Cosgrove & Rijsberman, 2000). The *World Water Vision* contains a strong normative inclination towards regime creation in shared international river basins, and has built consensus around the core elements of the *Rio Declaration* and the *Dublin Statement*.

(d) The World Commission on Dams (WCD) has analyzed the various problems that have occurred as the result of a century of dam-building, and has tabled a report containing strong normative elements that tend towards cooperation in the development of water resources in shared international river basins (WCD, 2000). As was the case with the *World Water Vision*, the *World Commission on Dams Report* has built consensus around the core elements of the *Dublin Statement* and *Rio Declaration*. As such, components of this normative dimension could find their way into the development of water regimes.

As these are a potential source of the normative foundation for regime creation that is emerging at the global level, a review of the critical elements of each is instructive.

3.3.1 International Water Law

Modern international water law has been evolving over a long period of time. With the growth in trade, navigation became an important issue over time. This was given a boost with the industrial revolution, which started to place more emphasis on the need for law related to the non-navigational use of water. Early legal development in the water sector, occurring in the first half of the twentieth century, tended to be of a bilateral nature, with agreements being reached over the management of the River Oder, the River Meuse and the use of waters found in Lake Lanoux (Eckstein, 2002:82). These agreements tended to focus on different issues, so their codification was not uniform.

Consequently, in an attempt to bring greater uniformity into international water law, the International Law Association (ILA) developed what has now become known as the *Helsinki Rules on the Uses of the Waters of International Rivers* (referred to in the international water sector by the abbreviated form as the "*Helsinki Rules*") in 1966, which were drafted as a comprehensive code of law governing international drainage basins (Boisson de Chazournes, 2003:216; Eckstein, 2002:83). The *Helsinki Rules* have become best known for their guidelines on the non-navigational use of water, and are thus regarded by many scholars as being the precursor to the subsequent *United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses* - often referred to by the abbreviated form of the "*UN Convention*" - which started to evolve in 1970 and took almost three decades before it finally emerged (Boisson de Chazournes, 2003:216; Eckstein, 2002:82). While the text of the UN has been accepted, it has not been ratified by sufficient states so it technically remains a draft. Central to this legal development is the notion of equitable and reasonable apportionment of water, along with the technical data and capacity needed to make that apportionment. The *Helsinki Rules* complemented this central principle with various articles providing that no category of water use would enjoy any preference over any other (Article VI); that no states may reserve future use of water in a given river basin for itself (Article VII); and that existing activities would be deemed to be equitable and reasonable unless established to the contrary (Article VII) (Eckstein, 2002:83-85).

These rules were supplemented by a series of resolutions that were passed by the ILA, including the *Montreal Rules on Pollution* and the *Seoul Rules on International Groundwaters* (Eckstein, 2002:83). These have been accepted as the basis of negotiations between various riparian states sharing an international river basin, and as such have played an important role in the systematic codification and development of international water law, which could be used as the basis for regime creation. Unfortunately the *Helsinki Rules* have received little recognition as being an official codification of international water law, because the ILA is an NGO without any official governmental status (Eckstein, 2002:83). In order to overcome this problem, the General Assembly of the UN tasked the International Law Commission (ILC) to draft a set of agreed-upon articles for use in the governing of the various non-navigational uses of transboundary watercourses during 1970. With this official sanction by the UN, the work of the ILC received better recognition than that of the ILA, and they completed a set of *Draft Articles* by 1991, circulating these to UN member states for comments (Eckstein,

2002:83). In 1997 the General Assembly adopted the *United Nations Convention on the Non-Navigational Uses of International Watercourses*.

The *UN Convention* is intended to be a framework agreement, being flexible and open to a degree of interpretation, in order to accommodate the development of more specific bilateral and multilateral agreements on the governance of water found in international river basins. The inclusion of a dispute resolution clause has delayed the ratification of the *UN Convention.* Only twelve of the thirty-five states needed for it to enter into force have ratified the agreement, but 8 others have signed (but not yet ratified) at the time of writing (Eckstein, personal communication). This has prompted some NGOs like Green Cross International (GCI) to lobby among states for the ratification of the *UN Convention* as a question of some urgency (GCI, 2000).

Even if the *UN Convention* is never fully ratified, it still carries significant weight and will continue to influence the development of other water resource agreements (Eckstein, 2002:88; Boisson de Chazournes, 2003:217). As evidence of this both Eckstein (2002:89) and Boisson de Chazournes (2003:217) cite the fact that the 1995 *SADC Protocol on Shared Watercourse Systems* in the Southern African Development Community; the *Revised Protocol on Shared Watercourses*; the 1995 *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin*; and the 1991 *Protocol on Common Water Resources* concluded between Argentina and Chile; are all examples of the use of these central legal concepts.

Boisson de Chazournes (2003:219-223) notes that the *UN Convention* provides five key building blocks for the management of international river basins. These are:

(a) Water sharing principles, centered on the ‘equitable and reasonable use’ principle, and the ‘no harm’ rule.

(b) A general obligation for states to cooperate in the management of international river basins, centered on the ‘due diligence’ obligation. In this regard, joint mechanisms are expected to flow from the development of the regime.

(c) The integration of the protection of the environment as a regime applicable to international watercourses through the obligation to prevent and control pollution.

(d) The provision of dispute settlement and avoidance mechanisms through the mechanism of a fact-finding commission that can be established at the request of a party.

(e) The involvement of non-state actors, even though the *UN Convention* is a classical state-oriented instrument.

Significantly however, the *UN Convention* is not yet an international regime capable of functioning at the global level (Conca & Wu, 2002). As a result of this, critical elements needed for the creation of a regime are not evident in the *UN Convention*, but some key normative elements are. Some of these key normative elements can be found in the *SADC Protocol on Shared Watercourse Systems* and its 2000 Amendment, the *Revised Protocol on Shared Watercourses* (Ramoeli, 2002:106). These include the following:

(a) Under the General Principles of the *Revised Protocol on Shared Watercourses*, cooperation is called for between all riparian states in the development of joint-projects and studies. This is in support of the overall SADC objective of cooperation in various fields of economic development. This places water cooperation in the context of regional cooperation and economic integration initiatives within SADC.

(b) Specific mention is made for the need to share all information (data) that is relevant to the development of water resources in shared river basins within the SADC region. A significant component of this is the SADC Hydrological Cycle Observing System (SADC-HYCOS) (Ramoeli, 2002:108).

(c) The development of the necessary institutional framework that will support the sustained management of water in the various shared international river basins is also a central component of the *Revised Protocol on Shared Watercourses*. In this regard the following institutions have been proposed (Ramoeli, 2002:109):

> (i) A Monitoring Unit based at the SADC Water Sector Coordination Unit (SADC-WSCU).
> (ii) River Basin Commissions (RBCs) consisting of representatives of the various riparian states found within the respective international river basins.
> (iii) River Basin Authorities (RBAs) in respect of each international river basin.
> (iv) A dispute resolution mechanism that is integrated within the overall SADC structure.

3.3.2 The *Rio Declaration* and the *Dublin Statement*

The 1972 *Declaration of the United Nations Conference on the Human Environment* that took place in Stockholm was the first recorded view by governments that the environment was fundamental to human well-being, and that its protection was a central responsibility of states and the international community as a whole (WCD, 2000:201). Emerging from these early roots, the United Nations Conference on Environment and Development (UNCED) adopted what has now become known as the *Rio Declaration on Environment and Development* during what became popularly known as the Earth Summit in 1992 (UNCED, 1992). This declaration contains twenty-seven principles, collectively known as the *Rio Principles*, many of which are relevant to water resource management and dam building in international river basins (WCD, 2000:201-202). These are as follows:

Principle 1 states that human beings are at the centre of concerns for sustainable development, and they are entitled to a healthy and productive life in harmony with nature.

Principle 3 recognizes the right to development, but notes that this must be done in a sustainable fashion.

Principle 4 calls for the integration of environmental issues into the overall development process if that development is to be sustainable over time.

Principle 10 calls for a wider public participation in the decision-making process in all matters affecting the environment. Central to this is the role of information and data in order to make informed decisions.

Principle 13 says that states are responsible for compensating the victims of environmental damage, and that they must give priority to the development of law to codify this liability.

Principle 15 calls for the precautionary approach to be adopted by states, according to their respective capacities, and the use of scientific knowledge to mitigate environmental degradation. More specifically, the lack of scientific certainty may not be used as a

reason by states to postpone cost-effective measures to prevent environmental degradation.

Principle 27 recognizes the role of indigenous knowledge in the management of environmental issues, and entrusts states to ensure the participation by such people in the attainment of national sustainable development objectives.

The Dublin Conference took place in preparation for the UNCED and was thus was part of the *Rio Declaration on Environment and Development* process. The Dublin Conference was convened separately because activists felt that water was not being given sufficient prominence in the main process. This resulted in the *Dublin Statement* (ICWE, 1992), endorsing four key principles - what are now popularly known in the global water sector as the *Dublin Principles* - that have now come to be regarded as fundamental aspects of integrated water resource management (IWRM) (Lundqvist & Gleick, 1997:30). These are:

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.

- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

- Women play a central role in the provision, management and safeguarding of water.

- Water has an economic value in all its competing uses and should be recognized as an economic good.

The concept of basic needs was also reaffirmed during the 1992 UNCED in Rio de Janeiro, expanding it to include the needs of aquatic ecosystems.

> "In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems" (UNCED, 1992 – quoted in Lundqvist & Gleick, 1997:21).

Implicit in this statement is the idea that basic resource requirements for human and ecological functioning, along with the allocation of sufficient resources to meet those basic needs, are the responsibility of national and local governments, as well as service providers (Lundqvist & Gleick, 1997: 21). Significantly, the role of international organizations and NGOs is also alluded to in ensuring that this is the case. In short, the notion of basic needs (inclusive of the needs of the environment) is now considered to be part of the international normative order, but many governments are as yet reluctant to endorse this as it has legal ramifications arising from non-delivery.

In addition to this, the UNCED also concluded that links between the environment and development must be recognized at the highest political level. During the various preparatory meetings for the UNCED, and associated with the Dublin Conference, what became known as *Agenda 21* was launched (Lundqvist & Gleick, 1997:28). *Agenda 21* consists of forty chapters, with freshwater being dealt with in Chapter 18. Significantly, *Agenda 21* has been officially recognized in the *Revised Protocol on Shared Watercourses* (Treaty, 2000a:2).

The World Bank almost immediately translated these issues into policy. Encapsulated formally into the *World Bank Policy Paper on Water Resources Management*, the Bank aimed at the adoption of a comprehensive policy framework, treating water as an economic good, and combining it with a decentralized management and delivery structure (World Bank, 1993; Lundqvist & Gleick, 1997: 30). The World Bank thus effectively endorsed the *Dublin Statement* and *Agenda 21*. The latest water policy of the World Bank states amongst other things that,

> "The proposed [new World Bank] approach to managing water resources builds on the lessons of experience. At its core is the adoption of a comprehensive policy framework and the treatment of water as an economic good, combined with decentralized management and delivery structures, greater reliance on pricing, and fuller participation by stakeholders. ... The adoption of a comprehensive framework for analyzing policies and options would help guide decisions about managing water resources in countries where significant problems exist, or are emerging, concerning the scarcity of water, the efficiency of service, the allocation of water, or environmental damage" (World Bank, 1993).

In 1994, the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD) endorsed the *Dublin Statement*. During the same

year, the Commission for Sustainable Development (CSD) urged international agencies such as the UN Environment Programme (UNEP), the Food and Agriculture Organization (FAO), World Health Organization (WHO), World Meteorological Organization (WMO), UN Educational Scientific and Cultural Organization (UNESCO), UN Development Programme (UNDP), and the World Bank to strengthen their efforts towards developing a comprehensive assessment of the global freshwater resources (Lundqvist & Gleick, 1997: 30). This assessment was presented at the CSD in 1997, and subsequently again to a UN General Assembly Special Session. At this point the Swedish government took on the responsibility for developing the research capacity further by commissioning the Stockholm Environment Institute (SEI).

The Global Water Partnership (GWP) and World Water Council (WWC) are recent examples of global water sector initiatives (Lundqvist & Gleick, 1997:29). Both organizations were officially launched in 1996 after extensive consultations. The activities of these two bodies relate to the establishment of a common framework that builds on the principles and visions that emerged from Dublin, and that were later incorporated into *Agenda 21*. Originally initiated by the World Bank, UNDP and the Swedish International Development Agency (SIDA), the GWP is an international network committed to the translation of the newly emerging international consensus on IWRM into comprehensive and coherent services. The major emphasis is on achieving sustainable water resource management in developing countries. The emphasis within GWP activities is on the facilitation of projects that emanate from locally defined needs. It coordinates activities and provides leadership, rather than running any given project as such, providing an example of the potential influence of third parties in water resource management in shared international river basins. Encapsulated within this is the concern for ecosystem health as this forms the foundation of livelihood security and population health.

The following statement by the GWP gives an insight into their objectives:

> "Where waters are shared, action should be taken to build confidence among riparian states, enabling them to accept some form of restricted sovereignty concerning their common resource, based on the principles of equitable utilization and on regional cooperation. Mechanisms between riparian states in all major river basins should be developed and shared waters agreements formulated by 2015. Where 'water diplomacy' is needed to help prevent

> conflict, the mediating or adjudication capacity of the UN or other bodies may be utilized" (GWP, 2000).

This statement spells out the central issue of sovereignty when it comes to water resource management, specifically calling on governments to accept that international river basins cannot be managed effectively if sovereignty is regarded as being absolute with respect to a fugitive and shared resource like water.

The WWC is aimed at promoting awareness of critical water-related issues whilst facilitating long-term efficiency in planning and managing water resources. A strong element of this is the development of an analytical think tank capability, focussing on strategic issues such as the *World Water Vision* that was announced in The Hague during March 2000. During the Third World Water Forum that was held in Japan in 2003, the Director General of UNESCO announced the creation of the Water Cooperation Facility, consisting of UNESCO, the WWC, the International Law of Arbitration and the Universities Partnership for Transboundary Waters (UPTW).

3.3.3 The *World Water Vision*

The *World Water Vision* was developed as the result of intensive international consultation prior to the Second World Water Forum that took place at The Hague during March 2000 (Cosgrove & Rijsberman, 2000; WWC, 2000a). The *World Water Vision* is designed to be a consensus document, containing the elements of water management that will be needed to make that management sustainable over time (WWC, 2000b). As such it provides the normative foundation for the subsequent development of rules, norms and procedures that would be necessary for the negotiation of water regimes in various parts of the world. Two elements of the *World Water Vision* are specifically relevant to an analysis of the critical elements of regime creation for the management of water resources.

Firstly, the reform of water resource management institutions has been identified as one of the most critical challenges. This is particularly so in the context of Southern Africa given that one third of all international rivers identified as being "at risk" are found there (Wolf *et al.*, 2003:47). In this regard, "political will must change decision-making to include all stakeholders, especially women, so that stakeholders have the power to manage their own resources" (Cosgrove & Rijsberman, 2000:41). The general effect of

this element is to decentralize water resource management away from the direct control of a small hydropolitical elite, and make those who are responsible for water resource management more accountable to the people that are affected by their decisions. In SCT jargon, this is an act of politicization and therefore desecuritization.

Secondly, due to the recognition that institutions reduce uncertainty, increasing cooperation is called for in the context of shared international river basins (North, 1990:4). Central to this is the desire to make shared water resources a source of potential cooperation, rather than a source of potential conflict (Cosgrove & Rijsberman, 2000:43). This is in keeping with the sentiments articulated by Prof. Kader Asmal (2000) (the South African Minister of Water Affairs and Forestry) in his capacity as the Stockholm Water Prize Laureate, and supported by Jägerskog (2001; 2002:73). The *World Water Vision* recognizes the complexities in the negotiation of cooperative agreements in the water sector, citing the thirty years needed to reach agreement on the *United Nations Convention on the Non-Navigational Uses of International Watercourses*. Recognizing these complexities, the *World Water Vision* calls for the following (Cosgrove & Rijsberman, 2000:44):

- The exchange of data, or efforts to jointly gather data, as a means of building confidence between riparian states.
- The development of a shared vision of any given problem occurring within a shared international river basin.
- The negotiation of international agreements for the management of water resources in a shared international river basin using the positive effects of confidence-building and cooperative initiatives outlined above.
- The development of formalized conflict resolution mechanisms as a part of any international agreement on the management of shared international river basins.

Considerable effort is now being made by the WWC and GWP to promote the *World Water Vision*, with two important developments directly linked to this. The World Summit on Sustainable Development (WSSD) that was hosted in Johannesburg during 2002 debated the overall *problematique* of sustainable development, with water resource management as a component of that overall objective. Significantly, at least one important water-related agreement was reached during a side event at the WSSD (Treaty, 2002b). Japan hosted the Third World Water Forum during March 2003 during which

renewed focus was placed on the attainment of the *World Water Vision*, and in particular in overcoming the obstacles to its full implementation. During the Third World Water Forum, the Water Cooperation Facility was launched, bringing together the specialist skills and capabilities of UNESCO, the WWC, the International Court of Arbitration and the UPTW in support of the *World Water Vision*. This is expected to increase the normative basis for regime creation in international river basins.

3.3.4 The World Commission on Dams

The World Commission on Dams (WCD) was brought into existence with a mandate to review what has become known as the "Large Dams Debate". Central to this debate is the mobilization of water and the development of hydraulic infrastructure by states as a foundation for national development priorities. The WCD set out to achieve two main objectives (WCD, 2000:xxx). The first was to review the effectiveness of large dams and assess alternatives for water resource and energy development, while the second was to develop internationally acceptable criteria, guidelines and standards where appropriate for the various phases of dam construction and management.

The WCD process was highly contested by many countries, especially those with a strongly articulated hydraulic mission that is based on the notion of aggressively harnessing water resources for the purpose of rapidly developing economies, countries and regions. Emerging from this process was a consensus position that has been captured in the *World Commission on Dams Report* (WCD, 2000). It is this consensus position, which was distilled out of a highly contested process of consultation, and a detailed review of existing dams (and in particular their performance records since completion), that has resulted in what have now become known as the WCD's Seven Strategic Priorities (WCD, 2000:213-257). Some of these are relevant to regime creation. These Seven Strategic Priorities are:

To gain public acceptance for the need to develop water resources by means of a dam. Central to this is the notion of informed participation and informed consent, both of which involve data and information being made available to all interested and affected groups of people.

To develop a comprehensive assessment of options available to decision-makers that is based on participation in the policy, institutional and technical dimensions of dam construction and management.

To foster adaptive management and operational practices of existing dams in order to reflect the constant changes taking place in the social, political, environmental and economic arenas that underpin the dam(s) in question.

To sustain rivers, river basins and their associated ecosystems, along with the livelihoods that flow from those ecosystems. Central to this is the generation and dissemination of data that is relevant to the management of the river basins and associated ecosystems and livelihoods.

To foster governance through the development of a culture based on joint negotiations that recognize the rights and share the benefits of river basin development in a more equitable fashion.

To impress on decision-makers that the compliance with agreed practices and approaches would ensure the public trust and confidence that is necessary to reduce conflict that is known to emerge from the development of large dams.

To foster the culture of interstate agreement on the joint management of international river basins. These agreements will of necessity have to be based on a shift away from a paradigm based on the promotion of national self-interest, to one that seeks to promote mutual self-interest for regional cooperation and peaceful collaboration. The storage and diversion of water in international river basins has been a known cause of considerable tension between (and within) countries in the past, so the future development of such infrastructure will increasingly become the subject of agreement between states. This has major implications for regime creation because of the large numbers of dams that already exist in international river basins, given the fact that these will now have to be managed jointly. Central to this endeavour are the *Helsinki Rules* and the *United Nations Convention on the Non-Navigational Uses of International Watercourses*, involving the establishment of a formalized dispute resolution mechanism (WCD, 2000:306).

3.3.5 Generic Elements of a Water Regime

If the sources of the normative dimensions for agreements in international river basins analyzed above provide an insight into generalized elements of regimes, then the work that has been done by various authors such as Haftendorn (2000), Ostrom (1990), Jägerskog (2001; 2002), Haas (1983), Abernethy (2001), Krasner (1983) and others (Pinheiro *et al.*, 2003) provides details of the more specific elements.

An analysis of Haftendorn's (2000:65) definition of a water regime reveals the critical elements of a water regime. Central to any water regime is the existence of a set of rules that have been agreed by the affected riparian states. These rules need to be observed by the various riparian states over time. The outcome of the application of these rules must reduce the transaction costs to the respective riparian states.

These rules will have to be negotiated between the riparian states, and will represent a set of agreed-upon procedures that all participating parties will abide by over time. If the rules are deemed to be unfair, or disadvantage any riparian state, then the agreement will break down. On the other hand, if the rules and procedures are deemed to be fair and reasonable, then the agreement will continue to exist.

The work that has been done by Elinor Ostrom (1990) provides a deeper insight into this process. Ostrom is interested in the social structures for the management of common pool resources that have evolved over time. In particular, she is interested in challenging the *Tragedy of the Commons* thesis that has been propagated by Hardin (1968). Ostrom (1990, 2-7) reviews the existing literature that forms the foundation of conventional wisdom on the management of common pool resources, which is based on three models that have been developed from various literatures and disciplines.

The first of these is the tragedy of the commons model, which has come to symbolize the degradation of the environment and the non-compliance with rules of collective governance. The key outcome of this is ruin, as each person pursues his own best interest in a world that is based on finite limits, rather than access to limitless resources (Hardin, 1968:1,244 as cited by Ostrom, 1990:2).

The second model is encapsulated in the dynamics of the prisoner's dilemma game, which is often used to formalize Hardin's tragedy of the commons model. In this game, each player has two strategies. The first is to cooperate and keep within the agreed rules. The second is to defect and to break the rules, because the risk of getting caught is limited and the benefits are potentially high. This results in a deep dilemma for the various players, all of who act without knowledge of the strategy being chosen by the other player(s). The outcome of this is generally sub-optimal (Putnam, 1993:164). As one commentator has noted, "these paradoxes cast in doubt our understanding of rationality and, in the case of the prisoner's dilemma suggest that it is impossible for rational creatures to cooperate" (Campbell, 1985:3 in Ostrom, 1990:5).

The third model is based on the logic of collective action that was developed by Mancur Olson (1965), who set out to show that the notion that groups tend to act in support of their group interests is supposed to flow logically from the widely accepted premise of rational, self-interested behaviour. Olson's (1965:2) findings are that unless the number of individuals is quite small, or unless there is coercion or some other device with which to induce compliance, then rational self-interested individuals will not act to achieve their common or group interests (Ostrom, 1990:6). Central to this is the free-rider problem (Putnam, 1993:164) (see Nicol *et al.*, 2001).

All of the outcomes of these three models are generally sub-optimal, and ultimately end up by making the participants worse off than before (Putnam, 1993:164). Ostrom (1990: 15-21) therefore seeks to develop a new model, also using game theory. This model is contrary to the conventional wisdom, and is centered on the negotiation of a binding contract, which is generally ignored in the literature. This alternative model assumes that the agreed-upon contract can be enforced, for which a series of options exist. One such option is self-enforcement, where the participants in the game have detailed and accurate information that is relevant to their decision-making. Using this model in some empirical research, Ostrom has shown that the tragedy of the commons dilemma is not always the fate of common pool resources. In fact, Ostrom has observed two possible outcomes. One is an affirmation of the tragedy of the commons thesis. The other is proof that in some cases individuals seem to have successfully developed what can loosely be called a regime (Ostrom does not use this exact terminology because she focuses on inter-group rather than inter-state behavior), and are managing their common pool resources in a sustainable and relatively conflict-free way. This leads Ostrom to ask what the difference is between these two extreme outcomes? In an answer to this question, she hypothesizes

that three critically important elements exist in the cases where common pool resources are being managed successfully, namely the participants have the capacity to communicate with one another; the participants have the capacity to develop trust; and the participants have the capacity to develop a sense of a shared future.

Significantly, all of these are second-order resources that will be analyzed in more detail in next section. They do, however, provide an insight into some of the necessary elements of regime creation. Central to this is Ostrom's (1990:183) finding that:

> "When individuals who have high discount rates and little mutual trust act independently, without the capacity to communicate, to enter into binding agreements, and to arrange for monitoring and enforcing mechanisms, they are not likely to choose jointly beneficial strategies unless such strategies happen to be their dominant strategies. The collapse of the Pacific sardine fishery (McHugh, 1972) and the collapse of the Antarctic blue whale fishery (Clark, 1977) are tragic testimony to the capacity of these models to predict outcomes in empirical situations approximating the theoretical conditions."

Consequently, a central component of any successful agreement for the management of common pool resources - a regime in the context of this study - is the social capital needed in order to learn who can be trusted, what effects the actions of individuals will have on the group, and how to organize in such a way as to gain benefits and avoid mutual harm (Ostrom, 1990:184). In this regard, rule making and rule adherence play a major role in the success of regimes, with the crucial issue of compliance monitoring being essential to provide the incentive to other participants to continue with their rule-following behavior (Ostrom, 1990:187). For an institution that is responsible for the management of common pool resources to succeed Putnam (1993:166) supports Ostrom's views that there are four critical elements needed. These are that the boundaries of the institution must be clearly defined; the affected parties must participate in the definition of the rules and procedures that will be adopted; violators of the rules (defectors) must be subjected to graduated sanctions as these reinforce the value of the norms and discourage non-compliance; and there must be a low cost mechanism for resolving conflicts.

Jägerskog (2001; 2002) has been working on understanding the dynamics of regime creation in the highly contested Jordan River basin. When analyzing his findings, it becomes apparent that elements of a successful water regime include rules and

procedures that are agreed upon by all affected role-players; the observance of these rules, including a sanction for the non-observance of the agreed-upon rules; the institutionalization of conflict potential through the consensus building efforts needed to negotiate and legitimize rules and procedures; the agreement on key issues that can be regarded as being common problems confronting all affected role-players; and a reduction in transaction costs through the negotiation of a set of procedures that are legitimate in the eyes of all the role-players.

Writing in the specific context of managing international river basins in Southern Africa, the Commissioners of the Permanent Okavango River Basin Water Commission (OKACOM) note that there are three key principles that apply to their situation (Pinheiro *et al.,* 2003:118). These are the respect for the sovereignty of each riparian state, the obligation that one state should not cause significant harm to a co-riparian state, and the requirement that the water use must be equitable and reasonable.

Other authors cite similar elements. For example, Haas (1983:58) notes that one of the most important functions of a regime is the collection and dissemination of data. Abernethy (2001) says that the primary goal of an RBO is the entrenchment of the security of rights for the participating stakeholders, through a system of rules and procedures. These act in concert to provide a framework of legality and therefore improve the security of supply in closing international river basins. In similar vein, Krasner (1983:2-3) declares that the purpose of a regime is the facilitation of agreement between the participating actors, in terms of which the principles and norms, manifest in the form of rules and procedures, define the character of the specific regime. Significantly, regimes cannot be relevant for zero-sum situations in which states act to maximize the difference between their utilities and those of others, which accounts for the paucity of regimes in the security arena (Krasner, 1983:8).

The combination of these various elements is a series of reduced transaction costs, which become the benefits that are shared as an international public good (Nicol *et al.,* 2001:3) in any successful water regime.

3.3.6 Conclusion Regarding the Critical Elements of Regime Creation

From this overview, a number of critical elements needed for the successful creation and maintenance of any given regime have been isolated.

International Water Law, which is based on the *Helsinki Rules* and the *United Nations Convention on the Non-Navigational Uses of International Watercourses*, provides the normative basis for agreements in international river basins. These norms have been used in the *SADC Protocol on Shared Watercourse Systems* (and its amendment the *Revised Protocol on Shared Watercourses*) amongst others. Key elements of this include:

(a) Normative values such as the equitable and reasonable use of water resources.
(b) Institutional development including a dispute resolution structure.
(c) The generation of basin-wide technical data needed to manage an international river basin, and the sharing of that data between all affected parties.

The *Rio Declaration* and *Dublin Statement* are a manifestation of reflexivity with respect to the management of all matters impacting on the environment, and these also provide normative elements that are appropriate to regime creation. Key elements of this include:

(a) The mobilization of appropriate scientific knowledge that is open to all affected parties.
(b) The principle of subsidiarity and the broadest participation in the management of water resources, which should be decentralized and accessible.
(c) The management of international river basins as an ecological and hydrological entity, implying that the data and knowledge needed to attain this objective must be institutionalized and made available for all affected role-players to use.

The *World Water Vision* recognizes that institutional reform is one of the main challenges in the quest for sustainable water resource management, and it provides more concrete elements of regime creation. These include:

(a) The reform of existing water management institutions in such a way as to meet the subsidiarity requirements of the *Rio Declaration* and the *Dublin Statement*.
(b) The generation and exchange of uncontested data as a confidence-building mechanism.
(c) Efforts towards the development of a common understanding of the problems within any given international river basin.

(d) The negotiation of agreements between all affected role-players in what can effectively be called water regimes (although such terminology is not actually used in the *World Water Vision* text).
(e) The development of a dedicated conflict resolution mechanism as part of the institutional arrangements that will be needed to manage shared water resources.

The *World Commission on Dams Report* is a consensus document that contains a number of critical elements for regime creation in international river basins. These include:

(a) Broad participation in the management of water resources using the principle of subsidiarity.
(b) The informed consent of all affected parties, including the informed decision-making needed to determine what options are available. Central to this is the role played by data, which becomes the foundation of informed consent.
(c) Conflict mitigation through dialogue and the use of sanctions for the non-compliance of agreements.
(d) The development of a formalized dispute resolution structure.
(e) A critically important paradigm shift away from one of national self-interest (which has a zero-sum outcome) to one of mutual self-interest (which has a plus-sum outcome).

An assessment of the work that has been done by six independent authors (Haftendorn, 2000; Ostrom, 1990; Jägerskog, 2001; Jägerskog, 2002; Haas, 1983; Abernethy, 2001; Krasner, 1983) and others (Pinheiro *et al.,* 2003) has revealed that the critical elements of regime creation include:

(a) A set of uncontested and legitimate rules and procedures.
(b) The observance of those rules and the enforcement of sanction for non-compliance.
(c) The reduction of transaction costs through the acceptance and application of those rules.
(d) Shared knowledge that is detailed and accurate.
(e) Institutional growth and development is incremental in nature, and is usually specific to a given social, political and environmental setting. This means that there is no universal model that can be applied.

(f) Institutions are capable of learning and generating knowledge that is appropriate and synergistic.
(g) A shared understanding of the problem being confronted by all role-players is essential, and comes with the growth of institutional knowledge.
(h) The existence of social capital that is needed to negotiate agreements, generate consensus and choose appropriate institutional models and procedures.

From this wide range of views, it can be concluded that there are three critical elements of regime creation, which can be found in almost all of the literature, even if the terminology used differs slightly. These are:

(a) A common set of rules and procedures that are mutually acceptable to all of the affected role-players, because this promotes plus-sum outcomes and creates the normative foundation for future cooperation.

(b) Hydrological data, to be agreed upon and accepted by all the role-players, as a basis for building confidence and fostering the culture of cooperation.

(c) A conflict management mechanism in order to address the naturally existing conflict potential that is inherent in basin closure, thereby preventing such conflict from escalating into an issue of national security proportions.

3.4 The Necessary Conditions for Regime Creation

> "Social adaptive capacity has been identified ... as the main bottleneck to matching water availability to socially, economically and environmentally sound water management" (Allan, 2000:90).

A number of critical elements to regime creation have been isolated in this literature overview. Given the general absence of water regimes globally (with a few isolated exceptions), the creation of a regime is not an inevitability in all cases. This suggests that specific impediments exist, which can either prevent a regime from evolving, or can hinder the development of a regime once it has been initially created. This indicates the existence of a highly nuanced set of pre-conditions if regime creation is to occur at all. The key focal point of this overview therefore centres on the existence of second-order

resources as a necessary condition for the creation of a regime in an international river basin.

3.4.1 Introduction

In the previous section it has been shown that regimes are an effective way to manage basin closure, largely because this approach institutionalizes the conflict potential and reduces uncertainty for all role-players. This builds confidence and mitigates against an uncontrolled escalation in the development of dams and related hydraulic infrastructure in international river basins, thereby transforming the potential zero-sum outcome of basin closure into a plus-sum outcome. Ostrom (1990:184) has shown that one of the elements that exists in successful agreements to manage common pool resources is what she calls social capital. In similar vein, Falkenmark's (1986:197) concept of the water barrier that was introduced in the Jordan River case study assumes that technological development will be able to manage the problems arising from water scarcity. As such, a threshold (both in terms of water scarcity and the level of technology needed) is assumed to exist beyond which no further socioeconomic development can take place. This is central to the concept of the water barrier scale (WBS) and water scarcity index (WSI) that both form an intrinsic part of Falkenmark's logic (Falkenmark, 1986:197; 1989b:116). It is therefore necessary to develop a deeper understanding of what social capital - that which Ohlsson (1998; 1999) calls adaptive capacity; what Homer-Dixon (2000) calls ingenuity; and what can collectively be called second-order resources - might comprise in the management of a closing international river basin.

3.4.2 The Implications of Basin Closure on Water Management Institutions

Working on the development of the concept of basin closure, and in particular the changing institutional arrangements that are needed to manage this condition, Molden *et al* (2001:73-87 - also see Molden & Merrey, 2002:148) have developed a useful model. This model, referred to hereafter as the Molden Model, shows what happens as the water resources within a given river basin are developed for economic use over time. Their central hypothesis is that changing patterns of water use within a given river basin require what they call "adaptive institutions", for the sustainable, equitable and productive management of water resources. Central to this model, are a number of key concepts that need to be understood.

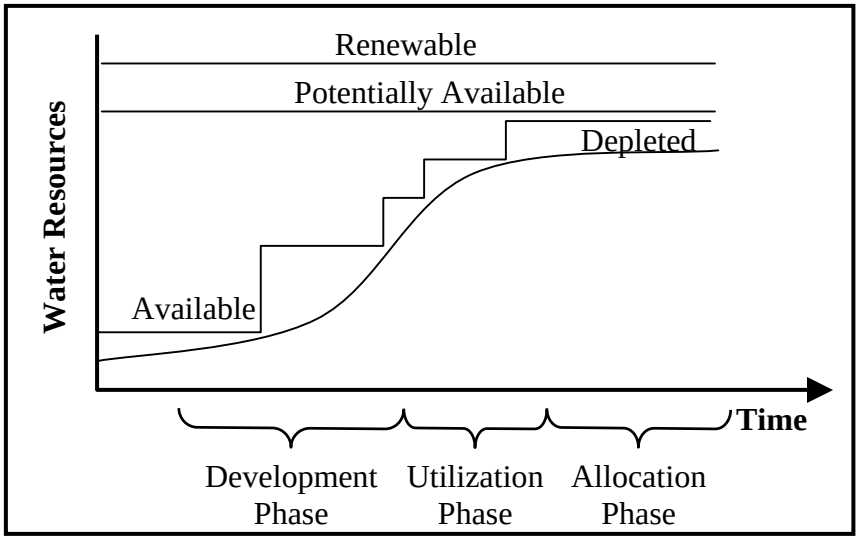
The renewable water resource within a given river basin consists of the total volume of water flowing into that specific watershed. This comes from a variety of sources such as precipitation, groundwater discharge and surface water flows (see Figure 7 - the horizontal line labeled “Renewable”). In essence, this represents the total water resource-base that exists within any given river basin under natural conditions.

The potentially available water is less than the renewable water resource-base, and consists of the water that is available for depletive use within the given river basin. From a purely technical perspective this consists of the gross inflow into the river basin, minus non-utilizable flows (such as those needed for instream flow requirement (IFR) in order to maintain the ecological integrity of the river) minus any agreed water commitments that must be met (e.g. for downstream users) (see Figure 7 - the horizontal line labeled “Potentially Available”).

Available water is a function of the existing hydraulic infrastructure within a given river basin at any moment in historic time. In purely technical terms this consists of the nett inflow, minus the amount of water that has been set-aside for committed uses, minus the non-utilizable uncommitted outflow. In essence, this is the amount of water that is available for use within the river basin in terms of the various assurances of supply design parameters, which have been determined by the hydraulic mission of the state. This changes over time as the water resources are developed (see Figure 7 - the stepped line labeled “Available”).

Depleted water is the use or removal of water from a given river basin that renders it unavailable for further use within that basin. Water is not really consumed, which is one of the unique characteristics of this particular resource, because it is usually returned to the hydrological cycle in some form or other after having been used. This can be in the form of useable return flows from irrigation systems, industrial or domestic return flows, or returns to the atmosphere as water vapour through the stomata of plants, which are not useable in an immediate sense of the word, but which are available elsewhere as part of the global hydrological cycle. Consequently, Molden *et al* (2001) prefer to use the term “depleted water” in their specific model, as this indicates water that is no longer directly available for economic use (see Figure 7 - the “S” shaped curve labeled “Depleted”).

Figure 7. The Molden Model.



Source: Redrawn from Molden *et al.*, 2001:77 and Molden & Merrey, 2002:148.

As water demand increases, there is an impulse to develop more of the available water resource-base within any given river basin. As more water is made available however, more water is also depleted. There is consequently a correlation between available water and depleted water, with the former being represented as a series of steps, which increase as each new dam comes on line. The latter is represented as an "S" shaped curve. Over time, as more of the water resources are developed in response to the growing demand, the depleted water curve approaches the available water curve, necessitating the development of a new hydraulic structure such as a dam. In highly developed river basins, the depleted curve approaches the potentially available supplies. In a closed river basin, the depleted curve approaches (or even exceeds) the potentially available curve. The potentially available water represents the maximum water resource-base that can be mobilized in a sustainable manner, unless other water is brought into the system by means of an IBT. This condition is equivalent to a frontier production function in the field of economics (Molden *et al.*, 2001:77).

As the water resources are developed over time, the institutional arrangements needed to manage those resources also change. According to Molden *et al* (2001:77-78) three distinct phases of institutional development can be isolated (see Figure 7), each associated with a specific level of resource development, and consequently each needing

a different set of rules, procedures and management priorities. These three phases consist of the following:

The development phase: This phase is found in the early stages of river basin development. During this phase, there is no scarcity of naturally occurring water, so the main emphasis is on developing the resources that exist in nature. Due to the abundant availability of water, the laws of economics dictate that it is not a scarce good and consequently the value is relatively low. Growing demand for water results in increased development of hydraulic infrastructure such as dams and pipelines. This starts to place an economic cost on water, but in general the economic value stays low due to its relative abundance. Institutional priorities at this stage are centered mainly on engineering-related issues.

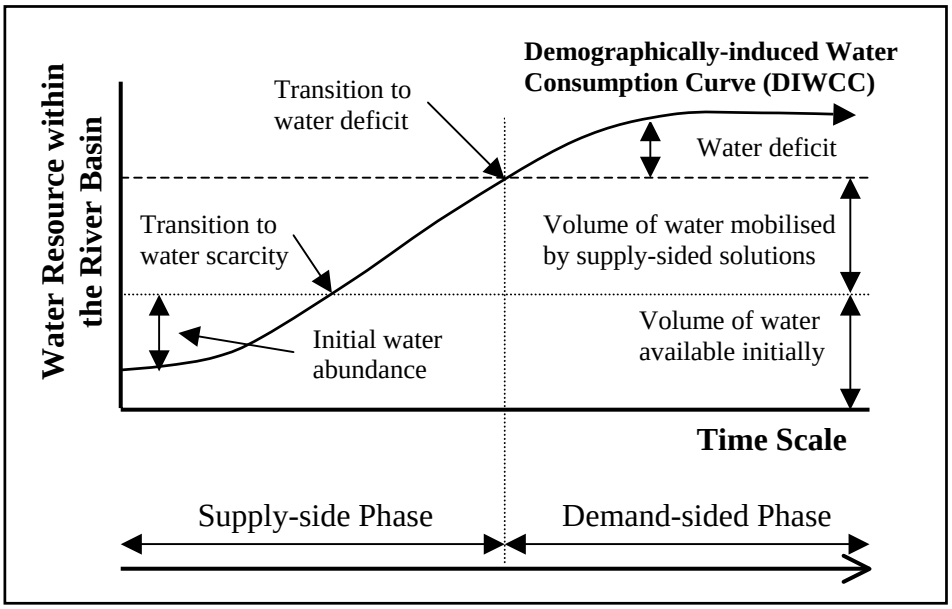
The utilization phase: This phase starts to occur once there has already been significant development of the hydraulic infrastructure. As such there has been considerable economic cost involved in mobilizing water and guaranteeing the assurance of supply to a given level. In this phase efficiency starts to become an issue, so the institutional arrangement changes to adapt to this new management requirement. The institutions tend to focus on sectoral issues such as the management of irrigation projects or the supply of bulk water to domestic or industrial users. Scarcity is not yet a major problem, but the economic cost of water delivery starts to become a concern. Small new infrastructural projects are also developed as the depletion curve approaches the available curve, but these are less attractive and more costly for various engineering-related reasons, so their improved yield is rather limited. In a sense this is roughly like the economic law of diminishing returns.

The allocation phase: This phase starts to become relevant as basin closure is being reached, and depletion approaches the potentially available water curve. This means that there is limited scope for new infrastructural development, so increased efforts need to be made to increase the productive use of the water. The increasing scarcity of water means that the economic laws of supply and demand start to operate and the value of water rises. At this stage allocative efficiency (SWE) becomes an issue, with the need to start inter-sectoral allocation from lower sectoral value users to higher sectoral value users. Managing the demand for water also starts to become a central issue. The institutional focus now changes to the allocation of water between competing users and sectors, the resolution of conflict that now becomes endemic within the river basin, and the regulation

of water supply. Coordination becomes increasingly important involving significant transaction costs. The apportionment of water to different riparian states becomes a key issue in international river basins at this time.

While the Molden Model is helpful in showing how institutional arrangements within a given river basin need to change over time, it does not cast enough light on some important conceptual issues. In response, this author has engaged in some research work with the purpose of developing a more comprehensive model - referred to hereafter as the Turton/Ohlsson Model (see Figure 8) (Turton, 1999; Turton & Ohlsson, 1999). Central to this work is the need to understand the various transitions that are implicit in the Molden Model.

Figure 8. The Turton/Ohlsson Model.



Source: Redrawn from Turton 1999; Turton & Ohlsson 1999; and Turton & Meissner 2002:46.

This refined model, although similar to the Molden Model, was developed independently. The central need is to understand what social triggers, if any, are important for institutional development as the various phases of water resource management are encountered over time. As such the identification of thresholds is important, as these trigger off a new set of institutional needs, which if not met, could result in an increase in conflict potential and a delegitimization of the institution. The Turton/Ohlsson Model is based on the assumption that it is largely demographic factors that drive the demand for

water in a given river basin (see Figure 8 - the "S" shaped curve labeled "Demographically-induced Water Consumption Curve (DIWCC)"). The Turton/Ohlsson Model is based on five assumptions (Turton, 1999; Turton & Ohlsson, 1999).

(a) As the demographic base of a given river basin changes over time, there is an increase in the demand for water. In this sense there is a close correlation between demographic growth and the growth in water demand. As a result, the main curve on the graph is called the "Demographically-induced Water Consumption Curve" (DIWCC). The word "consumption" is used loosely in the sense that water is used but not really consumed as one would consume a resource like coal, which once "consumed" would no longer be available for burning as an energy source. Water is "consumed" but returned to the hydrological cycle in some form or either, either as effluent or as water vapour. The important aspect is that this water is not readily available for direct re-use, so in a loose sense it has been "consumed". In reality effluent can be treated, but this adds cost and is normally beyond the capacity of most developing countries to do, resulting in pollution as a significant element in the depletion of a resource-base. Lundqvist (1998) has labeled this phenomenon "hydrocide", which is a manifestation of a specific - and particularly debilitating - second-order resource problem for the developing world in general.

(b) During the early stages of development within the given river basin, there is an initial period of water abundance. Under such conditions, demand is relatively low, water availability is relatively high and consequently water has a low economic value. This in turn means that the incentive for the abuse of water is high during the early stages of river basin development.

(c) Economic development takes place, very often having been triggered off by a specific event such as the discovery of gold on the Witwatersrand, which in turn creates a rapid increase in the demand for water (Turton & Meissner, 2002:39). This forces the DIWCC upwards, to a point where it crosses the horizontal line that represents the volume of water that was available initially. This corresponds to the Potentially Available line on the Molden Model (see Figure 7). This juncture refers to a specific moment in time known as the transition to water scarcity.

(d) Water scarcity exists within the given river basin when the DIWCC exceeds the locally available supply of water. The transition to water scarcity results in the development of the hydraulic mission in society, as politicians seek to mobilize water in

order to create a stable infrastructural platform on which future social and economic development can be built. Engineers are commissioned with the task of mobilizing water by means of the development of hydraulic infrastructure. This corresponds with the stepped "Available" curve on the Molden Model (see Figure 7). Institutional development that has been created by the transition to water scarcity is similar to the development and utilization phases of water resource management previously depicted (see Figure 7). Basin closure is approached, and possibly even reached in this phase of water scarcity. If basin closure is reached, then there is a strong stimulus to augment supply within the given river basin by capturing the resource-base in an adjacent river basin by means of an IBT. This increases the volume of water that can be mobilized though human ingenuity, thereby enabling water supply to continue even after basin closure has been reached. This acts as a primary stimulus for resource capture, with direct implications for other downstream riparian states in international river basins. This important element of water resource management is not evident in the Molden Model, which presumes that water is managed within the context of a given river basin with no linkage to other river basins, placing it at odds with the South African reality (see Chapters 4 & 5).

(e) Continued economic development causes water to be mobilized to such an extent that the DIWCC starts to approach, and eventually passes, the maximum volume of water that can be mobilized by a supply-sided management approach such as an IBT. This represents the transition to water deficit, beyond which no further water can be mobilized without severe long-term ecological implications. Under these conditions water can become securitized as the strategic implications of water as a fundamental component of the economic growth potential of the state become apparent. Institutional development in this phase is centered on water allocation, conflict resolution and the management of demand, with specific implications for other riparian states in international river basins, given the potential impact that resource capture has had on their own resource-base.

3.4.3 Adaptation as a Result of Second-Order Resources

Haas (1983:57) notes that organizations can learn and adapt, which is accomplished through the processing of information and the development of institutionalized knowledge (as defined in Chapter 1). As such, knowledge creates the basis for cooperation by illuminating complex interconnections that were not previously

understood (Krasner, 1983:19). Knowledge is therefore a function of cooperation, which in turn is the foundation of adaptation. As Horta (2000:196) notes,

> "Ultimately, the internal dynamics of institutions determine to a large degree how institutions will pursue a new set of goals and how these will become incorporated into institutional practice. … [T]hese theories make an important distinction between organizational adaptation and learning. While the latter leads to the adoption of qualitatively new objectives and priorities, the former involves changes brought about by new pressures or incentives, but without adjustments in the organization's underlying goals and priorities."

So institutionalized knowledge, learning and adaptation are closely linked, but are also different from each other. A critical element of both the Molden Model and the Turton/Ohlsson Model is the central role that adaptation plays within any institutional arrangement for water management in a closing river basin. The weakness of both these models is that they assume that adaptation will occur, without explaining what the specific elements of adaptation are. According to Allan (2000:323), this is where the work by Ohlsson (1998; 1999) becomes highly relevant. Ohlsson (1999:5; 23-24) was initially concerned about the Malthusian-related issues of abundance and scarcity, seen within the context of natural resources and this linkage to human populations. Central to Ohlsson's argument is the existence of three distinct forms of scarcity. These are the *scarcity of non-renewable resources* such as minerals; the *scarcity of renewable resources* such as water that are used for the production of biomass and food; and the *scarcity of social resources* that will be needed by societies to adapt to changing levels of renewable and non-renewable resource scarcity.

These three forms of resource scarcity have major significance for explaining and predicting the institutional adaptation that is assumed by both the Molden Model and the Turton/Ohlsson Model. Focusing on environmental scarcity as a potential cause of conflict, Ohlsson (1999:47-48) notes that there are five conditions that may result in open violence. These are:

- Trapped development occurs when depleted resources cannot be substituted in the foreseeable future, which place social groups that are dependent on that resource-base for their survival in a desperate situation. In this case conflict is precipitated by the lack of viable options and the polarization of society.

- The lack of social regulatory mechanisms is a sign of the social and political powerlessness of both traditional and modern institutions of the state and civil society. In this regard the "powerlessness of power" occurs when a political system is unable to detract itself from certain social and political conditions, and developmental goals such as sustainability become impossible to attain. Open conflict becomes more endemic as social institutions fail to manage the rising levels of discord. Seen in this light, sustainability becomes intimately linked with the adaptive capacity of society.

- The environment becomes instrumentalized when certain powerful groups in society manage to manipulate the environmental scarcity in such a way that the resource scarcity becomes transformed into a group identity issue. In this regard trans-boundary rivers are easy to instrumentalize as a means of applying political pressure. Opposition groups start to use ecological crises to articulate their criticism of the state, and marginalized groups are used to attain specific political objectives.

- The organizational ability, and opportunity to become armed, increases as the environmental conflict escalates. This on its own does not precipitate violence, but when it coincides with social and political cleavage lines, it enhances the conflict potential that is inherent within such societies.

- The overlay of historic conflict patterns becomes more relevant as environmental scarcities become a factor. For violence to occur, the adaptive capacity of society in general, and the state in particular, becomes highly relevant under these conditions.

It must be noted that social adaptation - or more accurately stated, the lack of appropriate social adaptation - is a central feature of many of these conflict patterns. Reviewing the Rwanda genocide as a case study of environmentally-induced conflict, Ohlsson (1999:148) concludes that,

> "Now, judging from the developments in the field, the time for such a reconceptualization is ripe, whether practitioners are clear about what they are really doing, and whether social scientists studying the process

> recognize what is happening or not. As an example, water managers in water scarce countries have gone through an early phase of scrambling for more water, mainly with technical and engineering means (attempting to *overcome* scarcity), only to be forced into learning how to live with scarcity; first by saving water (attempting to *manage* scarcity); then increasingly by finding better uses for the limited available resource (attempting *adaptation* to scarcity); in the process being forced to deal with a number of difficult problems occasioned by the social and economic structural change necessitated (thus encountering the *social resource scarcity* sought for here (emphasis in original text)."

This has led Ohlsson (1999:161) to distinguish between two specific types of resource that are relevant to this analysis of resource scarcity. These are as follows:

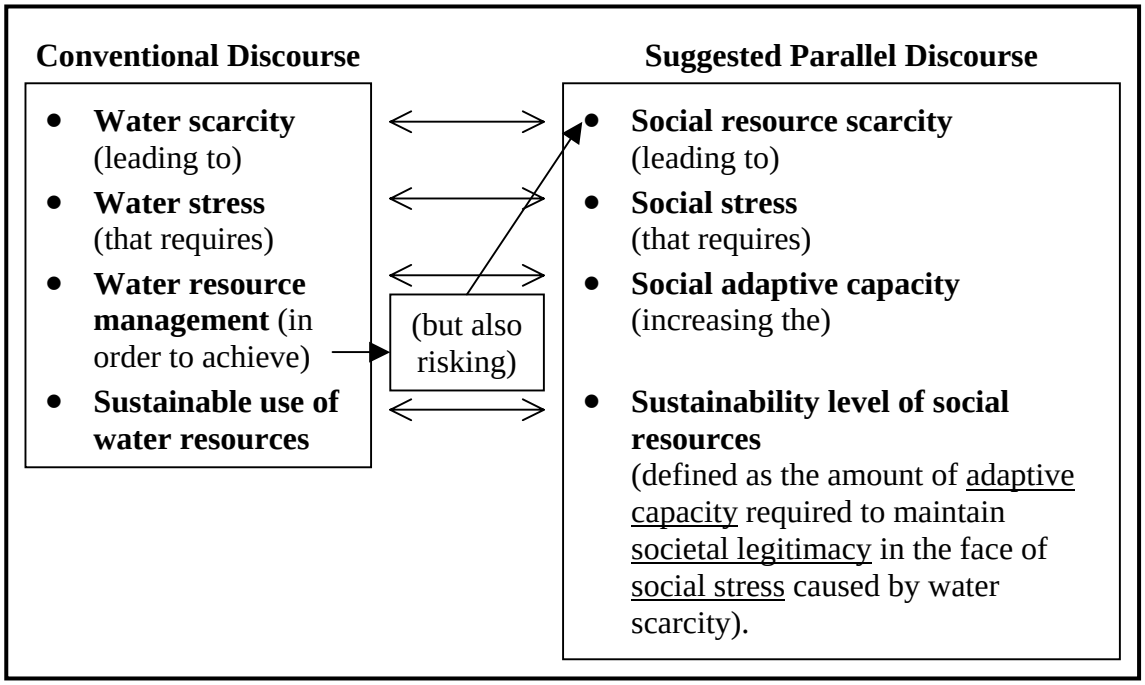
A first-order resource: This is a natural resource such as minerals, land and water, which may be scarce or abundantly available. There are also two distinct types of first-order resource, namely non-renewable and renewable resources, each with fundamentally different characteristics:

> (a) *Non-renewable resources* have a finite availability, exist in the form of a *stock*, and once depleted cannot be replaced. A characteristic of these resources is that they are *consumed*, which is an irreversible process. Typically, consumption of these resources results in a whole series of other problems such as pollution and environmental deterioration, so the management of the resource needs to factor this in.
>
> (b) *Renewable resources* have infinite availability, exist in the form of a *flux*, are not depleted and therefore are *not consumed*. Consequently, effective management of these resources can result in continued economic growth over time. The operative word therefore becomes "effective management", establishing a linkage to second-order resources.

A second-order resource: This is a social resource, which may be either scarce or abundantly available. More appropriately, it is the type of resource that is needed for effectively dealing with first-order resource scarcities. Seen in this light, the failure to mobilize the appropriate amount of social resources with which to accomplish institutional transformation and change, must be seen as a special form of resource scarcity.

In this respect, Ohlsson (1999) has identified two different discourses on resource scarcity, which is called Ohlsson's Parallel Discourse of Scarcity hereafter (see Figure 9). This work represents a substantial shift forward in the way that water resource management can be explained and understood. These assumptions are subsequently developed further in the Turton/Ohlsson Model (see Figure 8). If Ohlsson's (1998; 1999) work is valid, then there are essentially three phases to water resource management, and consequently three specific focal points of water policy, each necessitating a different institutional arrangement.

Figure 9. Ohlsson's Parallel Discourse of Scarcity.



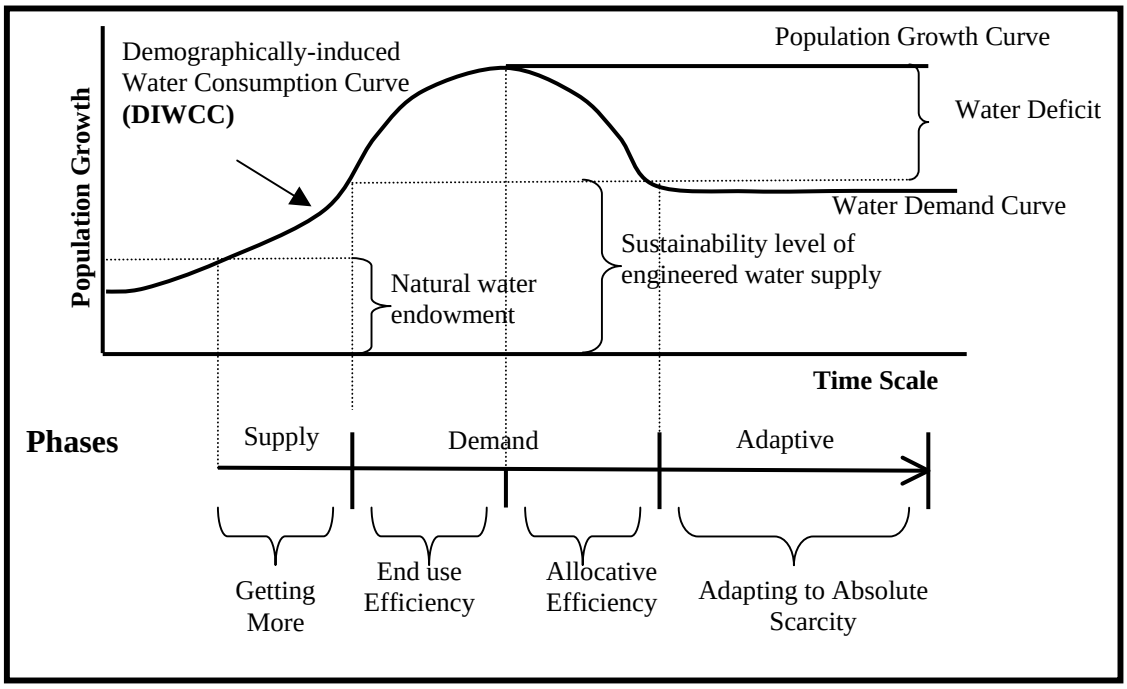
Source: Redrawn from Ohlsson 1999:164.

Using the same concepts as the Turton/Ohlsson Model, the assumption was made that water deficit is an unsustainable condition, much like an overdrawn bank account or balance of payment deficit in economic terms. Consequently, if water demand continues above the level of water mobilized by supply-sided solutions (roughly equivalent to the "Available" curve in Figure 7), then ecological collapse is likely. This would become a classic type of threshold event, heralding in a non-linear collapse of economies and the social systems that they support. To use Homer-Dixon's (2000:173) terminology, "greater complexity … and a higher chance of nonlinearities tend to boost the number of

unknown unknowns in the natural, social, and technological systems around us". If this condition were to be averted, then any policy choice would have to involve the decision to re-align the DIWCC with the sustainability level of engineered water supply shown in Figure 10. This would change the shape of the "S" curve, and would split the water demand curve from the population growth curve (Ashton & Haasbroek, 2002:197).

In technical terms this is called reflexivity (Allan, 2000:29; Beck, 1992; Beck, 1995; Beck, 1996a; Beck, 1996b; Giddens, 1990). Reflexivity in turn constitutes an empirically verifiable indicator of the effectiveness of water policy as an output of any given institutional arrangement, because it shows the ability of the management unit to reduce the deficit and realign the demand for water with the sustainable levels of supply. In other words, the change in trajectory of the water demand curve is the result of effective adaptation and institutional learning. Using the economic analogy previously alluded to, reflexivity is like paying back the bank overdraft before the point of bankruptcy is reached, or reducing the national balance of payments deficit before the whole economy stagnates. Reflexivity therefore enables the "unknown unknowns" - to use Homer-Dixon's (2000:173) terminology - that are associated with the threshold effect to be avoided before they occur.

Figure 10. The Reflexive Model.



Source: Redrawn from Turton 2000a; Ashton & Haasbroek 2002:197.

Based on this, a more sophisticated model is developed - hereafter referred to as the Reflexive Model (see Figure 10) - that contains three distinct phases of water resource management, namely the supply-sided phase, the demand management phase and the adaptive phase.

The supply-sided phase of water resource management starts when the DIWCC crosses the first threshold from water abundance into water scarcity. This acts as a stimulus for the hydraulic mission of society, which goes by different names in different parts of the world. Reisner (1993) coined the term hydraulic mission when describing the US experience at mobilizing water in order to settle the arid West. Breznhev (1978) describes a similar occurrence in the former USSR. Swyngedouw (1999a; 1999b) has used it in his study of the mobilization of water in the modernization of Spain. Platt (1999) refers to this as the phase of "heroic engineering" in the mobilization of water resources for the development of the Boston and New York metropolitan areas. This is what Waterbury (1979:116) refers to as the "High Dam Covenant" in the case of the Nile and the construction of the Aswan High Dam as a foundation for economic modernization in Egypt. Allan (2000:28) notes that the hydraulic mission is essentially a feature of modernity, which is a term used to describe the processes of change in the industrialized North during the nineteenth and twentieth centuries.

The demand management phase starts when the DIWCC crosses the second transition from water scarcity to water deficit. In reality this consists of two distinct sub-phases, namely an early and an advanced phase.

(a) *The early phase* is about end-use efficiency, where intra-sectoral allocative efficiency occurs at the level of the production unit away from water-related activities that yield a low return to water, towards productive activities that show a higher return to water. This is not too complex to manage as it involves limited social disruption and is thus preferred by politicians (Turton & Ohlsson, 1999; Allan, 2000:184).

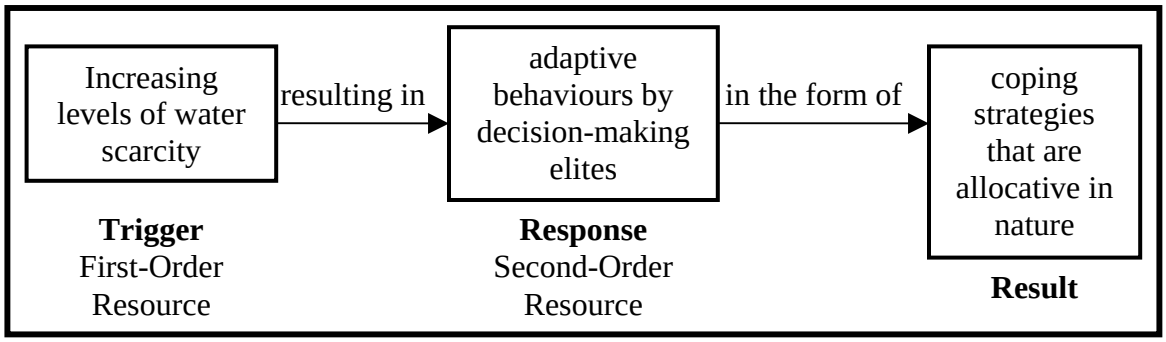
(b) *The advanced phase* is about allocative efficiency, and in particular inter-sectoral allocative efficiency, where water is moved away from economic sectors involving a low return to water (typically agriculture), towards economic sectors showing a higher return to water (typically industry). This is highly disruptive in social terms, and consequently tends to be avoided by politicians, but is necessary

if a reflexive response is to be achieved in the long-term (Turton & Ohlsson, 1999; Allan, 2000:184).

The adaptive phase occurs when the social entity concerned needs to learn how to live with absolute scarcity and still manage to survive in a rapidly globalizing economy where efficiencies of production are important. This is a difficult phase of water resource management because it implies that economic growth and social stability will need to be managed in the face of endemic and debilitating water deficit. It also means that the complexity related to the management of the environmental problems that result after first-order resource depletion has occurred (arising from the threshold effect) would need to become part of the institutional objectives. In the water sector this includes issues such as the acid mine drainage that occurs after exhausted gold mines flood and decant their toxic waters into streams, which is currently happening in parts of Gauteng Province and elsewhere in the SADC region. In international river basins this also includes managing the thorny issue of riparian relations and water allocations between the various riparian states in a way that prevents the securitization of the dwindling water resource-base.

It is therefore evident that adaptation, which involves institutional learning, is really a key concern for sustainable water resource management, as suggested by the Molden Model. In fact, it can now be deduced that changes in the first-order resource availability trigger responses that are needed to manage those changes. These responses are second-order resource dependent (see Figure 11). There is thus an intimate link between first-order and second-order resources that is not evident in the Molden Model, which needs to be explored further.

Figure 11. The Linkages between First-order and Second-order Resources.



Source: Redrawn from Turton & Ohlsson 1999.

There are consequently a number of great challenges facing water policy-makers in countries where water scarcity is a major factor determining the economic growth potential of the state. Ohlsson (1999:189) has identified three generic challenges, namely the management of conflict; getting more use out of the same volume of water; and making better use of the available water. In order to manage these three challenges, he notes that three policy goals are needed. These goals would have to be incorporated into regimes or institutions if they are to function in a sustainable and satisfactory manner over time. These policy goals are as follows:

The management of competing demands for water from different societal sectors and population groups (within a given river basin) in order to achieve a distribution of the scarce resource that is deemed to be equitable. This will require robust institutions capable of withstanding the potentially delegitimizing demands that will be made of them in their quest to mitigate and resolve endemic conflict.

The facilitation of technological changes in order to achieve greater end-use efficiency of existing water, or stated differently, doing more with the available water. This has a first-order resource focus because it seeks to limit the use of water as a resource, and therefore requires a specific form of technical ingenuity (Homer-Dixon, 2000). This is central to Falkenmark's (1986:197; 1990:181) concept of a water barrier that she considers to be relevant to the Jordan River basin.

The facilitation of socioeconomic changes in order to achieve greater allocative efficiency of water, or stated differently, doing alternative things with the available water. This has a second-order resource focus as it seeks to do better things with the available water. Because it involves changes to the fabric of society, such as those caused by the reduction of non-specialized agriculture that is usually performed by unskilled rural dwellers; the increase in mechanized factory farming using fewer unskilled workers; the resultant migration from rural areas to urban areas; and the redeployment of scarce water into the industrial sector, this is a highly complex process that carries considerable political risk. As such it places high demands on the second-order resource base of any given society.

The policy tools that are available in order to reach these policy goals can be divided roughly into two generic groups, namely the *administrative approach* and the *market approach* (Ohlsson, 1999:189). From this Ohlsson develops a matrix linking the water

policy goals with the available tools (see Table 14). Significantly, it is the development of appropriate institutional arrangements, and the generation of viable coping strategies in the form of policies, that lie at the heart of the water management dilemma. It is these very issues that are also second-order resource dependent, so the first-order resource focus inherent in most water scarcity narratives - such as the story being told about rivers running dry - is overly simplistic and deeply flawed (Ohlsson & Lundqvist, 2000).

Table 14. Matrix Showing Water Policy Goals and Available Tools.

Goals (right): Tools (down):	Equitable Distribution	End-use efficiency	Allocative efficiency
Administrative Approach	Recommended but not necessarily the best	Clumsy but probably still necessary	Government faces tough decisions
Market Approach	Needs administrative measures as well	Getting the prices right is difficult	Markets can be cruel decision-makers

Source: Redrawn from Ohlsson 1999:189.

From this literature overview it is evident that the problems confronting institutions because of basin closure are extremely complex indeed. This complexity is a mixture of both a first-order resource scarcity (water deficit), and a second-order resource scarcity (inability to reform or adapt institutions effectively) that cannot be understood in terms of a linear model.

3.4.4 The "Turning of a Screw" Model

The *problematique* arising from this complexity has resulted in research, which has shown that it is best understood in terms of a series of bottlenecks or oscillations between first-order and second-order resources. This can be likened to the turning of a screw in which there is a form of non-linear progression between identifying bottlenecks in water resource management; finding and mobilizing the appropriate social tools to meet the challenges as they arise; and dealing with the conflicts that are being created by the new adaptive ways in which water resources are being managed (Ohlsson & Turton, 1999; Ohlsson & Lundqvist, 2000).

This progression oscillates in a non-linear fashion, between a perceived scarcity of water (first-order resource), and a perceived scarcity of the social means needed (second-order resource) to overcome this initial first-order water scarcity, all the while spiraling upwards because increasing amounts of social resources need to be mobilized as water deficit becomes endemic. The task of managing this oscillation is about the process of learning, preferably within the context of an institution, how to effectively deal with, firstly the *conflicts encountered as a result of the water scarcity* (first-order focus), including those within both the international and domestic political environments; and secondly the *conflicts encountered as a result of the social resources applied to overcome this natural resource scarcity* (second-order focus), including conflicts that are aimed at reducing state legitimacy.

It can therefore be seen that there is a shift in emphasis over time, from managing first-order resource problems (getting more water) initially, and ultimately managing second-order resource problems (managing water allocation between riparian states and doing better things with the available water). These correspond to the three water management phases indicated in the Reflexive Model (see Figure 10). Details of some of these issues are as follows (Ohlsson & Turton, 1999; Ohlsson & Lundqvist, 2000):

During the *supply-sided phase* the problem is perceived as water scarcity. The logical solution is therefore to build hydraulic infrastructure and mobilize water as part of the hydraulic mission of society. This is entirely first-order in focus, but second-order issues arise in the form of conflict over access to the water resource being mobilized - the so-called “pipelines of power” thesis in which hydropolitical privilege is not evenly spread throughout society - in water scarce regions (Turton, 2000b). Other issues focus on conflict between people who are displaced by the dam-building projects and the government, and conflict between riparian states within an international river basin, which usually results in a zero-sum outcome inherent in the upstream/downstream hydropolitical game - sometimes called the “Rambo option” (Ohlsson & Lundqvist, 2000).

During the *demand management phase*, the problem becomes more complex because it is essentially about doing more in economic terms, with less available water. Sustainability is at stake and very little new water can be mobilized due to basin closure, so the perception of the problem changes from the management of water supply (water as a first-order resource issue), to the management of demand (institutional measures such as

water demand management (WDM) as a second-order resource issue). Central to this is the transformation of the management of water as an absolute scarcity, to one of a relative scarcity that can be managed provided that society is prepared to pay the necessary price in social and economic terms. This results in a new emphasis being placed on second-order problems - what Edward Tenner (1996 cited by Homer-Dixon (2000:178) calls revenge effects - such as conflict:

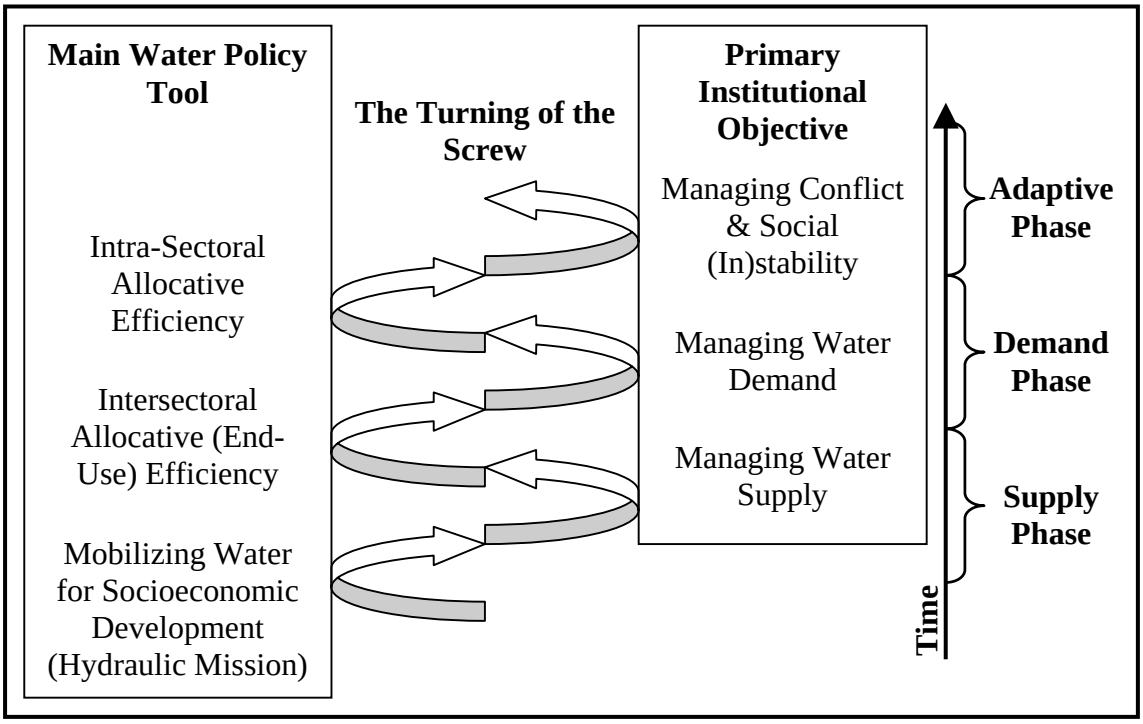
- arising from the changes in rules, norms and administrative procedures, which change the pattern of hydropolitical privilege that have become the norm in society;
- arising over the metering of water to previously non-metered users who have grown accustomed to free water;
- arising when people have to start paying full cost recovery level tariffs for their water services;
- arising from displaced farmers as the shift to water-saving technology forces already marginalized people off the land;
- between rural and urban users of water;
- between riparian states in international river basins, especially where one country is more developed than another and has consequently already mobilized the majority of the water;
- and between economic sectors, as sectoral water efficiency (SWE) issues become more relevant.

During the *adaptive phase*, the problem is extremely complex, as it is about doing alternate and even-more economically productive things with the now highly scarce, probably polluted and very expensive available water. This involves a major emphasis-shift towards second-order issues. This in turn unleashes a new series of revenge effect-styled second-order problems, which come in the form of conflicts:

- arising from the restructuring of society, away from an agrarian-based economy, to an industrially based economy;
- arising from rural/urban migrations and the increase in slums around large metropolitan areas;
- arising from increasing levels of crime, as the rapidly urbanizing work force is unable to gain full employment due to inadequate education levels, and the effects of economic stagnation;

- between riparian states over the allocation of water in international river basins;
- arising from new political and economic dependencies, that arise from the need to balance local water deficits, by importing virtual water from the global grain market;
- and arising from economic marginalization, as the developing country battles to integrate into the global economy, because the nett outflow of hard currency needed to achieve food security through the importation of virtual water becomes inflationary.

Figure 12. The "Turning of the Screw" Model.



Source: Adapted from Ohlsson & Turton 1999 and Ohlsson & Lundqvist 2000.

The oscillations within the "Turning of the Screw" Model can be visually depicted as a spiral (see Figure 12). The left-hand column shows the main policy tool that is used in each of the water management phases. The right-hand column shows the primary institutional objective for each of the water management phases, as initially defined in the Reflexive Model (see Figure 10), which are shown on the time-line at the extreme right of the diagram. The oscillations between first-order resource and second-order resource

priorities are depicted as the "turning of the screw" between the main policy tool and the primary institutional objective columns.

It is instructive to summarize the argument for the importance of second-order resources that has been developed so far. Having noted that adaptive management is needed in the water sector from the Molden Model, the connection between institutional learning and the various phases of water resource management over time have been explored (Turton, 1999; Turton & Ohlsson, 1999). The "Turning of the Screw" Model has shown that there is an intimate linkage between first-order resources and second-order resources, with an oscillation in emphasis between these two types of resource over time. From this it can be concluded that second-order resources, which have been crudely defined as social adaptive capacity, are the actual determinants of social stability in water-scarce states (Ohlsson, 1998; Ohlsson, 1999; Turton, 1999; Turton & Ohlsson, 1999; Turton & Warner, 2002). In support of this, Trottier (1999:134) has shown that this theoretical aspect is valuable in explaining the conditions in the occupied territories of the Jordan River basin, while Brooks *et al* (2002:11) have suggested that these aspects should guide future International Development Research Centre (IDRC) funding.

In his ongoing work on the MENA region in which he has sought to develop an integrated theoretical base for the study of hydropolitics as a unique discipline, Prof. Tony Allan has taken note of the importance of second-order resources, and has said the following about their role in water resource management:

> "Another body of theory developed by Ohlsson & Turton (1999) is useful in explaining why water policy reform is difficult. The theory is also useful in gaining an understanding of the social and political dynamics of water policy reform. … First-order scarcity can occur and worsen when demand rises to outstrip supply. Second-order scarcity can vary according to the pace at which social adaptive capacity can be strengthened. An improvement in social adaptive capacity can compensate for a physical water shortage. An improvement in the volume and quality of water cannot compensate for a shortage in social adaptive capacity in the same measure. … Only when low social adaptive capacity is combined with water deficits is there an intractable situation. An economy need not be significantly hampered by water deficit. … The achievement of a high level of social adaptive capacity is not determined by water availability" (Allan, 2000:322-323).

In the preface to the same work, Allan (2000:xvi) also notes that "[Turton's] work with Leif Ohlsson … is the most cited in the book". Similarly, in a review of thirty-years of IDRC funded projects in the water sector, the authors of the report said:

> "Homer-Dixon has directed the discussion of ingenuity at the macro level and on the importance of ideas and institutions for problem solving. At the micro level however, in the areas of fresh water scarcity and conflict, the research of Ohlsson and Turton has been critical in the shift away from an emphasis on scientific information and technologies. Drawing from, and expanding upon, Homer-Dixon's theory of ingenuity, Ohlsson and Turton have presented an analysis of social responses to complexity. They have developed a framework for how societies diverge in their problem solving of water scarcity and how, potentially, conflict may arise as a result of a shortage of social adaptive capacity" (Brooks *et al.*, 2002: Annexure B3).

Stated differently then, it can be said that second-order resources are an independent variable, because the quality, quantity and timing of the availability of those resources determine the final outcome of basin closure. In other words, if basin closure occurs at a place and time where there is also a low level of social adaptive capacity (i.e. a second-order resource scarcity), then the securitization of water is likely to occur as the conflict potential increases and is transformed into a probable zero-sum outcome. Conversely, if basin closure occurs at a place and time where there is a high level of social adaptive capacity (i.e. a second-order resource abundance), then the conflict potential can be mitigated with a probable plus-sum outcome, as regimes are negotiated, and adaptive institutions are created and maintained. Second-order resources are consequently the independent variable (Turton, 1999; Turton & Ohlsson, 1999; Allan, 2000:322-325; Turton & Warner, 2002:67).

3.4.5 Ingenuity as a Second-order Resource

Having determined that second-order resources are the independent variable, it is now possible to examine these in more detail. In this regard it is instructive to note that, according to the Global Water Partnership:

> "The water crisis is often a crisis of governance: a failure to integrate policies and practices related to the management of water resources. Good water governance exists where government bodies responsible for water establish an effective policy and legal framework to allocate and manage

> water in ways responsive to national social and economic needs, and to [ensure] the long-term sustainability of the resource-base" (GWP, 2000).

Having reached this point, very little has been revealed about what second-order resources actually are, beyond the generic description of why they are needed. Even Ostrom's (1990:184) work merely notes that something which she calls social capital is needed to make common pool resource management effective, without going into details of what this might actually consist of. Fortunately, Thomas Homer-Dixon (1991; 1994; 1995; 1996; 1999; 2000) has done some groundbreaking research into what he calls ingenuity, which will be argued is nothing more than a second-order resource or a form of social capital.

Homer-Dixon develops his argument along the following lines. He starts off by analyzing the concept of a resource, much the same as Ohlsson (1999) did, but with a different emphasis. With respect to environmental resources, and in particular scarcities of those resources, Homer-Dixon (1996:360) identifies three generic forms of scarcity.

Supply-sided scarcity: This occurs when the actual resource-base diminishes over time. This can be thought of as being a smaller sized resource pie. The causes of this could be varied and include periodic drought, which is a natural event; global climate change, which could have an impact on precipitation levels reducing the total volume of water within a river basin; hydrocide[1], which reduces the availability of water through pollution and abuse of the resource (Lundqvist, 1998); and the mobilization and use of water upstream can cause a physical reduction in volumes available downstream, which typically results from basin closure.

Demand-induced scarcity: This occurs when a growing population remains dependent on a finite resource such as land, with a resultant decrease in resource availability *per capita*. This can be thought of as a smaller slice of the overall resource pie and is based on the notion of a finite resource-base such as land. In the water literature, this type of argument is called the "numbers game", which can be traced back to the pioneering work by Falkenmark (1986; 1989b; Ohlsson & Lundqvist, 2000). Postel (1999) bases much of her work on this logic. Ohlsson (1999: 80-144) has found that this form of scarcity (in this case land) acted as a driver for the Rwanda genocide.

[1] This is a form of induced-scarcity that is typically the plight of developing countries using dirty technologies to drive economic growth (Ohlsson & Lundqvist, 2000).

Distributional scarcity: This arises from a growing imbalance between wealth and poverty. This is also known as structural scarcity after resource capture has been implemented by powerful elites in society. The author's "pipelines of power" thesis can be used to explain this phenomenon (Turton, 2000b). The case of apartheid South Africa also falls into this category (Homer-Dixon, 1996:365; Homer-Dixon & Percival, 1996; Percival & Homer-Dixon, 1995; Percival & Homer-Dixon, 1998).

Building on this conceptualization, Homer-Dixon (1996:361) notes that environmental scarcity is not only a consequence of institutions and policy - it can also influence these in a reciprocal manner. The cause-effect linkage is not linear and unidirectional. Therefore, explanations for environmental scarcity should not be subordinated to institutions and policies alone, because it is also partly a result of the physical context in which society is embedded. Consequently, once environmental scarcity becomes irreversible, say through the destruction of topsoil by erosion and poor agricultural practices, and the resultant siltation of dams, then the scarcity becomes an external influence on society. Seen in this light, both institutions and policies are a product of the second-order resources in society.

One of the possible adaptive responses to increasing levels of environmental scarcity is related to technology, where it is argued by Cornucopians - another name for a techno-economic optimist - that rising levels of resource scarcity will become the stimulus for invention. Seen in this way, society will somehow find the remedy when it is needed, because history has shown that necessity is the mother of invention. Refuting this argument as being overly simplistic, Homer-Dixon (1991:101) notes that market-driven adaptation to resource scarcity is most likely to succeed in wealthy societies. It is in these developed countries that sufficient reserves of capital, knowledge and talent help economic actors invent and adapt technologies that result in changes to consumption patterns. He goes on to suggest that this argument is deeply flawed, because the majority of countries that are in fact being confronted by increasing levels of environmental scarcity are developing countries, which are economically poor, with inefficient markets, a lack of financial capital and a paucity of knowledge and know-how. Consequently, the water barrier that Falkenmark (1986:197; 1990:181) speaks of is dependent on second-order resource availability, which Israel has in abundance, but which the Palestinians, Syrians and Jordanians have in varying degrees of scarcity by way of example (Allan, 2000: 324).

When being confronted by increasing levels of resource scarcity, societies can avoid the resultant social disintegration and turmoil (second-order scarcity) if they can adapt to the rising levels of (first-order) scarcity. In this regard, Homer-Dixon (1994:16) notes that adaptive strategies essentially fall into two broad categories. Firstly, societies can continue to rely on their indigenous resources, but use them more sensibly. Economic instruments such as taxation and other incentives could be used to increase the price of resources, thereby encouraging conservation and innovation while reducing depletion. Alternatively, societies might choose to decouple themselves from dependence on their own environmental resources, by producing goods and services that do not rely on those resources. This would involve the reinvestment in capital and skills in order to achieve the shift to other forms of wealth creation.

In order to achieve either of these two options however, what Homer-Dixon (1994:16-17) calls ingenuity will be needed. Central to this concept of ingenuity is the notion of social capital - the same concept that Ostrom (1990; 1994; 2000) utilizes. First used in the English language by Hanifan (1916), there is also a strong French sociological tradition that is mostly associated with the work of Pierre Bourdieu (1986) (Fine, 2001:28-53). Putnam (1993:167-170) notes that social capital includes both the normative values and social networks that can improve the efficiency of society by facilitating coordinated actions. It is these very things that are needed to negotiate and maintain regimes in closing river basins. The significant aspects of social capital are that:

- A reputation for honesty and reliability is an important asset for a would-be participant in a communal venture.
- The reliance on a reputation reduces the uncertainty in the absence of collateral and therefore induces compliant behavior.
- Social networks allow this trust to be spread, and thereby result in confidence-building. Trust is an essential component of social capital.
- Unlike financial capital, social capital increases the more it is used. As such, once it exists, it need never be depleted over time; and if well managed will grow.
- Social capital can therefore be regarded as being a moral resource.
- Like all public goods, social capital is undervalued and under-supplied by private agents.
- Unlike other forms of capital, social capital must be produced as a byproduct of other social activities such as in an institution.

Percival & Homer-Dixon (1998:281) state that environmental scarcity forces groups to focus on narrow survival strategies, which in turn reduce the interactions of civil society within the state. Putnam (1993:173) notes that networks of civic engagement are needed to create social capital, so environmental scarcity reduces the density of that engagement, thereby eroding the cohesiveness of society and reducing the stock of social capital. This in turn fosters group segmentation with a concomitant increase in group identity (Percival & Homer-Dixon, 1998:281). Civil society retreats in the face of this dynamic and is thus unable to articulate its changing demands on the state. More significantly however, this fragmentation reduces the density of social capital, which in turn creates gaps that are open to the exploitation by powerful social groups. In this regard, Putnam (1993:172) notes that reciprocity is a highly productive component of social capital, so the reduction in reciprocal behavior erodes the social fabric. This is the underlying driver of resource capture, which over time delegitimizes the state and other institutions charged with the responsibility of managing the adaptive responses needed (Percival & Homer-Dixon, 1998:281).

Ingenuity in its broadest sense is thus the set of ideas that can be applied to solve practical technical and social problems such as those arising from the depletion of natural resources (Homer-Dixon, 2000:21). Violence and conflict *per se* cannot arise from environmental scarcity alone. These scarcities need to combine with other factors such as the failure of institutions or government in order to result in open conflict. This consequently supports the conclusion that has been reached by Turton (1999), Turton & Ohlsson (1999), Turton & Warner (2002:67) and Allan (2000:323) that second-order resources are the independent variable, or the key determining factors in water resource management. So if ingenuity is the key to the solution, what exactly is ingenuity? More importantly, how does it work and can it be stimulated?

Homer-Dixon (2000:21-22) says that ingenuity includes a wide range of aspects including new ideas - which he calls innovation - but more importantly, also those ideas that are not necessarily novel but are nonetheless very useful. In this regard, ingenuity can be considered as being the sets of instructions that tell humans how to arrange the constituent parts of their social and physical worlds in a way that helps them achieve specific goals. Ingenuity has both a quantitative and a qualitative element to it however. In a quantitative sense, the amount of ingenuity needed to continue running a system that has been developed, is not the same as the amount needed to initially create that system

in the first place. This is because the nonlinearity associated with both threshold effects and revenge effects, increases the degree of complexity that needs to be managed. In a qualitative sense, the type of ingenuity needed to create new technologies differs from that needed to reform old institutions and social arrangements.

Homer-Dixon (2000:22) has consequently isolated two key forms of ingenuity, namely technical and social ingenuity. *Technical ingenuity* helps us solve the problems that arise in the physical world. An example in the water sector would be the construction of hydraulic infrastructure as part of the hydraulic mission to mobilize water on which social and economic development can be sustained. *Social ingenuity* helps us meet the challenges that humans face in their social world. An example in the water sector is the negotiation of regimes in closing river basins and the reform of water institutions in keeping with the adaptive management that is central to the Molden Model (see Figure 7), the Turton/Ohlsson Model (see Figure 8) and the Reflexive Model (see Figure 10).

More significantly, there is a critical link between the two forms of ingenuity. Social ingenuity is a critical pre-requisite for the generation of technical ingenuity (Homer-Dixon, 2000:22-23). The reason for this is that markets provide the necessary mechanisms and incentives for inventiveness and the creation of new technologies. Politicians bargain for and create coalitions, underpinning them with the necessary incentives to put new institutional arrangements in place. Competent bureaucrats plan and implement public policy, while ordinary people in communities and households build local institutions and change their behavior in order to solve the problems that they face. These forms of social capital are all supplying a continuous source of social ingenuity. One of the outputs of this mobilization of social ingenuity is technical ingenuity. Social ingenuity is thus the independent variable in this equation. As a result of this, society needs ingenuity in order to develop more ingenuity (Homer-Dixon, 2000:232), making this relationship a complex one indeed.

Taking this further, Homer-Dixon (2000:173) notes that broadly speaking there are three kinds of system that humans interact with, namely natural, technical and social systems. The *natural systems* have existed since before *Homo Sapiens* evolved into the dominant species that it is today. These natural systems, such as river basins, have taken billions of years to form and have a dynamic that works over these long periods of geological time. *Social systems* are relatively modern creations, having evolved as products of human evolution and endeavor. The time-scale in these systems is thus relatively short.

Technological systems are man-made with the purpose of interfacing between natural and social systems. As such they can be traced back to early hominid development and are in fact an important element in the ultimate evolution of humans, having enabled them to become masters of their respective environments.

In the development of technological systems, the philosophical basis of modern science 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 one could 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 in 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*" (emphasis added) (Anscombe & Geach, 1954: 46).

The control of nature aspect is still relevant today within the natural sciences, and is particularly manifest in hydraulic engineering, where in essence human ingenuity is applied to alter the naturally-occurring hydrological flow patterns, the result of which ecosystems have evolved over millions of years of geological time. Seen in this way, dam building is a profoundly unnatural act, because it seeks to control nature, which is why sometimes "things bite back" in the form of revenge effects that basically increase the degree of complexity that needs to be managed (Tenner, 1996). This philosophical foundation affects the way that humankind constructs knowledge, which in turn impacts on the way that Man interprets information. 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. To this Homer-Dixon (2000:83) says:

> "Seduced by our extraordinary technological prowess, many of us come to believe that external reality - the reality outside our constructed world - is unimportant and needs little attention because, if we ever have to, we can manage any problem that might arise there."

Driven by the belief in the control over nature that is inherent in our scientific knowledge and resultant techno-economic optimism, the world has increasingly become human-impacted, with very few natural systems still occurring. One of the results of this is an increase in the level of complexity (Arthur, 1994 in Homer-Dixon, 2000:103). Another is the growing interdependence between the natural, social and technological systems, which in turn means that a greater chance exists to encounter the unintended consequences of nonlinearities and threshold effects as environmental scarcity increases (Homer-Dixon, 2000:173). In this regard it has been shown that the ingenuity requirement goes up as environmental problems worsen, because societies need more sophisticated technologies and institutions to reduce pollution and to conserve, replace and share natural resources (Homer-Dixon, 2000:23). It is precisely these aspects that are in short supply in the developing world.

The supply of ingenuity thus involves both the generation of good ideas, as well as their implementation within society (Homer-Dixon, 2000:23). When examining this in more detail, it was discovered that many of the critical obstacles occur not when the ingenuity is created - there is usually not a shortage of good ideas - but rather when people try to implement these ideas. In fact, the biggest obstacle is often political competition among powerful groups in society, which stalls or prevents key institutional reform (Homer-Dixon, 2000:23). The supply of social ingenuity is therefore the major bottleneck in society (Homer-Dixon, 1995), in which the benchmark was defined as the amount of ingenuity needed to compensate for any aggregate social disutility caused by environmental stress. Stated differently, this is the minimum amount of ingenuity that a society needs to maintain its current aggregate level of satisfaction, despite the stress caused by environmental scarcity (Homer-Dixon, 2000:23). Stated simplistically, it is the inability of developing states to innovate in the face of complex challenges, which causes them to fail (Barbier & Homer-Dixon, 1996). Central to this observation is the conclusion that developing countries tend to fail because they are unable to generate or use new technological ideas in order to reap greater economic benefits. The crucial factor in this equation is the quality of public institutions, where resource scarcities affect the potential for innovation. Seen in this light, first-order resource scarcities directly affect the adaptive capacity of society, thus increasing second-order resource scarcity (Ohlsson, 1999:156).

Emerging from this argument, Homer-Dixon (2000:1) notes that there is a concept called the ingenuity gap. This is the main reason why developing countries fail (Barbier &

Homer-Dixon, 1996; Homer-Dixon, 1995; Homer-Dixon, 1996). It seems therefore that ingenuity cannot easily be created or stimulated, because in essence it is a product of social capital, which in turn can be understood as being the synergistic application of second-order resources in society.

3.4.6 Ingenuity and Institutional Learning

Having determined that second-order resources are an independent variable, and having established that ingenuity is a form of second-order resource that is needed to adapt water management institutions, it is instructive to explore the linkage between ingenuity and institutional learning. In this regard, the views of Brooks *et al* (2002:11) offer some insight, when they say that:

> "It is an implicit thesis of this review that wider application of the related concepts of second-order scarcity and of social adaptive capacity would provide a more productive way by which to differentiate among resource management responses to water scarcity, and their implications for policy design in different cultures, different socio-economic conditions, and different eco-regions. Thus we concur with Turton's conclusion on 'the need for changes to take place within a social entity in order to meet the challenge of increased water scarcity'".

Krasner (1983:12) has shown that regimes are needed to manage complexity. In fact, the increase in complexity can become one of the fundamental *stimuli* for regime creation in the first place. Central to this is the generation of knowledge (Haas, 1980). In essence there are five completely distinct, but extremely important, elements to this form of knowledge that needs to be understood. *Technical information* is the foundation of knowledge, but data on its own does not constitute knowledge. This technical information must be *processed and evaluated* before it becomes knowledge, so there must be agreed-upon scientific methodologies at work within the chosen institutional setting. *Consensus* needs to be generated on the validity of the initial data, as well as the methodologies used to evaluate those data, if the resultant output is to become knowledge. Consensus building is a social process with a strong political dimension to it. The resultant *output of this process* must result in changed perceptions about the core problem being confronted by the regime or institution. If there is no change in perceptions about this core problem over time, then the knowledge is probably not legitimate simply because insufficient consensus has been reached on the initial data, the methodology used to evaluate those

data, or the final result of this process. This *new knowledge* must become the basis of new policy that guides the regime in the attainment of the institutional goal that arises from the changed perception of the core problem being confronted.

Seen in this light, the *difference between information and knowledge is the process of legitimization*. Knowledge is institutionalized and is seen to be legitimate, whereas information need not necessarily be so. Legitimate knowledge, when captured in an institutional setting, results in more than adaptation - it results in institutional learning as well. Adaptation becomes the institutional response to the process of institutionalized learning, which in turn is the result of the social processes of consensus building and legitimization. It should come as no surprise then that institutional development is an incremental process, particularly in contested arenas where suspicion is high. In this regard, Ostrom (1990:190) suggests a model for negotiation by noting that,

> "Success in starting small-scale initial institutions enables a group of individuals to build on the social capital thus created to solve larger problems with larger and more complex institutional arrangements. Current theories of collective action do not stress the process of accretion of institutional capital. Thus one problem in using them as foundations for policy analysis is that they do not focus on the incremental self-transformations that frequently are involved in the process of supplying institutions. Learning is an incremental, self-transforming process".

Learning is necessary, because adaptations need to be made as regimes are created and institutions are developed. In this regard Ostrom (1990: 190) found that the activities of external political regimes were positive factors in helping most of the groundwater producers in southern California to self-organize, but such activities were negative factors in preventing continued self-organization in other cases that she has studied. As a result of this, a theory of self-organization and self-governance of smaller units within larger political systems will need to take the activities of the surrounding political systems into account. This means in effect that successful models from a given location cannot necessarily be transplanted into other hydropolitical settings and be expected to work. The reason for this is the culture-bound nature of problem definitions, threat perceptions and norms governing cooperative behavior, all of which are intimately linked to the specific historic experiences of the various role-players.

Ostrom (1990:191) has concluded that there are three problems that current theories of collective action fail to take into account. These have major ramifications for regime creation because they reduce the effectiveness of existing theoretical models for providing the foundation for the policy analysis of institutional change. These three shortfalls in existing theory include the:

- need to reflect the incremental, self-transforming nature of institutional change;
- importance of the characteristics of external political regimes in an analysis of how internal variables affect levels of collective provision of rules;
- and the need to include information and transaction costs.

It seems therefore that while institutions are capable of learning and adapting - to which it can now be said with a degree of confidence that this is related to second-order resource availability - there is in effect little by way of acceptable theory that can guide an analysis of how and why institutions succeed (or fail). In short, current theory does not link concepts like first-order resource, second-order resource, social capital, adaptive capacity and ingenuity, all of which are vital elements in the desecuritization dynamic of closed international river basins.

3.4.7 Indices of Second-Order Resource Availability

How can ingenuity be linked to the management of water resources in a closing international river basin? The UNDP, the World Bank, the GWP and the WWC now promote the concept of IWRM, which is essentially based on the French model. This is an administrative approach based on treating the entire river basin as a unit of management, and focuses on the establishment of various technical administrative units (River Basin Commissions) combined with user groups (River Basin Authorities) where stakeholders discuss, and reach agreement on, the appropriate goals. This approach places great demands on the administrative capacity of states, which are exactly the type of resources that are scarce in many developing countries (Ohlsson, 1999:189-190).

Central to this is the role of institutions, which specify the range of socially permissible, required or recommended actions in any given situation (Homer-Dixon, 2000:283). Institutions also generate and make available key information about the actions of others (i.e. they reduce uncertainty), which is a key function of regimes in closing river basins if the zero-sum outcome of securitization is to be avoided. Two hundred years ago US

President Thomas Jefferson realized that the complexity of institutions must rise in response to the complexity of the human interactions that they are intended to manage, and the tasks that they are expected to perform (Homer-Dixon, 2000:283). This takes one back to the adaptation that is assumed in the Molden Model (see Figure 7), the Turton/Ohlsson Model (see Figure 8) and the Reflexive Model (see Figure 10).

Is the concept of ingenuity helpful? In answering this question, Ohlsson (1999:151) has the following critique about Homer-Dixon's theory:

> "Yet, opting for the terms 'ingenuity' and 'ingenuity gap', Homer-Dixon never takes the last step. I can but speculate about the reasons, since the parallel seems so obviously fruitful: i) the resources societies need to mobilize in order to deal with challenges posed by scarcities of natural resources are distinctly social in character; ii) a failure to mobilize enough such social resources rightly ought to be termed a social resource scarcity; iii) highlighting the social resource scarcity aspect of a perceived natural resource scarcity shifts the attention from attempts of getting more of the scarce resource (often frustrating and conflict-creating), to concentrating on efforts to adapt".

So what is missing from this conceptualization is the ability to change the nature of the underlying paradigm that informs water resource management. While this paradigm is changing at present, it is still generally about seeing water as a problem, and as such it is still predominantly first-order in focus, even if it has introduced some second-order dimensions (Ohlsson & Lundqvist, 2000).

It has been shown that second-order resources are the independent variable and thus the key determining factors of the outcome of basin closure, yet there is nothing available in the literature to take one beyond this point (Turton, 1999; Turton & Ohlsson, 1999; Turton & Warner, 2002:67; Ohlsson & Turton, 1999; Ohlsson & Lundqvist, 2000; Allan, 2000:323). In reality, there are simply no agreed-upon indicators that can be used to measure the existence of second-order resources in society.

In an attempt to overcome this problem, Allan (2000:322-325) has taken the initial conceptual development that was done by Turton (1999), Turton & Ohlsson (1999), and Ohlsson & Turton (1999), and concretized this into an indicator of second-order resources. Using gross national product (GNP) *per capita* adjusted to purchasing power parity (PPP), Allan has produced a matrix for the MENA countries. This matrix shows on

the vertical axis, the level of water security in each country, measured as the volume of freshwater available *per capita* per year. On the horizontal axis the degree of adaptive security is measured, using the World Bank data on GNP *per capita* per year. This shows a good split of countries between possible combinations of water-rich but adaptive societies; water-rich and non-adaptive societies; water poor and non-adaptive societies; and oil rich and adaptive societies. The selection of GNP as an indicator was taken to embrace the capacity of society to mobilize resources for the development of institutions and consequently to generate a range of adaptive coping strategies. Alcamo (2000:164) supports the use of such data as an indicator of state susceptibility. In this regard, the highly aggregated data is valuable because it exists over long time sequences, and it can be linked to the state capacity to respond to crisis. In similar vein, Homer-Dixon (2000:101) has shown that adaptation is unlikely to occur in poor countries, so a measure of relative wealth, particularly if this can be used in a comparative fashion, is a valid albeit crude indicator. From the application of this methodology, Allan (2000:325) has concluded that it is the social and political process that in turn enables water policy reform, and not *vice-versa*.

Taking this further, Turton & Warner (2002:65) have developed a similar Resource Matrix for Selected African Countries (see Figure 13). This matrix embraces the following concepts, for an analysis of various countries that are found in Southern and East Africa:

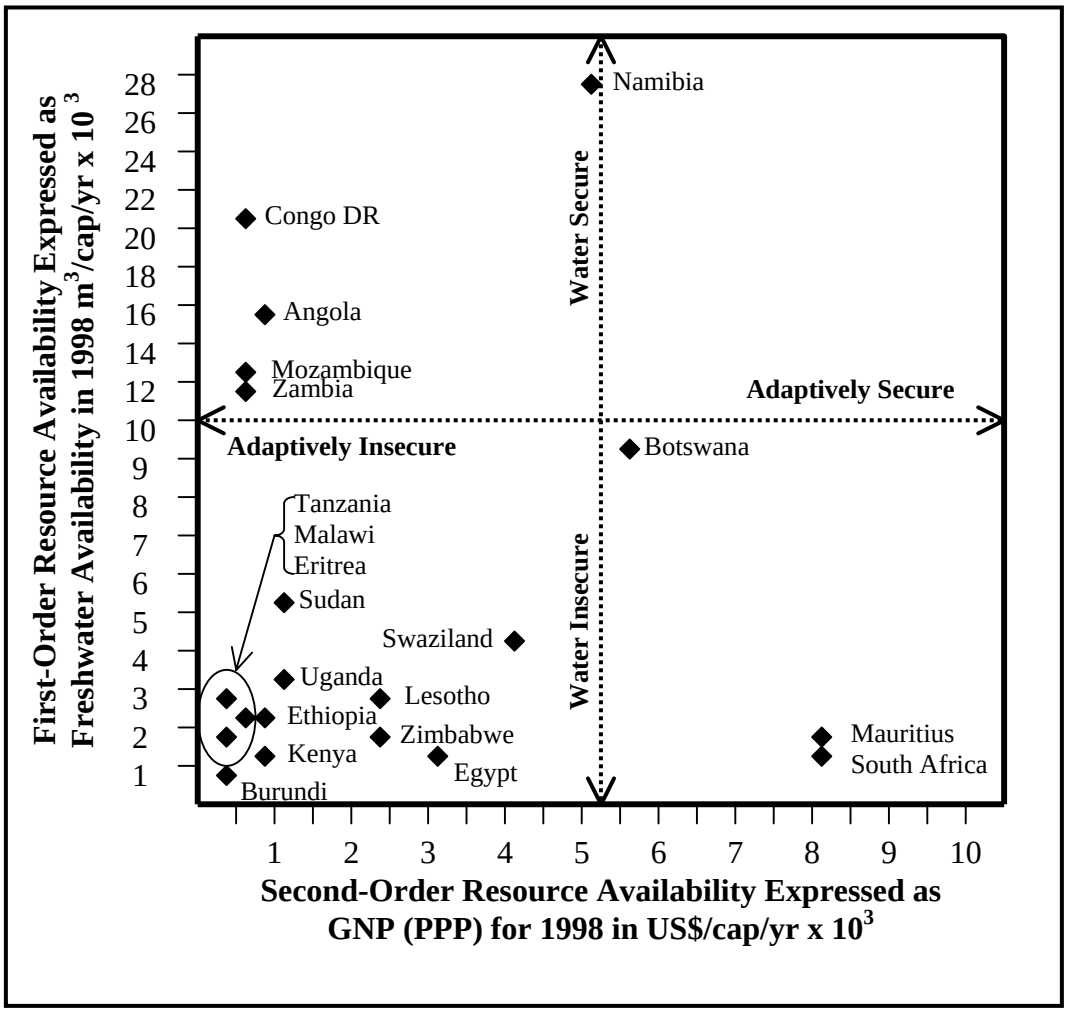
Structurally-induced relative water abundance (SIRWA): This is located in the lower right hand quadrant and includes Botswana, Mauritius and South Africa, which mostly have first-order type of water resource problems (i.e. problems primarily related to the availability of water rather than the development of institutions).

Structurally-induced relative water scarcity (SIRWS): This is located in the upper left hand quadrant and includes Angola, the Democratic Republic of Congo (DRC), Namibia, Mozambique and Zambia, which mostly have second-order type of water resource problems (i.e. problems related to the development of institutions and infrastructure with which to mobilize and distribute water as a basis for economic growth and social development).

Water poverty (WP): This is located in the lower left hand quadrant and includes Lesotho, Malawi, Swaziland, Zimbabwe, Tanzania, Burundi, Egypt, Eritrea, Ethiopia,

Kenya, Sudan and Uganda, which have a complex set of problems relating to both first-order and second-order resource scarcities (i.e. they have insufficient water for sustained economic growth and development, and they also have limited institutional capacity with which to resolve these problems).

Figure 13. Resource Matrix for Selected African Countries.

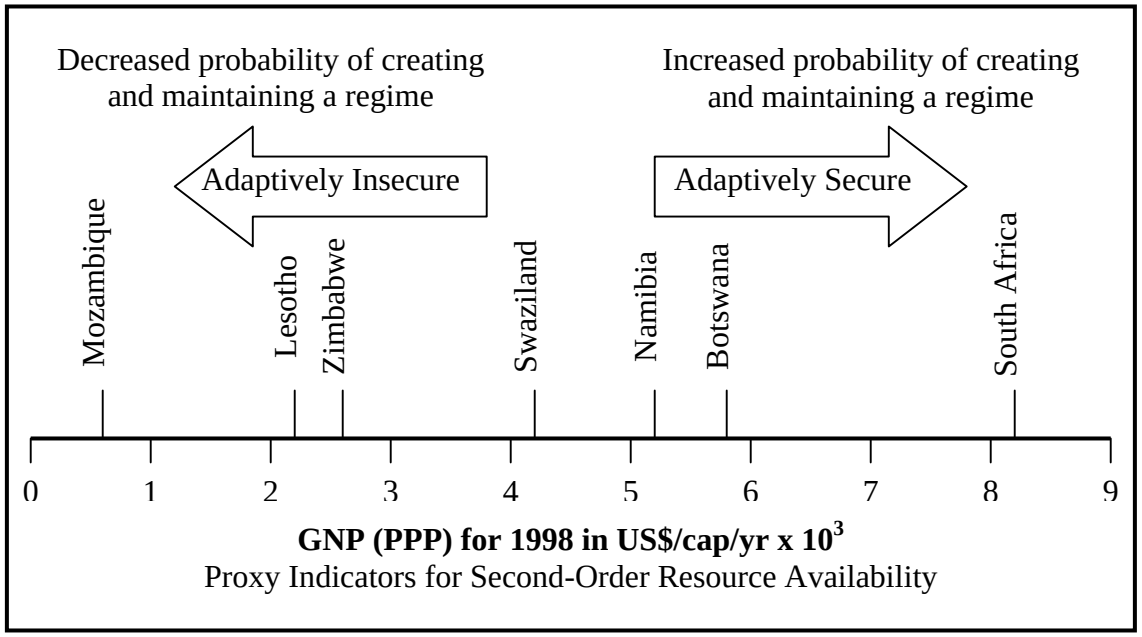


Source: Redrawn from Turton & Warner 2002:65 using World Bank Atlas 2000 data and layout from Allan, 2000:324.

From an assessment of this Resource Matrix for Selected African Countries (see Figure 13) it can be shown that in all cases presented, the relative abundance (or scarcity) of the second-order resource seems to determine the outcome of development potential of the state concerned and is thus the independent variable (Turton & Warner, 2002:67). Where there is a relative abundance of first-order resources in conjunction with a relative

scarcity of second-order resources, the developmental potential is likely to remain low. This condition can be labeled SIRWS, which is an unhealthy condition that policy development should seek to actively counter. Where there is a relative scarcity of first-order resources in conjunction with a relative abundance of second-order resources, the developmental potential is likely to be high. This condition can be labeled SIRWA, which is a healthy condition to be actively sought as a policy-outcome. Where there is a relative scarcity of both first-order and second-order resources, the developmental potential is likely to remain low. This condition can be labeled WP, which is a debilitating condition that is likely to result in a spiral of social and economic decay over time, with no apparent end in sight short of external intervention in some form. Under these conditions, policy intervention is likely to be exogenous in nature, being dependent on third party involvement.

Figure 14. Adaptive Security Spectrum for South Africa's Co-riparian States.



Source: Drawn from World Bank 2000:42-43 data used in Turton & Warner 2002:65.

Arising from the data shown on this Resource Matrix for Selected African Countries (see Figure 13), the theoretical propensity for regime creation and (dys)functionality can be plotted with respect to the second-order resource availability across the spectrum of riparian states found in the various international river basins under review in the South African component of this study. This is shown as the Adaptive Security Spectrum for South Africa's Co-riparian States (see Figure 14) and is based on the available evidence

that poor countries are less likely to mobilize the necessary social and technical ingenuity, and will thus be less likely to negotiate and sustain a regime on their own (Homer-Dixon, 1995; Barbier & Homer-Dixon, 1996). Consequently, the states to the left of the spectrum are adaptively insecure, and are thus less likely to be able to mobilize the necessary second-order resources to create a regime; whereas the states to the right of the spectrum are more adaptively secure, and are thus more likely to be able to mobilize the necessary second-order resources to create and sustain a regime. This finding will be tested in the South African case study (see Chapters 4 & 5).

GNP *per capita* adjusted to PPP provides a highly aggregated dataset of second-order resource availability for all of the riparian states that share an international river basin with South Africa. In terms of the logic that has been developed in this literature review, there is a decreased probability of creating and maintaining a regime the further one moves to the left of the spectrum, with a greater chance of dysfunctionality over time. The converse holds true the further one moves to the right of the spectrum. The veracity of this theoretical conclusion will be examined in more detail in light of the empirical data on regime creation (see Chapters 4 & 5).

3.4.8 Conclusion Regarding the Necessary Conditions for Regime Creation

From the literature overview it can be seen that the primary function of second-order resources within the context of river basin management is the development of institutions, technologies and knowledge with which to manage the potential zero-sum outcomes of basin closure. This is done through two key processes, namely the reduction of the uncertainty caused by basin closure, and the development of appropriate coping strategies.

The reduction of the uncertainty caused by basin closure for all riparian states and other role-players is a key process of desecuritization, because it is in essence perceptions of insecurity that are the fundamental driver of conflict. The core issue that needs to be tackled is the institutionalization of the conflict potential that is naturally inherent to basin closure. Consequently the main empirically verifiable indicators of the existence of such a second-order resource are the ability to generate three key elements: basin-wide data; a common set of rules and procedures; and a conflict mitigation mechanism.

The development of appropriate coping strategies capable of managing the wide range of problems arising from the threshold effects of basin closure is also a key process of desecuritization, because in essence there is insufficient water to be distributed between riparians to meet all demands being made on the overall system, so something has to be done other than to simply share water. The core issue that needs to be tackled is a redefinition of the perceived problem of water deficit. Central to this is the transformation of the perceived problem away from one of absolute scarcity (where water is seen as a finite resource) to one of relative scarcity (where water is seen as an abstract resource that can be traded in the form of virtual water). Consequently, the main empirically verifiable indicator of the existence of such a second-order resource is the ability to gain consensus on the data, thereby legitimizing it and making it uncontested. Seen in this way, the effects of scale become manifest. Water deficit is thus seen as a local phenomenon, possibly up to the level of the river basin. There is no water scarcity at the global level, so the remedy therefore lies beyond the scale of the river basin (where IBTs have been the traditional solution), and can be found in a range of options including the management of demand, the inter-sectoral allocation of water and the global trade in virtual water.

In the absence of literature on more refined indicators, second-order resources - such as adaptive capacity, social capital or ingenuity - are likely to manifest in a number of ways in the context of regimes in international river basins. An indicator of *technical ingenuity* within various regimes is the ability of any given riparian state to generate hydrologically-relevant data without external assistance. Indicators of *social ingenuity* within various regimes are:

(a) The ability of any given riparian state to legitimize the hydrologically-relevant data by means of negotiation and analysis, and transform it into knowledge (as defined in Chapter 1).

(b) The ability to negotiate a set of rules and procedures that form the normative basis of a regime that is acceptable to all the riparian states in a given international river basin.

(c) The ability to negotiate an agreement in times of crisis on an issue that has not been incorporated into the initial rules and procedures. This indicates the adaptive capacity of the institution, or the ability to maintain the agreement over time.

(d) The ability to make allocative decisions that are deemed to be fair by all of the riparian states in the international river basin using the knowledge that has been produced through technical ingenuity.

(e) The existence of a conflict management structure as an integral component of the regime.

3.5 Conclusion

A review of the literature relevant to the dynamics of the desecuritization of water resource management enables some insight to be generated at the theoretical level, with applicability to the rest of this study. Returning now to the overall statement of the problem - how can the zero-sum outcome of basin closure be transformed into a plus-sum outcome in South Africa's international river basins? - a number of conclusions that are relevant to the dynamics of desecuritization can be drawn at this stage.

The *third sub-problem* asks what are the alternatives to the securitization of water resource management that exist in an international river basin facing closure? An analysis of this question from the perspective of theory shows that:

(a) Regime creation can effectively desecuritize water resource management while still maintaining the necessary security of supply.

(b) Even in the highly contested Jordan River basin, there are traces of a water regime, but this is not yet functioning amongst all role-players at the basin level.

(c) From this the Desecuritization Model was developed (see Figure 6).

The *fourth sub-problem* asks what are the critical elements of regime creation that can be considered as a management model in the various South African international river basins? From an analysis of this question it can be concluded that central to the long-term survival of the regime is the ability of the institutional arrangement to generate sufficient uncontested knowledge, which results in a redefinition of the perception of the core problem away from water as an absolute scarcity, to water as a relative scarcity. The critical elements of regime creation consist of three distinct aspects:

(a) A common set of rules and procedures that have been agreed upon by all riparian states and are thus uncontested.

(b) A set of hydrological data that forms the basis of all water management decisions, including water allocation between riparian states, which is relatively uncontested.

(c) A formal conflict mitigation structure as an institutional arrangement that is capable of dealing with the inherent conflict potential related to basin closure.

The *fifth sub-problem* asks what is the necessary condition for the establishment of a regime in a closed (or closing) international river basin? From an analysis of this question it can be concluded that there must be sufficient second-order resources in existence, also known as social adaptive capacity, ingenuity or social capital. There are two distinct components to this:

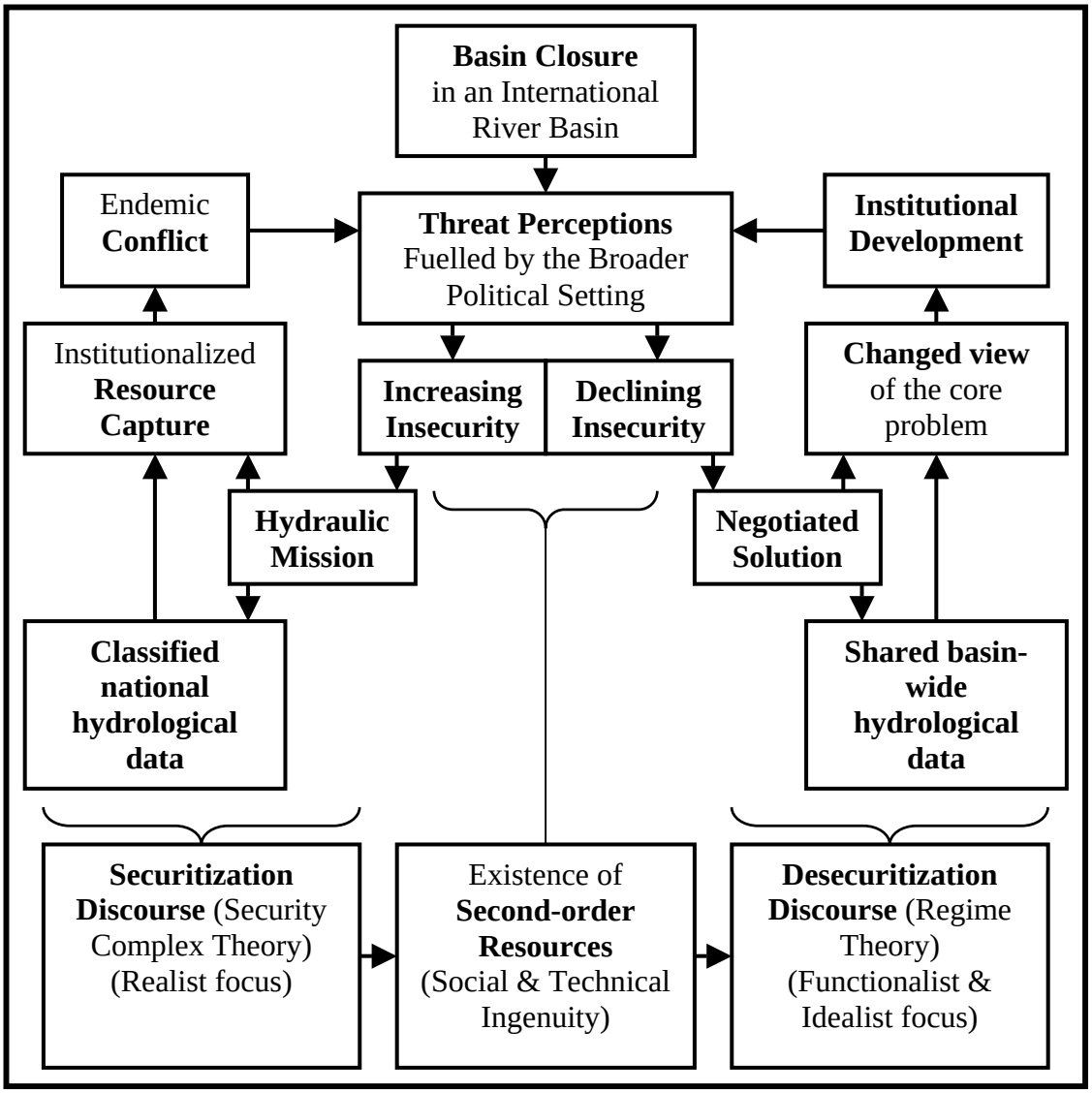
(a) The first is related to the technical elements such as data generation. More specifically, during the demand management phase of water resource management, the choice of end-use efficiency, or intra-sectoral allocative efficiency mechanisms, is biased towards the need for technological ingenuity, such as the development of water saving devices.

(b) The second is related to social elements, such as the agreement on norms and the negotiation of rules and procedures around which a regime is built. More specifically, during the adaptive phase of water resource management, the need to make use of inter-sectoral allocative efficiency mechanisms is heavily biased towards social ingenuity in order to effectively restructure society.

From the combined review of literature for all five sub-problems (see Chapters 2 & 3), and in particular from the Securitization Model (see Figure 3) and the Desecuritization Model (see Figure 6), a new Integrated Model can now be generated (see Figure 15). From this Integrated Model it is apparent that second-order resources are indeed the critical elements in transforming the zero-sum outcome of basin closure into a plus-sum outcome and are thus the independent variable. It now remains to determine to what extent the various elements of this model are evident in the South African case study (see Chapters 4 & 5). In other words, is there evidence of basin closure in the four

international river basins to which South Africa is a riparian state? If so, is there any evidence of the securitization of water resource management? Conversely, is there any evidence of regime creation, and if so what have been the basic drivers, and what are the current stumbling blocks? In short, will all the riparian states that share the four international river basins with South Africa, be in a position to negotiate and maintain water regimes in response to the shared problem of water scarcity? This will be the main focus of the next chapter.

Figure 15. Integrated Model Showing the Linkage Between the Securitization and Desecuritization Dynamics in a Closing International River Basin.



Chapter 4

DESCRIPTIVE OVERVIEW AND ANALYSIS OF THE SOUTH AFRICAN CASE STUDY

4.1 Introduction

The theoretical framework established that water resource management could become securitized under certain conditions (see Chapter 2) and a Securitization Model was developed (see Figure 3). Generally this happens when water deficit threatens the economic growth potential of a state, thereby elevating this to the level of a possible national security concern. In the quest for improving security of supply (in a hydrological sense), insecurity is merely cascaded elsewhere into the international river basin (in a hydropolitical sense), with a strong possibility of a zero-sum outcome if left unchecked. It was subsequently shown that even in the face of possible securitization, there is also a process of desecuritization at work within closed (or closing) international river basins (see Chapter 3) and a Desecuritization Model was developed (see Figure 6). Central to this is the role and function of regimes as key elements in the desecuritization dynamic. It was also shown that a critical element of regime creation is the existence of second-order resources in sufficient quantities and of specific types, of which technical ingenuity and social ingenuity are the most important. An Adaptive Security Spectrum for South Africa's Co-riparian States was developed as a result (see Figure 14). It now remains to be seen to what extent securitization, desecuritization and regime creation has been a feature of South Africa's international river basins. This chapter introduces the physical features that make water resource management somewhat challenging in the South African case. It also provides a descriptive overview and analysis that serves to contextualize the management of international river basins within the broader South African political environment in order to provide the necessary background for the subsequent analysis of the hydropolitical processes that occurred as a result.

4.2 South African Climatological Features

There is a direct causal relationship between climate, geography and the natural characteristics of various river basins globally. It is this causal linkage that makes every international river basin somewhat unique, defying attempts at scientific generalizations. In the case of South Africa, there are a number of specific factors that interact, causing a

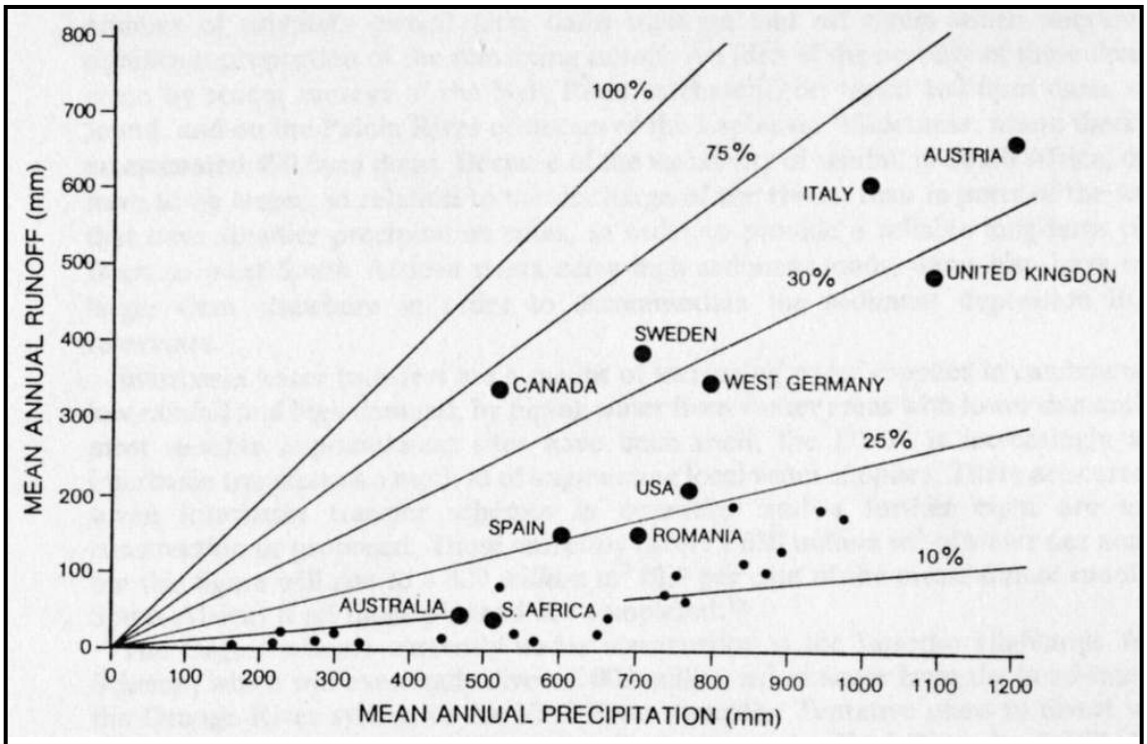
convergence of geophysical processes, which create the unique set of developmental challenges confronting the country. Given that development is about prioritization, wealth creation and the extraction of natural resources, it is also a profoundly political process because it determines who gets what, when, where and how. It is this political context that brings together the physical attributes created by geography, and the various challenges such as the need to create an infrastructure on which all national development aspirations are to be based. In short, in the hydropolitical context, it is these factors combined that drive the hydraulic mission of society. It is therefore necessary to understand these geophysical factors before any sense can be made of the hydropolitical processes inherent in the broader range of political dynamics of the country.

South African shores are washed by two ocean currents, which are fundamental drivers of the climate in the country. The cold Benguela Current flows northwards from the Antarctic along the west coast, which results in the adjacent Namib and Kalahari Deserts. These deserts[1] develop when cold air blows from the sea onto the warmer landmass (called a sea breeze), which is a climatological condition that is not conducive to precipitation. The warm Agulhas Current flows southwards from the tropics, bringing high levels of precipitation along the eastern parts of the country. This occurs when warm, moist air blows off the ocean, and cools as it moves over the landmass, which is a climatological condition that results in precipitation, particularly around mountains and escarpments such as those found in the eastern portion of South Africa. There is a marked gradient of precipitation in South Africa, with higher levels of rainfall occurring in the north and tapering off dramatically to the south, with a similar gradient from east to west. High rainfall is thus concentrated along a narrow band coinciding with the escarpment along the east coast (known as orographic precipitation). The average annual precipitation is 497 mm, compared to the world average of 860 mm, and this is unevenly distributed with 65% of the country receiving less than 500 mm of rainfall annually, and 21% receiving less than 200 mm (Rabie & Day, 1992:647). Aridity is thus the prevailing condition in South Africa with drought being part of the normal climatological cycle, and has been this way since modern recorded time (Brown, 1875; Brown, 1879).

[1] This is a global phenomenon and is not unique to Southern Africa. Wherever a cold ocean current washes a given shore and there is a prevailing sea breeze, there is a desert adjacent to that ocean current. Examples are the Patagonian Desert of South America, the Mojave Desert of North America and the Australian Desert, all of which are surrounded by a semi-arid transition zone.

In addition to the maldistribution of precipitation in South Africa, there is also a very high evaporative demand from the atmosphere, ranging from 1,100 mm in the north-east to more than 3,000 mm along the west coast, always well in excess of the annual precipitation that occurs (Rabie & Day, 1992:647). The final result of this is a very low ratio of mean annual runoff (MAR) when compared to mean annual precipitation (MAP) (see Figure 16). When compared to other countries, the MAR to MAP ratio for South Africa is amongst the lowest for any populated region in the world (O'Keeffe *et al.*, 1992:277; Rabie & Day, 1992:647).

Figure 16. Ratio of Mean Annual Runoff to Mean Annual Precipitation for Selected Countries.



Note: The large named circles represent selected countries, while the small unnamed circles represent various river basins in Southern Africa.

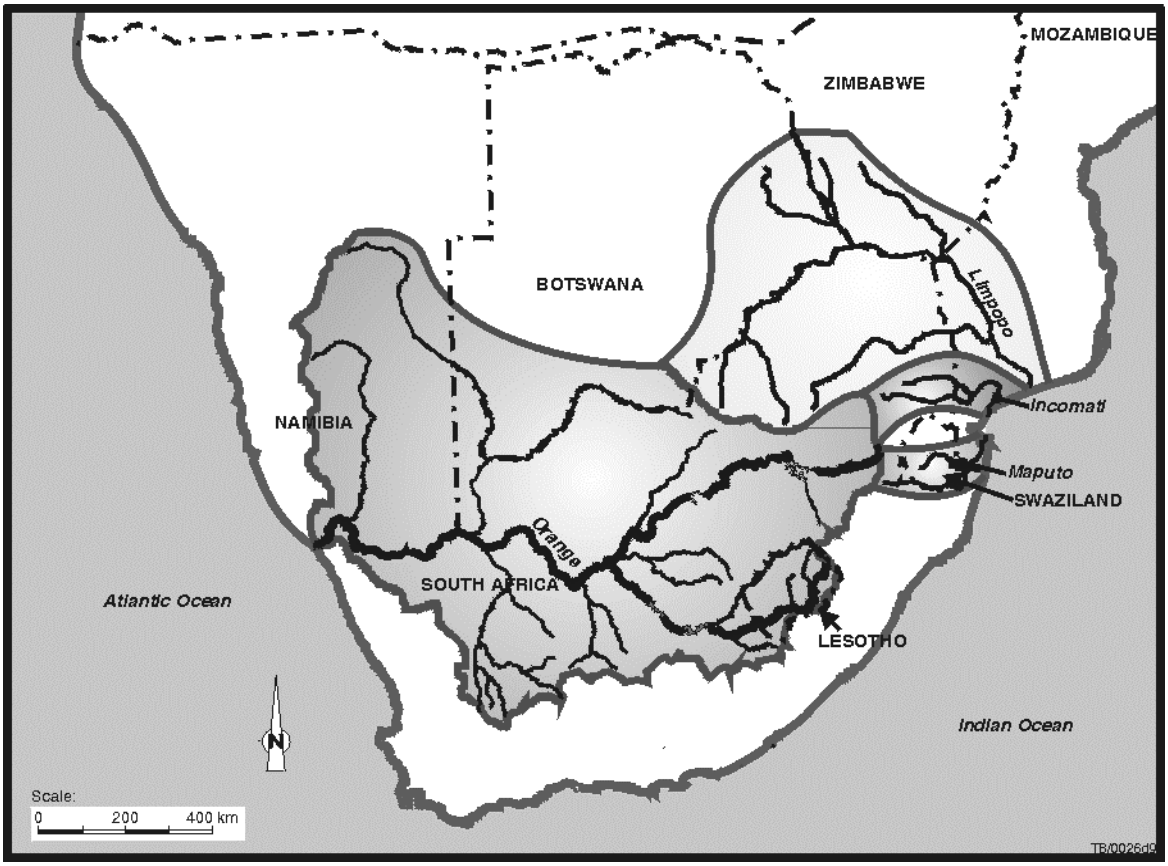
Source: O'Keeffe *et al.*, 1992:281.

Total MAR from South Africa is estimated at around 53,500 x $10^6 m^3 yr^{-1}$, of which approximately 60%-62% (33 000 x $10^6 m^3 yr^{-1}$) can be economically exploited (O'Keeffe *et al.*, 1992:278; Rabie & Day, 1992:647). Stated differently, the MAR (water that actually reaches the rivers and becomes streamflow) in South Africa represents only 10% of the MAP (Rabie & Day, 1992:647). In South Africa, 60% of the MAR arises from just 20% of the total land area - mostly the highlands and escarpment to the east of the

country. The economic exploitability of these water resources is further exacerbated by the fact that precipitation patterns are highly variable in South Africa, with consecutive sequences of up to ten years when less than average rainfall occurs (Rabie & Day, 1992:647).

South Africa has the most developed economy in the entire SADC region, and shares 4 international river basins with its 6 co-riparian neighbours. Approximately 60% of the geographic area of South Africa is covered by these 4 international river basins - Orange, Limpopo, Incomati and Maputo - which also represent the most developed transboundary watercourses in the entire SADC region (Basson, 1999). The physical location of these international river basins is shown in Map 7.

Map 7. South Africa's International River Basins.



Source: Basson 1999.

Within the geographical confines of these 4 international river basins, around 32% of the total South African MAR occurs, which supports the generation of approximately 70% of the South African gross national product (GNP) (Basson, 1999:3). In addition to this, a

staggering 90% of the electricity supply in South Africa is generated (which in turn is about half of the electricity generated on the entire African continent), and almost all of the mining activity on which the overall economy is based occurs in these international river basins (Basson, 1999:3). These 4 international river basins are also in close physical proximity to one another, all sharing a common watershed that runs through the Gauteng area where the vast majority of the economic activity is physically located.

Comparative statistics for all of South Africa's international river basins are shown in Table 15.

Table 15. Comparative Statistics for South Africa's International River Basins.

	Orange	**Limpopo**	**Incomati**	**Maputo**
Total Basin Area	964 000 km^2	183 000 km^2	50 000 km^2	35 000 km^2
Average Mean Annual Runoff for the whole basin	11 200 x $10^6m^3yr^{-1}$	5 750 x $10^6m^3yr^{-1}$	3 600 x $10^6m^3yr^{-1}$	3 900 x $10^6m^3yr^{-1}$
Basin Area for **South Africa**	62% (59%)	45% (44%)	62% (61%)	56%
Mean Annual Runoff contribution by **South Africa**	55% (56%) Uncontested	81% (66%) Contested	81% (64%) Contested	56%
Basin Area for **Botswana**	9% (11%)	20% (21%)	Nil	Nil
Mean Annual Runoff contribution by **Botswana**	0% (0%) Uncontested	3% (6%) Contested	Nil	Nil
Basin Area for **Zimbabwe**	Nil	15% (15%)	Nil	Nil
Mean Annual Runoff contribution by **Zimbabwe**	Nil	7% (16%) Contested	Nil	Nil
Basin Area for **Mozambique**	Nil	20% (19%)	33% (33%)	10%
Mozambique contribution to Mean Annual Runoff	Nil	9% (12%) Contested	6% (16%) Contested	6%
Basin Area for **Swaziland**	Nil	Nil	5% (6%)	34%
Swaziland contribution to Mean Annual Runoff	Nil	Nil	13% (20%) Contested	38%
Basin Area for **Lesotho**	4% (3%)	Nil	Nil	Nil
Lesotho contribution to Mean Annual Runoff	41% (40%) Uncontested	Nil	Nil	Nil
Basin Area for **Namibia**	25% (27%)	Nil	Nil	Nil
Namibia contribution to Mean Annual Runoff	4% (4%) Uncontested	Nil	Nil	Nil
Note: Data shown in parenthesis is taken from Savenije & van der Zaag (1998:30) and is used to illustrate the contestable nature of data in some hydropolitical settings.				

Source: Adapted from Basson 1999 and Savenije & van der Zaag 1998:30.

It is apparent that the physical size of each international river basin has a rough correlation with the actual streamflow in each river. The largest basin in terms of surface area is the Orange, followed by the Limpopo, Incomati and Maputo in descending order. The two largest basins - Orange and Limpopo - also link the 4 most economically developed states in the SADC region - South Africa, Botswana, Namibia and Zimbabwe - all of which are also reaching the limits of their available water resources. This means that water deficit is a common problem confronting all of these states, and can have the undesirable impact of decreasing the economic growth potential of these countries, raising the issue to one of national strategic importance to all riparians.

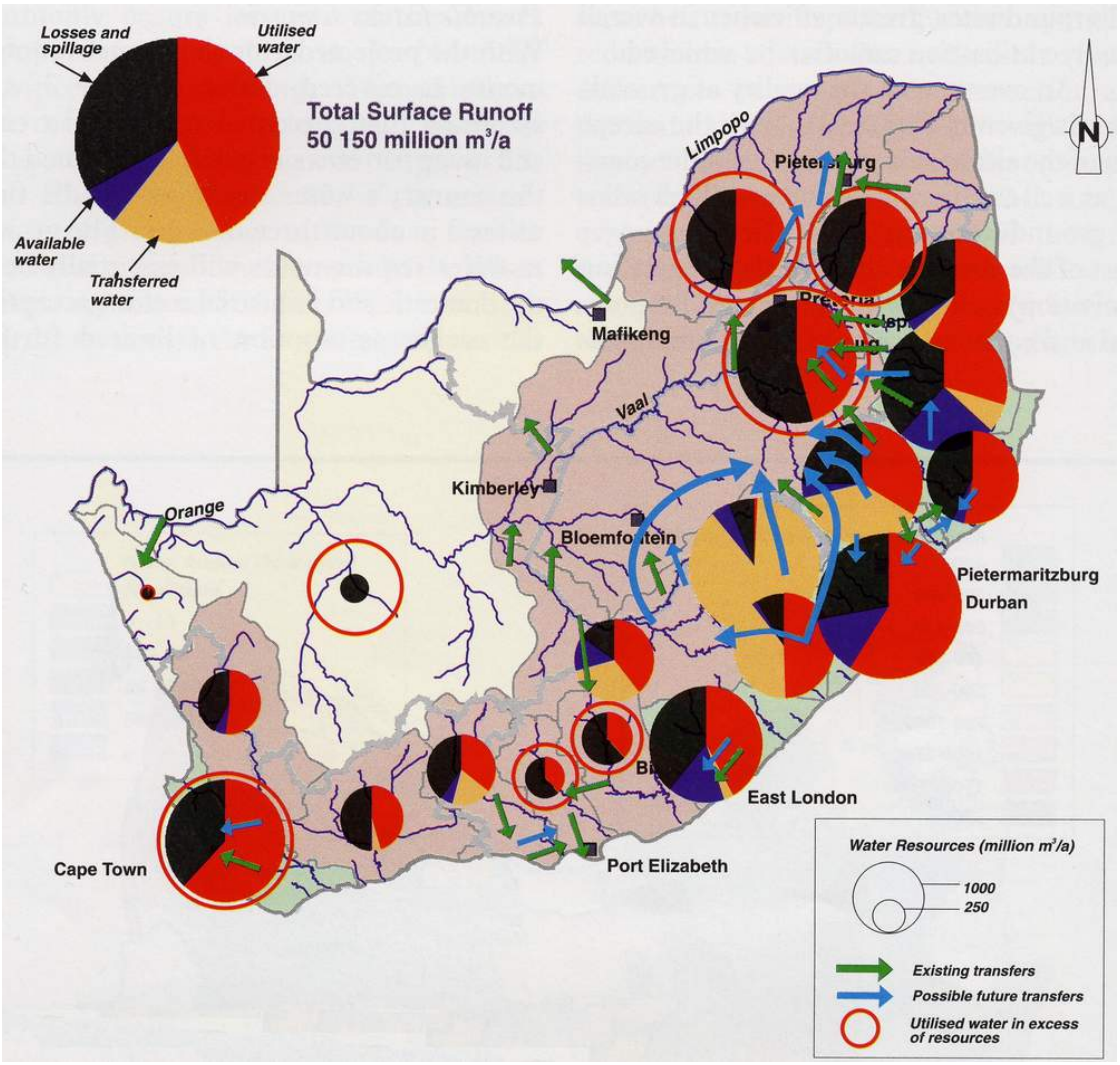
4.3 The Impact of Climatic Conditions on Water Resource Management

As a result of the prevailing climatic conditions, South African rivers are extremely variable, with a great range between high and low flow conditions. Specifics will be dealt with under each individual river basin, but for now it is necessary to note 3 strategic implications of this variability. Firstly, the availability of water has generally dictated the economic development options in the past. Secondly, drought is common, which means that storage of water is a fundamental component of the water resource management strategy for all riparian states in the various international river basins. It is significant to note that the *World Commission on Dams Report* listing the top twenty countries in the world by number of large dams places South Africa in eleventh position and Zimbabwe in twentieth position (WCD, 2000:370). The same report places South Africa in seventh position globally in terms of dams for water supply and ninth position in terms of dams for irrigation (WCD, 2000:373), which is a strong reflection of the extent of its hydraulic mission. Thirdly, given the above two aspects, IBTs are a key component of the South African hydraulic mission.

The relevance of these 3 implications becomes more apparent if possible future scenarios for water utilization in South Africa are considered (see Map 8). The importance of IBTs as a means of alleviating local water scarcity in individual catchments is codified in the *National Water Act* (1998:22). Chapter 2, paragraph 6(g) of the *National Water Act* calls for the provision of “inter-catchment water transfers between surplus Water Management Areas (WMAs) and deficit WMAs” as part of the National Water Resource Strategy. This means that water is managed as a national resource in South Africa, with the need to move water around the country recognized by law, which is somewhat at odds with the prevailing international norm of managing each river basin as in integral hydrological

unit. Attention is drawn to the strategic importance of the rivers that lie to the east of the escarpment, and therefore carry the majority of the unexploited MAR (see Map 8). This is shown as the colour orange in the respective pie chart, making the east-flowing rivers in effect the target for future resource capture. Note should also be taken of the existence of 7 economically important centers in this scenario that will be utilizing water in excess of the resource availability, as well as the existence of the large number of existing and proposed IBTs that cascade water from the eastern watersheds into the economically active areas of South Africa (see Maps 8 & 9).

Map 8. Scenario for the Utilization of River Water in 2030.



Source: Basson *et al.*, 1997:62.

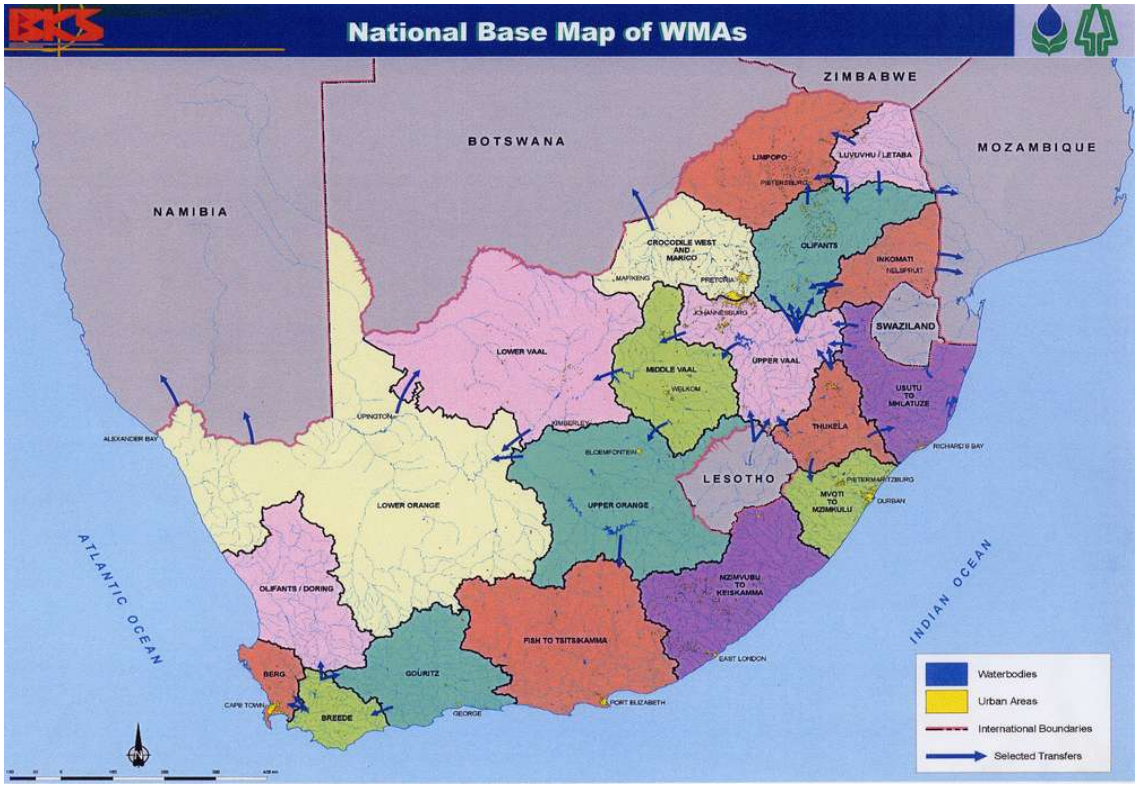
Table 16. Inter-basin Transfers of Water Involving International River Basins in South Africa.

Name of Transfer Scheme	Source International Basin	Recipient International Basin	Average Transfer ($10^6 m^3 yr^{-1}$)	Use
Vaal - Crocodile	Orange	Limpopo	615	Industrial, Domestic
Vaal - Olifants	Orange	Limpopo	150	Industrial (ESCOM)
Olifants - Sand	Limpopo	Limpopo	30	Pietersburg
Crocodile - Limpopo	Limpopo	Limpopo	6	Gaborone
Komati - Olifants	Incomati	Limpopo	111	Industrial (ESCOM)
Usuthu - Olifants	Maputo	Limpopo	81	Industrial (ESCOM)
Assegaai - Vaal	Maputo	Orange	81	Industrial, Domestic
Buffalo - Vaal	Non International Basin	Orange	50	Industrial, Domestic
Thukela - Vaal	Non International Basin	Orange	630	Industrial, Domestic
Orange - Buffels	Orange	Non International Basin	10	Industrial, Domestic
Orange - Lower Vaal	Orange	Orange	52	Irrigation, Domestic
Orange - Riet	Orange	Orange	189	Irrigation
Orange - Fish	Orange	Non International Basin	643	Irrigation, Domestic, Industrial
Fish - Sundays	Orange *via* Fish	Non International Basin	200	Irrigation, Domestic
Caledon - Modder	Orange	Orange	40	Industrial, Domestic
LHWP (1A)	Orange	Orange	574	Industrial, Domestic
LHWP (1B)	Orange	Orange	297 (by year 2003)	Industrial, Domestic

Source: Adapted from Basson *et al.,* 1997:54 and verified by Department of Water Affairs and Forestry.

Given the strategic importance of IBTs in the overall South African development context, this challenges the internationally emerging norm inherent to IWRM that sees each river basin being managed as a hydrological unit. The extent of IBT development involving international river basins in South Africa is shown in Table 16 and on Maps 8 & 9.

Map 9. South African Water Management Areas Showing Inter-basin Transfers.



Source: Department of Water Affairs and Forestry.

The significance of these facts on the overall securitization dynamic becomes apparent in an official DWAF document entitled *Overview of Water Resources Availability and Utilization in South Africa* that lists future options on the availability and utilization of water in South Africa. This reads as follows:

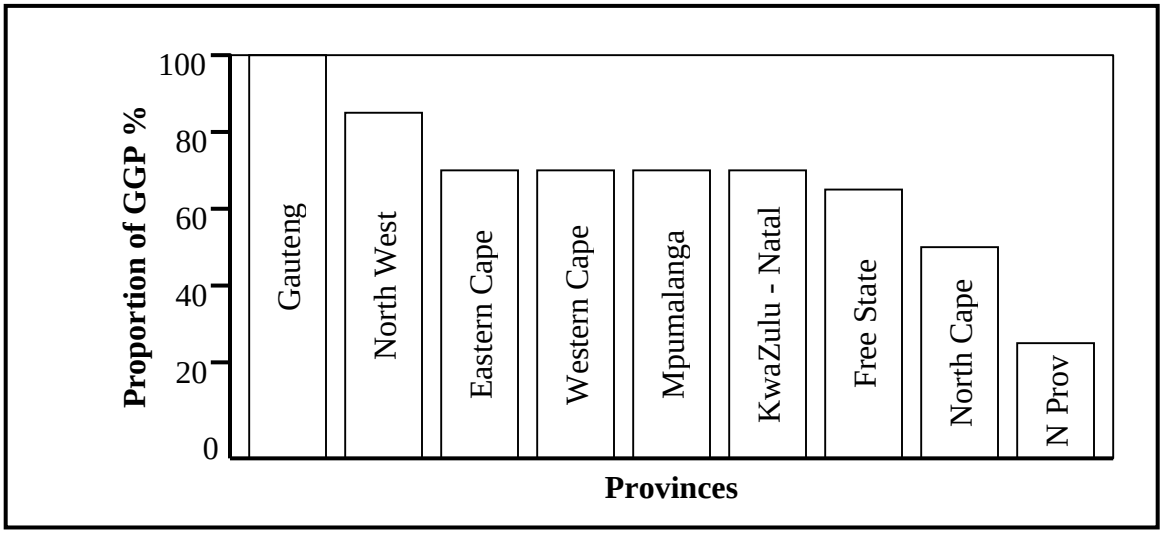
> "Importation of water from large under-utilized rivers within reasonable proximity of South Africa could most likely be a viable and sustainable option for the augmentation of local water resources. Because of its size and northern location, the Vaal River System would probably be the logical recipient basin. The Zambezi River is the only river that is reasonably close and of sufficient size to serve as a source for the importation of water. ... A further option is the importation of water from the higher lying southern

tributaries of the Zaire River, through the Zambezi River, to South Africa" (Basson *et al.,* 1997:67).

This is clearly a manifestation of the strategic importance of water for South Africa's future economic growth and prosperity, with elements of this supply-sided management approach forming a fundamental component of the South African hydraulic mission.

The existing complexity of water resource management at the national level is shown on Map 9, which indicates all major IBTs between official WMAs. Attention is drawn to the fact that almost all river basins are connected by IBT, with water generally being cascaded from the southeast to the northwest across the eastern escarpment, spanning the spatial and temporal disparity between population settlement and natural water availability. Intra-basin Transfers within each WMA are not shown on this map.

Figure 17. Proportion of Gross Geographic Product of Each Province Supported by Inter-basin Transfer of Water in South Africa.



Source: Redrawn from Basson *et al.,* 1997:55.

The local economies in the various South African provinces are heavily reliant on water that has been imported from other river basins by means of IBT (see Figure 17). No less than 8 of the provinces are reliant on IBT water for 50% or more of their Gross Geographic Product (GGP), with 6 having more than 60% of their provincial economic activity totally dependent on this supply of water. Exogenous water, supplied by means off IBTs, is therefore the lifeblood of the South African economy, which would simply collapse if this source of supply were no longer secured, raising water resource management to a strategic issue of great national importance.

4.4 Brief Hydropolitical History of South Africa

In order to assess the relevance of water resource development in South Africa, it is necessary to first understand key elements of the hydropolitical history of the country. These historic elements have provided fundamental drivers of contemporary hydropolitical dynamics in the international river basins under review. As a point of departure, the following quotations encapsulate the key elements of the broader background of international relations in the Southern African region, and lay the foundation for the subsequent assessment of the hydropolitical dimension.

> "Except for Angola, the black states in the region are economically closely tied to, and in many cases heavily dependent on, South Africa. In military terms, [South Africa] is … the regional leviathan. On the political/ideological level, South Africa is seen by the black states as the last remnant of racism and white minority rule in Africa. In addition, South Africa is regarded as something of a colonial power too, maintaining its control of Namibia. … Being economically dominant is a feature, which in itself can easily give a state the image of a 'bully'. Add to this [South Africa's] military supremacy and its political/ideological distance from its neighbours, and the scene is set for heavily strained relationships. The black states also widely believe that South Africa is bent on keeping them economically and militarily weak … [which] they see as part of South Africa's strategy to create a regional environment conducive to the perpetuation of the *status quo* in [South Africa]. … Relations between South Africa and the black states are, on both sides, characterized by suspicion, fear and even a strong dose of paranoia. Each sees its security and stability threatened by the other; each side … perceives itself the target of destabilization by the other" (Geldenhuys, 1982:48-49).

> "The development of economic cooperation with South Africa, including possibly water supply from the Okavango, is likely to reinforce the respect of mutual interests which exists [between South Africa and Botswana]. A security agreement is pending. … Water, amongst other things, is an issue between Lesotho and South Africa. Pretoria has used failure to reach a firm agreement with Lesotho on security issues, … to delay a feasibility study on the Highlands Water Project. … South African technicians involved were actually withdrawn from Lesotho at that time. … [T]his is an excellent example of the two-pronged approach of South Africa to its problems – military strength, which has actually been used against targets in Lesotho, coupled with the carrot of development" (Gutteridge, 1985a:100).

In attempting to analyze the hydropolitical drivers, a brief description of 3 distinct phases of political dynamics will be made, in order to lay the foundation for the subsequent analysis of the international river basins spanning the country. The hydropolitical dynamics of South Africa can be broken down into 3 distinct time periods.

(a) *Genesis of the hydropolitical dimension:* The period prior to 1974 covers the genesis of the hydropolitical dimension of South African international relations with the birth of the hydraulic mission as a fundamental driver.

(b) *From Détente to Total Onslaught:* The period from 1974 to 1990 covers the era of transition from a policy of *Détente* to the emergence of the official approach that was known as the *Total National Strategy*.

(c) *Post-Cold War era:* The post-1990 period covers the ending of the Cold War and the collapse of apartheid in South Africa, both of which resulted in a reduction of the impact of overlay in the SADC region.

4.4.1 Genesis of the Hydropolitical Dimension

It can be said that the roots of South African international relations, particularly with respect to other states in the Southern African region, date back to the Anglo-Boer War (or the closing of the frontier), but for brevity details of this will be excluded (see Turton *et al.*, 2003).

In 1948 the National Party (NP) won an election victory in South Africa. This was seen as a major triumph for the Afrikaners with strong nationalist sentiments, many of whom still had living memory of their defeat in the Anglo-Boer War and their subsequent treatment in the British concentration camps. So in 1948 the political power that was lost in the Boer War was returned to the Afrikaners, who immediately set about consolidating their position by implementing the policy of Grand Apartheid. While the hydropolitical dimension of South African politics was in its formative stages prior to 1948, it was not yet strongly articulated during this time, so it cannot be seen as an independent variable in the context of the current study (Turton *et al.*, 2003). The earliest known record of water resource management in South Africa can be traced back to two books, both of which were written by J.C. Brown, a botanist at the Cape Town Botanical Gardens, in the 1870s (Brown, 1875; Brown; 1877). The first of these was entitled *Hydrology of South*

Africa; or Details of the Former Hydrographic Condition of the Cape of Good Hope, and Causes of its Present Aridity, with Suggestions of Appropriate Remedies for this Aridity and was published in 1875. The second book was entitled *Water Supply in South Africa and the Facilities for the Storage of it* and was published in 1877. These dates are significant because this corresponds with the closing of the South African frontier (see Turton *et al.*, 2003). The contents of the two books deal extensively with conditions of aridity, drought and floods - factors that are still relevant in contemporary times.

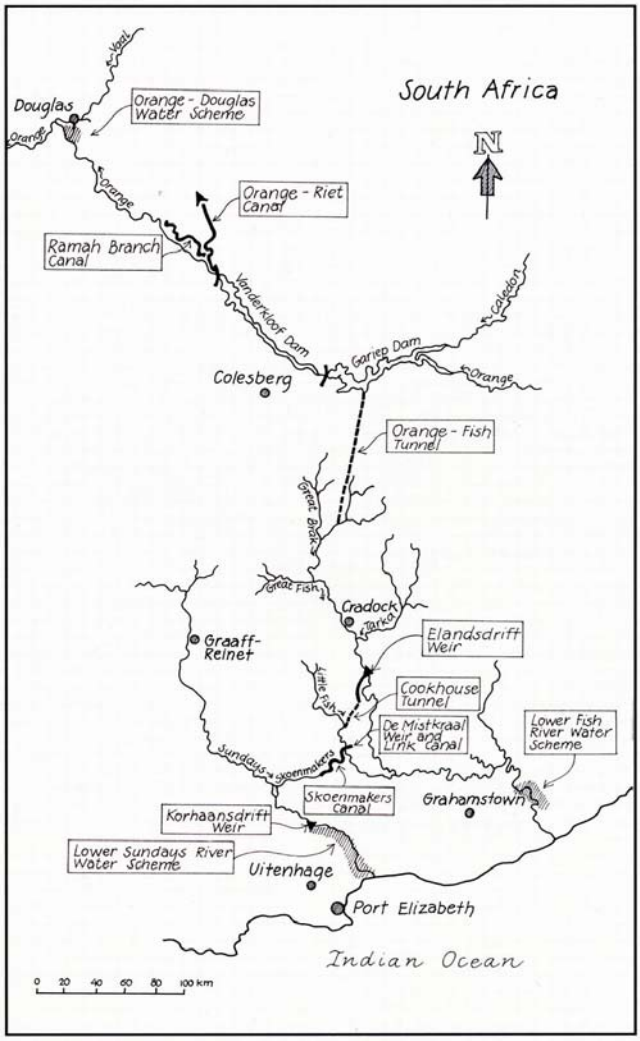
Economic development was high on the agenda when the NP came to power, given the impact of the Anglo-Boer War and the Great Depression, but without water this would be impossible. For this reason early reconnaissance work was begun on the hydrology of Basutoland as a possible source of water for the South African goldfields and their related industrial complex (Ninham Shand, 1956). It was against this socioeconomic background that British Prime Minister Harold Macmillan made his "Winds of Change" speech in the Cape Town Parliament, which referred to the strong desire for independence that was emerging in the former colonies (Geldenhuys, 1984:11). This set the scene for South Africa's systematic political and economic isolation. Events unfolded rapidly after the Sharpeville massacre in which sixty-nine people were killed and one hundred and eighty wounded, which took place shortly after Macmillan's speech (Spitz & Chaskalson, 2000:7). The UN Security Council adopted a resolution that mandated the visit by Secretary General Hammarskjöld to South Africa. The 1961 Commonwealth Conference in London saw Prime Minister Verwoerd trying to defend South African racial policies, leading ultimately to its expulsion (withdrawal under duress), which for many Afrikaners was final vindication of their Boer War defeat (Geldenhuys, 1984:24 & 205). This laid the foundation for what has been described as a "garrison state" (Frankel, 1984:30). When Ian Smith, the Rhodesian Prime Minister, announced the Unilateral Declaration of Independence (UDI) of Rhodesia from Britain, South Africa immediately offered its support. This determined the patterns of conflict that were to be unleashed from that moment onwards, with long-term repercussions in the hydropolitical domain.

Sharpeville also reverberated around South Africa, with the banning of the African National Congress (ANC), Pan Africanist Congress (PAC) and the imprisonment of leaders like Nelson Mandela and others. This dramatic series of events saw the birth of the "armed struggle" in the face of the apparent failure of Gandhi-styled passive resistance. The now famous 1964 Rivonia Trial that convicted Nelson Mandela and others was a direct outcome of this series of events (Spitz & Chaskalson, 2000:7). On the

water and development side of the hydropolitical equation, the South African focus of attention again turned to Basotholand, but this time as a source of water for the rapidly growing industrial complex in the Witwatersrand that was outstripping the capacity of the Vaal basin (Young, 1961; Carter, 1965).

At the same time, the Orange River Project (ORP) was launched, which was designed to transfer water from the Orange River downstream of Lesotho, through the escarpment into the Fish River, and then across another catchment into the Sundays River (Conley & van Niekerk, 1998:145) (see Map 10).

Map 10. The Orange River Project.



Source: Pallet *et al.*, 1997:60.

This has a profoundly political undertone to it as it was designed to restore investor confidence in South Africa in the post-Sharpeville period, and it can probably be regarded as the actual birth of the South African hydraulic mission. The strategic importance lies in the fact that the ORP started to make inroads into the economic underdevelopment in the so-called "border" area, which was the geographic home of the "armed struggle", thereby designed to stem the flow of impoverished militants to the military wings of the respective liberation movements. One dam in the ORP, which was called the H.F. Verwoerd Dam as testimony to the political significance of this project, was completed in 1971 and is still the largest reservoir by volume in South Africa. It has since been renamed the Gariep Dam. The 5,35-m diameter, 82,8-km long delivery tunnel was the longest in the world at that time and today sustains a major economic hub around the city of Port Elizabeth that would otherwise not have been possible to develop (Conley & van Niekerk, 1998:145). The ORP was hailed as a triumph of Afrikaner independence and technical ingenuity at the time.

In 1966 the guerilla war was launched in South West Africa, significantly drawing South African security forces into the Caprivi Strip where the Okavango and Zambezi form a water-rich haven in the midst of surrounding aridity (Frankel, 1984:102). Faced with this reality, which was manifest as increasing isolation for South Africa, diplomatic contact with Black Africa was deemed to be vital. One of the targets of this period of *détente* or peaceful coexistence was Chief Leabua Jonathan, who was destined to become the Prime Minister of Lesotho, when it gained its independence in 1966 (Geldenhuys, 1984:19). Strong relations were forged with him, and he was even regarded as being a South African *protégé*, until this began to sour (Geldenhuys, 1982:48). In an attempt to divert growing criticism of his own domestic political style, Jonathan became one of South Africa's strongest critics, openly declaring his support to the liberation struggle. This was a diplomatic slap in the face for South Africa.

Early aspects of the water, economic development and energy nexus can be found in two agreements between South Africa and Portugal during 1969. The first was on the Cahora Bassa Project on the Zambezi River in Mozambique, while the second was on the Cunene River (Treaty, 1969a; Treaty, 1969b). Both saw the need to mobilize water resources on a grand scale in order to create the necessary energy infrastructure on which subsequent economic developments could be based. They also laid the foundation for a regional network of water resource projects that were to have far-reaching implications for Southern Africa as a whole.

In 1970 the Jonathan government was toppled in a military *coup d'état* and Lesotho was plunged into political crisis. The State Security Council (SSC) was established in South Africa during 1972 against the background of this rising insecurity (Gutteridge, 1994:215). This was later to become an extremely important organ in the formulation of South African foreign policy (Geldenhuys, 1984:93). The end of this period is characterized by the deterioration in the threat perception and the publishing of the 1973 *White Paper on Defence*, which for the first time introduced the concept of a "total strategy" (Republic of South Africa, 1973; Geldenhuys, 1984:140). The height of the *détente* era occurred in 1975 with the Victoria Falls Bridge meeting between the intransigent Rhodesian government and Black nationalists, which had been made possible by the interaction between Prime Minister Vorster of South Africa and President Kaunda of Zambia (Geldenhuys, 1984:39).

4.4.2 From *Détente* to *Total Onslaught*

Similar to the 1960 period, when a series of events rapidly shaped a transition phase, 1974 can be called a watershed year in a political sense. The start of this was signaled by the *coup d'état* in Portugal (Geldenhuys, 1984:78). This event, taking place thousands of kilometers away from Southern Africa, set off a domino-effect that was associated with the rapid decolonization of the former Portuguese territories. White Africa was getting smaller, so Macmillan's "Winds of Change" were apparently becoming a real phenomenon. The fact that in each of the former Portuguese colonies, there was an unfinished war of liberation, and the speed with which the decision was made and executed, left no time to prepare for an interim administration. The effect was startling. Overnight the Angolan War of Liberation turned into the Angolan Civil War, which became the longest running civil war in Southern Africa. This raged on for more than a quarter century, although there are indications that it is now coming to an end with the signing of the Memorandum of Understanding on 4 April 2002 (Porto & Clover, 2003:65). South Africa was irretrievably drawn into this with the launch of Operation Savannah (Geldenhuys, 1984:79), which saw South African soldiers cross the border, to become a feature of the political landscape for the next few decades. Alarm bells were sounded as the regional balance of power changed overnight (Gutteridge, 1983:35). The Rhodesian Bush War was already ongoing, and virtually overnight a second front was opened up along the border with Mozambique. The Cahora Bassa Project immediately became a target for military attack, with the long power lines to South Africa proving

impossible to defend. This drew in South African military support, further strengthening the garrison state mentality that had already taken root in South Africa (Frankel, 1984:30). The South African border with Mozambique, a short distance from Pretoria, became a military frontline. Enthused by this series of events, youths took to the streets, angry at the apparent inability of the older generation to liberate South Africa, and the now famous Soweto Riots occurred on 16 June 1976. As with the Sharpeville Massacre, security force retaliation was swift and brutal.

The 1977 *White Paper on Defence* was largely devoted to refining the concept of a *Total National Strategy*, first mooted in 1973, as an official policy (Republic of South Africa, 1977). This defined a *Total National Strategy* as being "the comprehensive plan to utilize all the means available to a state according to an integrated pattern in order to achieve the national aims within the framework of specific policies" (Geldenhuys, 1984:140). This total strategy had its roots in the counter-revolutionary experiences of the Americans in Vietnam, the British in Malaya, and the French in Algeria and Indo-China. The term "total strategy" is derived directly from André Beaufre's work *An Introduction to Strategy* (Frankel, 1984:46). As such it resonated well with the security elites in the emerging South African garrison state, with its peculiar threat perception that interpreted the Cuban and East German support of the African liberation movements in Southern Africa, as being evidence of a *total onslaught*, driven by Soviet imperialism (Frankel, 1984:55). This saw the development of a two-pronged approach to security-related issues, and heralded the start of the gradual securitization of water resource management. The one element was based on a strong military response to any threat, supported by destabilization through economic means (Gutteridge, 1983:38). The olive branch of economic development thus became securitized with far-reaching ramifications. This was given greater structure when P.W. Botha produced a 12-point plan for survival at the NP Congress in 1979 (Gutteridge, 1985a:93).

Central to this *Total National Strategy* was economic development and the resultant dependencies that would emerge from this. The foundation for this thinking can be traced to the speech made by Prime Minister Vorster in 1974, in which he spoke of a power block of states (Geldenhuys, 1984:39). This was subsequently refined when he spoke of a constellation of politically independent states maintaining close economic ties. When P.W. Botha came to power, he used what he called a Constellation of Southern African States (CONSAS) as the basis of his policy (Geldenhuys, 1984:41). Foreign Minister "Pik" Botha subsequently announced in 1979 that this vision embraced some forty

million people south of the Cunene and Zambezi Rivers all joining forces to design a common approach to the security, economic and political field.

During the same year, a scheme to divert up to 3,000 x $10^6 m^3 yr^{-1}$ of water from the Zambezi, through the Thamalakane and Boteti Rivers in the lower Okavango basin downstream of the Delta was found to be economically competitive with the Tugela-Vaal scheme (Scudder *et al.,* 1993:263; Midgley, 1987:15). This project, designed to abstract water from the Chobe River (a tributary of the Zambezi in close proximity to the Okavango Delta) and feed it down to South Africa, where it would account for 130% more than was currently available in the Vaal River basin at the time, became an element of this emerging strategy (Trolldalen, 1992:138). Given the fact that Botswana would benefit from this project, this served to mute their opposition to South Africa's policy of apartheid. Another study from the same period found that as much as 7% of the Zambezi River MAR at Katima Mulilo (95 $m^3 s^{-1}$) could be diverted to South Africa, without having to develop storage facilities on the Zambezi River itself (Basson, 1995:46; van der Riet, 1980). The water, economic development and state security nexus was becoming stronger, with augmentation plans becoming increasingly sophisticated and ambitious.

At the Lancaster House Conference in late 1979, the foundation was laid for the cessation of hostilities in Rhodesia. Bishop Abel Muzorewa was widely tipped to win the elections. It therefore came as a great shock to the security elites in Pretoria when Robert Mugabe swept to victory in 1980. Mugabe immediately announced that he had no intention of joining the proposed CONSAS. Instead Zimbabwe, along with Botswana, Lesotho, Swaziland, Mozambique, Angola, Zambia, Malawi and Tanzania, joined forces in the Southern African Development Coordination Conference (SADCC), which was formally launched in Lusaka during 1980 (Pallett *et al.,* 1997:70). This new grouping was specifically designed to reduce their combined dependence on South Africa, and was quickly dubbed the "counter-constellation" (Baynham, 1989:88; Conley & van Niekerk, 1998:145; Geldenhuys, 1984:41). The establishment of SADCC was thus a direct response to South Africa's policy of destabilization. The linkage between water and development became manifest at the Fourth SADCC Consultative Conference which was held in Lusaka during 1984. Opening the conference, President Kaunda of Zambia said that the effects of water scarcity and drought had resulted in food deficits and poor prospects for agricultural development in Southern Africa (Africa, 1984).

The emergence of this *Total National Strategy* approach saw South African foreign policy becoming captive to the SSC, which had an all-consuming security focus to it (Frankel, 1984:149). Seen in this light, every aspect of foreign relations became securitized, including cooperation over water resources. An example of the impact of the *Total National Strategy* in the water sector can be found in a paper that was written by the Chief Engineer of the Rand Water Board (RWB), who used the concept to contextualize the need for the South African economic heartland to gain access to secure supplies of water (James, 1980). Listed in this document are IBT schemes such as the Lesotho Highlands Water Project (LHWP), the Tugela-Vaal link and the mooted Okavango development. Significantly, gaining access to the Okavango is referred to in the context of CONSAS, indicating the strategic relevance of water in terms of this overall policy (Blanchon, 2001:123). This is the basis of the "pipelines of power" thesis where political power is seen to result from the construction of major water transfer schemes in semi-arid areas as part of an aggressive hydraulic mission (Turton, 2000b).

In 1980 the armed struggle intensified after an announcement to this effect by the ANC during festivities to mark the occasion of its seventy-eighth anniversary (Gutteridge, 1990:167). A hostage incident at a bank in Silverton involving armed guerillas, along with a rocket attack on the South African Coal and Oil Company (SASOL) refinery, and the subsequent derailment of a train near Richards Bay, all came in quick succession (Gutteridge, 1981:5). This was punctuated by the political energy that the newly-independent Zimbabwe had given to the creation of SADCC, which was "devoted to mutual cooperation for development, and the reduction of members' collective dependence on South Africa" and therefore seen as further evidence of the *total onslaught* (Geldenhuys, 1984:41; Simon, 1991:205).

In 1981 the first military retaliation was launched, with a South African Defence Force (SADF) Special Forces raid on ANC bases at Matola near Maputo in Mozambique (Geldenhuys, 1984:140; Gutteridge, 1981:14). This was followed in 1982 with retaliatory attacks against ANC targets in Maseru, Lesotho (Gutteridge, 1983:35). These signaled that South Africa was not prepared to countenance what they perceived as being terrorist or guerilla bases in neighbouring states using rhetoric that resembles the contemporary US-led "War on Terror" (Geldenhuys, 1982:47). This was manifest in subsequent attacks on targets in Angola, Mozambique, Lesotho, Botswana and Zimbabwe. A Southern African Defence Zone was conceived embracing Namibia, Botswana, Swaziland and Zimbabwe to counter the presence of East German troops in Angola and Mozambique

(Gutteridge, 1981:19). This marked an escalation in South African destabilization tactics, involving both military action and economic pressure with the entire Southern African region becoming a theatre of operations (Geldenhuys, 1982:43). This approach simply strengthened SADCC resolve to liberate their members from the stranglehold of South African economic power (Geldenhuys, 1982:47). Swaziland was seemingly exempt from this practice because it seemed never to become deeply embroiled in activities that were deemed to be a security risk to South Africa (Geldenhuys, 1982:46).

In 1983 a car bomb was detonated in front of Department of Military Intelligence (DMI) Headquarters in Pretoria with significant casualties. This marked the escalation of the conflict into previously neutral areas, as evidenced by the subsequent bombing of the ANC offices in London, assassination attempts on ANC figures in Brussels, and the actual assassination of Dulcie September, an ANC representative in Paris. This series of events had unforeseen consequences, and South Africa increasingly became isolated as a pariah state, associating closely with the experiences of Taiwan and Israel (Frankel, 1984:65; Geldenhuys, 1990:206). Central to this association was the notion that these states were strategic pillars against a global Marxist onslaught that the Free World would not be able to ignore, which was a cornerstone in the *Total National Strategy* rationale (Geldenhuys, 1984:116).

This round of "tit-for-tat" exchanges ushered in a new era when in 1984 the South African constitution was changed and P.W. Botha was elevated to the status of Executive President. During the buildup to this constitutional watershed event, a security agreement between South Africa and Swaziland was reached, supported by an economic cooperation agreement (Treaty, 1982; Treaty, 1983b). This was followed shortly afterwards when the *Nkomati Peace Accords* (Treaty, 1984a) were signed by President Samora Machel of Mozambique and Prime Minister P.W. Botha of South Africa, during March 1984 (Gutteridge, 1985a:94). Water was intimately linked to the *Nkomati Peace Accords* when an agreement was signed during May in Cape Town between Mozambique, Portugal and South Africa on the revival of the Cahora Bassa Project (Treaty, 1984b).

Similar security agreements were mooted between South Africa and Botswana, where economic cooperation and possible access to the Okavango River was discussed; and Lesotho, where access to water was also a feature (Gutteridge, 1985a:100). Water and energy thus became a key element of this *Total National Strategy*. The need for such a security agreement was underscored by unrest within South Africa that was escalating

uncontrollably, with the SADF being increasingly committed to internal riot control. This started to blur the lines between police and army responsibilities. The ANC held a high-level meeting in Kabwe, Zambia during June 1985 at which time a decision was taken to allow attacks on soft targets (Gutteridge, 1985b:129). Special Forces reprisal was launched in Kabwe a few days later. A State of Emergency was announced in 1985, giving security forces wider powers (Gutteridge, 1985b:124). The ANC leadership started to regard the internal situation as a "peoples' war" from this moment onwards (Gutteridge, 1995b:130). The situation deteriorated rapidly with a flight of foreign capital threatening a total collapse of the economy, so all foreign currency trading was suspended in South Africa on 27 August 1985 (Gutteridge, 1985b:144). The security situation was precariously balanced indeed, with the possibility of a collapse of the South African Apartheid State a very real one at the time.

During 1986 violence erupted in Natal between *comrades* from the ANC and Zulu *impis* from Chief Buthelezi's Inkatha Freedom Party (IFP) (Gutteridge, 1990:168). This degenerated into a localized low-intensity civil war, which endured until after the election of Nelson Mandela as the first democratic President of South Africa (Percival & Homer-Dixon, 1995:3). In neighbouring Lesotho, Major General Justin Lekhanya overthrew Leabua Jonathan during a military *coup d'état* on 20 January 1986 (Esterhuysen, 1992:46; Lawrence, 1986). Shortly after this the *Treaty on the Lesotho Highlands Water Project* (LHWP) was signed on 24 October 1986 between "Pik" Botha of South Africa and Colonel Thaabe Letsie of Lesotho, fuelling speculation about possible South African involvement in the *coup d'état* (Homer-Dixon, 1994:19; Treaty, 1986a). Commentary on the LHWP from that time reflects the socio-economic benefit angle that was central to the *Total National Strategy* approach (Vorster, 1988:95).

During 1987 an agreement was reached between South Africa and the Transitional Government of Namibia on the creation of a Joint Technical Committee to oversee future projects on the Orange River (Treaty, 1987). During the same year another study on the feasibility of transferring water from the Zambezi through Botswana found that the cost of water delivered to Pretoria was competitive with existing water supply schemes (Scudder *et al.*, 1993:263; Midgley, 1987:15). This plan had been developed from earlier studies, with the most refined version consisting of a 1,116-km concrete structure feeding 2,500 x $10^6 m^3 yr^{-1}$ of water from the Zambezi/Chobe confluence through Botswana to a dam in South Africa, from where it would be reticulated to the Vaal River Supply Area (Borchert & Kemp, 1985; Borchert, 1987; Scudder *et al.*, 1993:268; Trolldalen,

1992:138). This water was needed to meet the estimated demand by 2015 even with the LHWP functioning (Williams, 1986; Scudder *et al.,* 1993:268). Botswana would have been supplied 60 x $10^6 m^3 yr^{-1}$ from this aqueduct (Borchert & Kemp, 1985; Scudder *et al.*, 1993:268). The existing (smaller) transboundary water supply from the Molatedi Dam in South Africa to Gaborone should be seen in light of this *Total National Strategy* approach (see Table 16).

This era drew to an end in the upper reaches of the Okavango River basin, where the battle of Cuito Cuanavale took place in 1988. This battle saw the first significant setback of the SADF since its initial incursion into Angola during Operation Savannah in 1975/6, thereby shattering the myth of South African invincibility. Although officially denied at first, General Magnus Malan subsequently admitted that this event turned the balance in favour of ditching "the millstone which Namibia had become" (Simon, 1991:187).

4.4.3 Post-Cold War Era

This era was ushered in by the political demise of P.W. Botha and the assumption of power by F.W. de Klerk. On 2 February 1990 de Klerk made a watershed speech in which he appealed for a united South Africa as a way to overcome the divisions of violently conflicting nationalisms (Gutteridge, 1994:214). This effectively marked the end of the SSC and the *total onslaught* mentality that they had established in the international relations of South Africa, which by this time had become all-embracing and somewhat paranoid (Spitz & Chaskalson, 2000:15). Almost immediately Nelson Mandela was released from prison and a process of the "normalization" of South African politics began. This was being actively brokered behind the scenes by the National Intelligence Service (NIS), with the Convention for a Democratic South Africa (CODESA) as a key high profile component.

The security forces had become deeply divided during the latter parts of the 1980s, with "hawkish" elements of the Police and Army combining to form the now deeply discredited paramilitary Vlakplaas Unit and Civil Cooperation Bureau (CCB), whose antics included the bombing of the London ANC offices and the assassination of a senior South West African Peoples Organization (SWAPO) activist in Namibia. "Dovish" elements clustered under the leadership of Dr. Niel Barnard, Director General of the NIS, with various special operations units being tasked with the sensitive role of determining the strategic implications, strategies and pitfalls of a negotiated settlement. This "dovish"

element played a major but low profile role in establishing the enabling environment in which a number of strategic actions could occur. These included the Cuban troop withdrawal from Angola and the implementation of UN Resolution 435 in Namibia; CODESA that negotiated the necessary transitional arrangements needed to ensure that the process of democratization could proceed with relative peace and stability; and the cessation of hostilities in Mozambique, in particular bringing the rebel *Resistência Nacional Moçambicana* (RENAMO) into the elections.

Namibian independence followed shortly after the release of Mandela, heralding the end of a liberation struggle that was second in duration only to that of South Africa itself (Simon, 1991:185). This series of events threatened to outpace SADCC, whose *raison d'être* was now being challenged by the rapidly changing political climate. A decision was therefore made to transform SADCC into the Southern African Development Community (SADC), which was concluded formally in Windhoek, Namibia in 1992 (Treaty, 1992a; Pallett *et al.*, 1997:70; Granit, 2000). A small blemish on South African / Namibian relations occurred in the form of a dispute over the border[2] between the two countries along the shared portion of the Orange River, but this has never become a major issue (Ashton, 2000b:86-89; Maletsky, 1999; Meissner, 2001).

The first democratic elections took place in South Africa during 1994, marking the end of isolation and the policy of destabilization. One of the first tasks of the newly elected ANC Government, was to resume full state control over water, most of which was linked to the land rights of approximately 60 000 white commercial farmers, on behalf of the majority of South Africans (Conley, 1997:23). Significantly, the first protocol that was agreed on within the context of SADC after the admission of South Africa as a full member was the *SADC Protocol on Shared Watercourse Systems* that was signed in Johannesburg during 1995 (Ramoeli, 2002:105). This was amended in 1997 and became known as the *Revised Protocol on Shared Watercourses* in order to incorporate the principles found in the *United Nations Convention on the Non-Navigational Uses of International Watercourses* (Granit, 2000; Ramoeli, 2002:106). While this has laid the foundation for greater cooperation in the water sector, economic development is still

[2] While the South African government is of the opinion that this issue has been effectively resolved, the Namibian government perspective differs somewhat (Heyns, 2003:20). The important aspect is that it is not a major driver of conflict at the time of writing.

threatened by the current political turmoil in Zimbabwe, and the aftermath of the civil wars in Angola and the DRC (Granit, 2000).

In 1998, political instability again erupted in Lesotho. This became a major test for SADC in general, and South Africa in particular given its past history. SADC decided to send in a peacekeeping force, comprising soldiers from South Africa and Botswana. This became known as Operation Boleas, which moved across the border and immediately came under heavy and unanticipated fire. Boleas forces split into two with one element concentrating on Maseru while the other moved in to secure the infrastructure related to the LHWP. A number of casualties were sustained on all sides. This has unfortunately caused strained relations between South Africa and Lesotho (Laurence, 1998; Mopheme, 1998a; Mopheme, 1998b; Mills, 1998).

4.4.4 Overlay and South African Hydropolitics

If the events noted above contextualize the patterns of regional conflict and cooperation, then it is necessary to locate these within the broader Cold War theatre. The interaction between the sub-regional and international political milieu relates to what Buzan (1991:216-220) and Buzan *et al.,* (1998:13-14) have called overlay. The link between these regional dynamics and global political interaction can be traced back to 1957. At that time a Soviet strategist and expert on economic warfare by the name of Major General A.N. Lagovsky, formulated what became known as the "weak link principle" (Gutteridge, 1984:60-61). In terms of this thinking, the Western powers such as the North Atlantic Treaty Organization (NATO) and its allies, were almost entirely dependent on a wide range of strategic minerals that were imported from countries in the developing world. By contrast, the Warsaw Pact countries were more-or-less self-sufficient in those strategic resources. This prompted General Alexander Haig (in his capacity as senior strategic advisor to the White House) to conclude, in a presentation to the US House of Representatives in 1980, that the era of the "resource war" had arrived (Gutteridge, 1984:61).

This made Southern Africa a theatre in which proxy-wars were played out, some of which involved strategic access to natural resources. Central to this was the theory of limited war that had been developed by Henry Kissinger, an academic and one-time US Secretary of State, who postulated that in the thermo-nuclear age, the risk of total war was so high that it was to be avoided at all costs (Dougherty & Pfaltzgraff, 1981:111-

116). Instead of total war between nuclear powers, a series of local proxy wars could be fought, each allowing global political tensions to be dissipated in a controlled way, and each allowing non-nuclear military technology to be developed by the nuclear powers and tested through the proxy forces. The linkage was established after the 1974 Portuguese *coup d'état*, when through a series of rapid political events, the Angolan War of Liberation became the Angolan Civil War. South Africa became deeply alarmed at this turn of events. Encouraged by Kissinger's statement that the Soviet and Cuban support of the Popular Movement for the Liberation of Angola (MPLA) in the Angolan Civil War was a "serious matter", and that Moscow's "hegemonial aspirations" would not be tolerated, South Africa decided to become the US proxy force in the region (Geldenhuys, 1984:79). This notion of limited warfare was played out in classic fashion when US support for the SADF proxy force, which at that time was literally in sight of Luanda, was suddenly withdrawn. This was seen as a humiliation by South Africa whose soldiers were left stranded and therefore forced to withdraw without capturing the capital city (Gutteridge, 1985a:97).

The final link to the Cold War is related to the cessation of hostilities associated with the collapse of the former USSR. On the same day in January 1990 on which President Gorbachev was in Vilnius remonstrating with Lithuanian secessionists, President de Klerk was in Umtata trying to persuade General Bantu Holomisa to reintegrate the "independent homeland" of Transkei back into South Africa, which was now firmly on the road to negotiations with the previously banned ANC and other political parties through CODESA (Gutteridge, 1990:176). The demise of apartheid is intimately linked with the collapse of the former USSR and consequently the ending of the Cold War. As such, this watershed removed the influence of overlay and consequently unleashed a set of political dynamics that will start to shape a new pattern of conflict and cooperation, and consequently impact on hydropolitical dynamics within the international river basins found in South Africa (Buzan, 1991:216-220; Buzan *et al.*, 1998:13-14).

4.5 The Orange River Basin

The Orange River basin is the most developed of all the rivers in Southern Africa, with at least twenty-nine dams having a storage capacity of more than 12 x $10^6 m^3$ (twenty-four in South Africa and 5 in Namibia) (Heyns, 1995:10-11) (see Map 11). The largest of these are the Gariep Dam, with a storage capacity of 5,600 x $10^6 m^3$ and the Vanderkloof Dam, with a storage capacity of 3,200 x $10^6 m^3$, both of which are in South Africa with the

former being a critical component of the ORP (see Map 10). The fact that the Gauteng Province is 100% reliant on IBT water (see Figure 17), all of which is channeled through the Vaal River system (see Table 16), illustrates the strategic importance of the Orange River basin given the heavy reliance of the South African national economy on water from this particular basin. It is evident that the Orange River basin is the largest of all the international river basins in South Africa, both in terms of physical size, and in terms of the volume of water (MAR) involved (see Table 15). The importance of this river basin is also evident (see Table 16), because the Orange is a recipient basin for 3 IBTs; a donor basin for 3 IBTs; with 4 intra-basin transfers also in existence. The Orange River basin is considered to be "at risk" (Wolf *et al*., 2003:47).

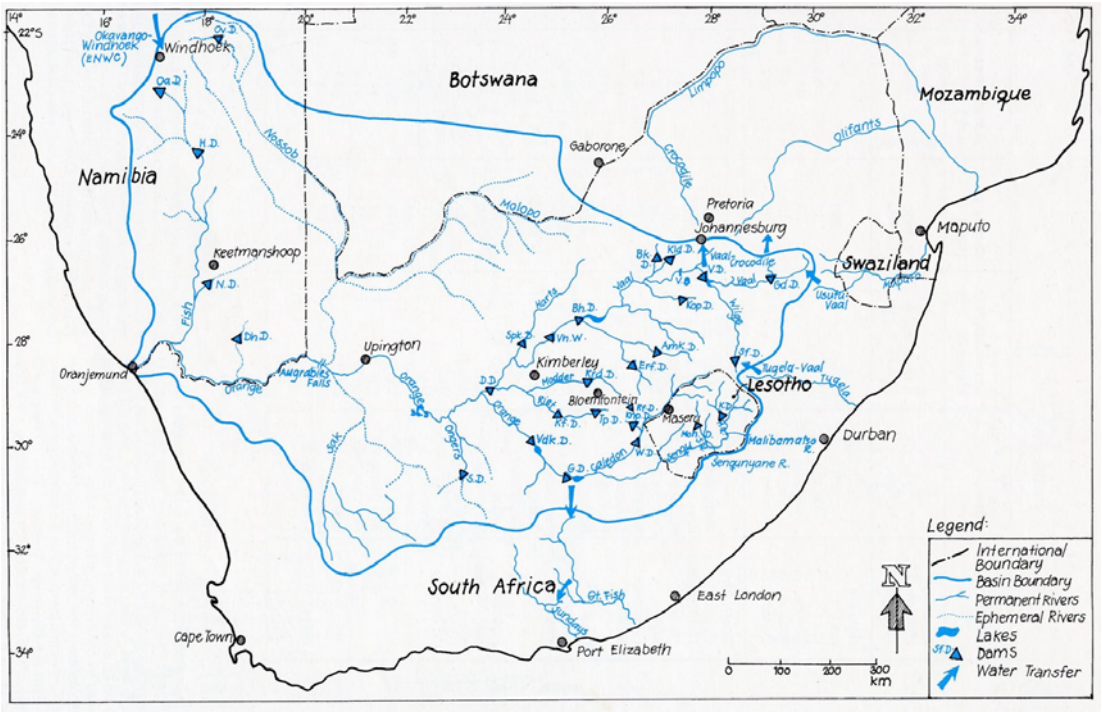
4.5.1 Physical Description of the Orange River Basin

The Orange River basin has a total basin area of 964,000 km^2 with an annual MAR of 11,200 x $10^6 m^3$ (see Table 15). There are 4 riparians, with 4% of the basin area lying in Lesotho (upstream riparian), 62% in South Africa, 9% lying in Botswana, and 25% in Namibia (downstream riparian) (see Map 11). Contribution to MAR by each riparian is unequally distributed, with 55% coming from South Africa, 0% coming from Botswana, 41% coming from Lesotho and 4% coming from Namibia (Basson, 1999). There are slight variations in this data between the riparians (see Table 15), but this is not contested in any way, so this minor discrepancy is hydropolitically irrelevant. The Orange River carries approximately 20% of the total river flow in South Africa, with the Vaal being an important tributary (Basson *et al.*, 1997:40).

The Vaal River is regarded as being a river basin in its own right and provides Gauteng with all of its water. Gauteng (formerly Witwatersrand) in turn houses 40% of the South African population, creates 50% of the country's wealth and generates 85% of the electricity in the entire country (Conley & van Niekerk, 1998:146). In order to support this economic activity, the Vaal sub-basin has links to 8 other river basins in a complex arrangement of IBTs that range from the Limpopo in the North, to the Sundays in the South (Heyns, 1995:18) (see Table 16 and Map 11). In the Vaal basin, much of the water returns to the Orange River as treated effluent, which is available for downstream users (Conley, 1995:11) A staggering 100% of the economic activity in Gauteng is reliant on IBTs (Basson *et al.*, 1997:55) (see Figure 17). This makes the Orange River of great strategic importance to South Africa, hence the significance of the LHWP (Blanchon, 2001; Davies *et al.*, 1993:169; Davies & Day, 1998:299-304; James, 1980). The Orange

River is closed, with an official classification of being "in deficit", so further opportunities for development are severely limited (Conley, 1995:7; Conley, 1996a:17). Namibia has expressed an interest in obtaining more water from the Orange River, but for transfers to occur the large losses that are experienced in the Lower Orange would have to be taken into account. The city of Gaborone can be supplied with water from Lesotho in future, giving Botswana a strategic interest in the basin, even though it contributes no MAR and uses none of the water from the Orange River basin at present.

Map 11. The Orange River Basin.



Source: Pallett *et al.*, 1997:79.

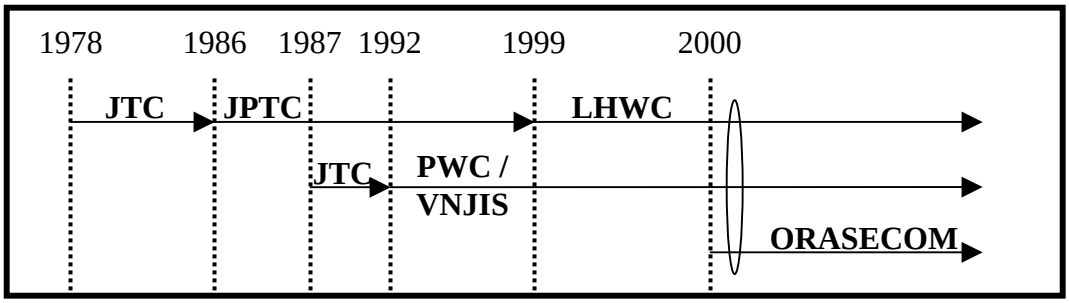
The Orange River forms the international border between South Africa and Namibia. There has been confusion over the actual location of the border, with a demarcation in 1890 being the high-water level on the northern bank, effectively depriving Namibia of independent access to the water (Hangula, 1993:105; Heyns, 1995:11). There is a border dispute between South Africa and Namibia as a result of promises that the border would be moved to the middle of the river, which were allegedly made during the run up to Namibian independence (Maletsky, 1999; Ashton, 2000b:86-89; Meissner, 2001:35). Shifting of the border has never occurred and allegations are being made that South Africa has reneged on its agreement. This has the potential to tarnish South Africa's

hydropolitical image, which was damaged during Operation Boleas in Lesotho during 1998, but it does not seem to be a major issue that threatens international relations.

4.5.2 Historical Progression of Regime Creation in the Orange River Basin

Regime creation within the basin has been fragmented but intense where it has occurred, reaching degrees of sophistication not evident in any of the other basins under review. It began with the establishment of the Southern African Regional Commission for the Conservation and Utilization of the Soil (SARCCUS) in 1948. This has 10 standing committees, one of which deals with water (Ohlsson, 1995b:60). An historic overview of regime creation is presented in Figure 18. For the purposes of a detailed analysis, the basin has been divided into 3 distinct components - the upper, middle and lower basin - with international relations in the hydropolitical realm having been characterized by the creation of various bilateral regimes of increasing sophistication over time, until a multilateral basin-wide agreement was reached between all riparian states in 2000, known as the *ORASECOM Agreement* (Treaty, 2000b).

Figure 18. Historic Overview of Regime Creation in the Orange River Basin.



The Orange-Senqu River Commission (ORASECOM) that was established through the *ORASECOM Agreement* is the fourth basin-wide regime to be established in Southern Africa and the first under the *SADC Protocol on Shared Watercourse Systems* (Treaty, 2000b). A significant aspect of the *ORASECOM Agreement* is the fact that Botswana is a recognized riparian state, even though it contributes no stream-flow and makes no use of the water from the Orange River (see Table 15). This gives Botswana a wider range of diplomatic options by allowing concessions to be granted to other riparian states in return for political support in RBCs where they have a greater strategic interest such as in the Limpopo and Okavango basins (Turton, 2003:152). This makes Botswana the balancer of political power in ORASECOM, with bargaining positions either in support of Namibia

(in return for concessions elsewhere such as in the Okavango and Zambezi River basins), or in support of Lesotho (in return for future concessions such as the supply of water to Gaborone).

The *ORASECOM Agreement* recognizes the *Helsinki Rules*, the *United Nations Convention on the Non-Navigational Uses of International Watercourses* and the *SADC Protocol on Shared Watercourse Systems*. It also refers to the *Revised Protocol on Shared Watercourses* with respect to definitions of the key concepts "equitable and reasonable" and "significant harm". Dispute resolution is formally vested in the SADC Tribunal, which is a first for regime creation in the regional water sector. It recognizes the right of the Parties to form bilateral arrangements (such as the Lesotho Highlands Water Commission (LHWC) and the Permanent Water Commission (PWC) although these are not mentioned by name), and it says that any new Commission will be subordinate to ORASECOM, while existing Commissions must merely liaise with ORASECOM (Treaty, 2000b: Article 1, para.1.4). This means that the LHWC will essentially continue to function as a bilateral arrangement, but that downstream riparians will be kept informed of upstream developments. Similarly, the PWC and it's associated Vioolsdrift and Noordoewer Joint Irrigation Scheme (VNJIS) will also continue to exist as separate entities. As such South Africa will still have direct control over its strategic interest in the basin, while Botswana will have formally gained a foothold in to negotiations on future water-sharing agreements between the riparians.

4.5.2.1 The Upper Basin: South Africa and Lesotho

Unlike the Limpopo basin case, for a long period of time there was no regime creation at all in the Orange River basin, until 1978 when a Joint Technical Committee (JTC) was established between South Africa and Lesotho to investigate the feasibility of the proposed LHWP (Mohammed, 2003:226). A year later the JTC tabled its preliminary feasibility investigation, and a decision was taken to proceed to the next stage of the work (Heyns, 1995:11). In 1986 the *Lesotho Highlands Water Project Treaty* was signed (Treaty, 1986a), but this did not constitute a determination of the apportionment of water according to Conley & van Niekerk (1997:11). The *Lesotho Highlands Water Project Treaty* has 4 protocols covering in detail aspects of design, construction, operation and maintenance, and the institutional arrangements needed to manage such a complex project. The *Lesotho Highlands Water Project Treaty* is the most comprehensive in existence in the Southern African water sector, with the main document being eighty-five

pages in length excluding annexures. From an institutional perspective, the *Lesotho Highlands Water Project Treaty* established two autonomous statutory parastatal bodies (Heyns, 1995:11). The Lesotho Highlands Development Authority (LHDA) is responsible for the management of the dam construction and related issues within Lesotho itself (Treaty, 1986a:23-32), whereas the Trans-Caledon Tunnel Authority (TCTA) is responsible for the management of the complex set of delivery tunnels into South Africa (Treaty, 1986a:33-39). In addition to these, a Joint Permanent Technical Commission (JPTC) was established, consisting of delegates from both riparian states, with the responsibility of coordinating the two parastatals, as well as to report back to their respective Governments. Article 10 of the *Lesotho Highlands Water Project Treaty* stipulates that South Africa is responsible for the costs of the project except for the Muela hydroelectric power station, which Lesotho has to pay for. Paragraph 6 of Article 11 of the *Lesotho Highlands Water Project Treaty* stipulates that South Africa will guarantee the loans. Article 5 of the *Lesotho Highlands Water Project Treaty* stipulates the calculation of royalty payments, which has been determined as half of the difference in cost for supplying $70m^3s^{-1}$ from the LHWP, and the least cost of the alternative Orange Vaal Transfer Scheme. Annexure II of the *Lesotho Highlands Water Project Treaty* stipulates minimum quantities of water to be delivered by the LHWP over time, starting with 57 x $10^6m^3yr^{-1}$ in 1995, and ending with 2,208 x $10^6m^3yr^{-1}$ after 2020. A related treaty deals with issues of diplomatic immunity for the JPTC members (Treaty, 1986b).

This regime was further strengthened in 1999 with the agreement on what became known as *Protocol VI of the Lesotho Highlands Water Project Treaty*, which upgraded the JPTC into the Lesotho Highlands Water Commission (LHWC) (Treaty, 1999a). This in turn resulted in the implementation of a new governance model that retained the two parastatal bodies (TCTA and LHDA). This change was the result of a study that highlighted problems with respect to reporting relationships and lines of authority between the LHDA and the JPTC. The final proposals regarding those changes were accepted by the two Governments on 22 November 1995, and implemented in 1999 as the New Governance Model of the original *Lesotho Highlands Water Project Treaty* (Treaty, 1999b). In essence the implementation of the new governance model marked the end of the initial construction phase (Phase 1a) and the commencement of water delivery.

4.5.2.2 The Middle Basin: South Africa and Botswana

There was no regime creation with respect to the Orange River basin between South Africa and Botswana prior to the *ORASECOM Agreement*. This is because although Botswana is technically a riparian state by virtue of its geographic location within the Orange River basin, it has contributed no streamflow in living memory, and the tributaries in that country can be regarded as being endoreic (Basson, 1999:17; Conley & van Niekerk, 1997:9; Heyns, 1995:10). Botswana therefore has had no overt interest in the Orange River basin prior to the *ORASECOM Agreement*, or stated differently, had not been given a chance to articulate those interests because historically regime creation was bilateral in nature, always involving South Africa as the hegemonic state, and one other hydropolitically weaker riparian state. This is now changing as the Botswana government has begun to realize that one of its strategic future options is to possibly obtain water from Lesotho (or at least to keep that alternative open to future exploration) (Turton, 2003:151).

4.5.2.3 The Lower Basin: South Africa and Namibia

In 1987 a Joint Technical Committee (JTC) was established to advise the South African government and the South-West African Transitional government on matters pertaining to the Orange River, referred to as the *Cooperation Agreement* (Treaty, 1987). Given that Namibia was not a sovereign state until 1990, and was therefore unable to enter into formal agreements with its co-riparians, there was a spate of agreements signed immediately after independence (Pinheiro *et al.*, 2003:117). It was against this background that the JTC was upgraded during 1992, when a treaty was signed between South Africa and Namibia, known as the *Agreement on the Establishment of a Permanent Water Commission* (PWC) (Treaty, 1992b; Chenje & Johnson, 1996:165; Pallett *et al.*, 1997:70). At the same time an agreement was signed on the establishment of a Joint Irrigation Authority (JIA) to implement the *Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Schemes* (VNJIS) (Treaty, 1992c; Chenje & Johnson, 1996:165; Pallett *et al.*, 1997:70). This was followed in 1994 by the launching of the Orange River Replanning Study (ORRS) (DWAF, 1998). Initially intended to clarify South Africa's own priorities as a country study, formal invitations were extended to Namibia and Lesotho to participate. This caused officials in those countries some unease at the time because the study was not being conducted under the auspices of a recognized international forum, and South African officials also initially experienced misgivings at

exposing potentially acrimonious internal deliberations to outside observers (Conley & van Niekerk, 1997:13). After the inception of the ORRS however, Namibia undertook its own study, to be followed by Lesotho. While these two studies did not have observers from the other riparian states, the results were shared. This created an improved climate of trust. Subsequent to this negotiations were started between all of the riparian states, motivated largely by Namibia, on the establishment of a basin-wide regime. This came to fruition when the Orange-Senqu River Commission (ORASECOM) was formally established on 3 November 2000 under the *ORASECOM Agreement*.

4.5.3 The Orange River Basin within a Broader Regional Setting

The Orange River basin is an extremely important source of water for 3 of the most economically developed states in Southern Africa - South Africa, Botswana and Namibia. While it is clearly the largest single water resource available to South Africa (see Table 15), it is also extremely important for Namibia, with a quarter of the total basin area falling under the sovereign control of that state containing no less than 5 dams with a combined capacity of 452 x $10^6 m^3$ (Pallett *et al.*, 1997:80). Botswana's main economic development is centered on the city of Gaborone, which can be supplied with water from Lesotho, and which is being fed at this moment in time from an IBT from South Africa and a major scheme in the form of the North-South Carrier (NSC), which derives its water from the Limpopo River basin (see Map 15).

4.5.4 Critical Hydropolitical Issues within the Orange River Basin

From the perspective of regime creation, there are 4 critical issues to note within the Orange River basin.

(a) *ORASECOM and existing bilateral regimes:* The relationship of the historically older bilateral regimes (JPTC and PWC) with the relatively new basin-wide multilateral ORASECOM is as yet largely unknown. In this regard, Paragraph 1.4 of Article 1 in the *ORASECOM Agreement* specifically states that all parties have the right to form bilateral agreements, and that existing Commissions will merely liaise with ORASECOM. As such, the existence of ORASECOM does not threaten the hegemonic status of South Africa within the overall hydropolitical configuration of the basin, but this situation may not go unchallenged by other riparian states. The robustness of the *ORASECOM Agreement* as a regime *vis-à-vis* the existing bilateral arrangements will be tested in the

middle-term future, with hydropolitically weaker riparian states like Namibia and Botswana probably throwing their support behind ORASECOM as a multilateral structure, while the hydropolitical hegemon (South Africa) is likely to opt for a maintenance of the *status quo* and the retention of the existing bilateral arrangements as the dominant instruments of cooperation.

(b) *Impact of basin closure:* Basin closure is known to result in a growing sense of insecurity for the respective riparian states in other international river basins, so why should the Orange River case be any different? In this regard, the key element is likely to be the extent to which water deficit impacts negatively on the economic growth potential of the respective riparian states. It is in this context that SWE starts to become relevant. The existing water use in the Orange River basin is known to be inefficient, with around 90% of the current allocation going to irrigation, which in turn produces low value crops (Basson, 1999:10). The relatively low SWE of agriculture will thus become a management focal point in the near future, with attempts being made to redirect agricultural water to industrial and other activities. This will likely have a significant social and political effect as the agricultural economy is slowly transformed to an industrial one. ORASECOM as an institutional arrangement will be severely tested as water allocations are made between riparian states at some time in the future.

(c) S*trategic ramifications of IBTs:* Given the high level of economic development in the basin, and its central role in a number of existing IBTs, the Orange River basin is likely to become more of a recipient basin in future as current resource capture trends continue. This has the capacity to increase the conflict potential within the basin, particularly when donor basins such as the Thukela, Incomati, Maputo and others, have their own economic growth potential capped as the result of what is in essence a form of induced scarcity. Basson (1995:42) has already noted that “the operation of the water resources systems in the central part of South Africa already impacts on the flow of major rivers draining from the central plateau of the country. Therefore, it also impacts on Botswana, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe, as well as on Lesotho as a donor state”.

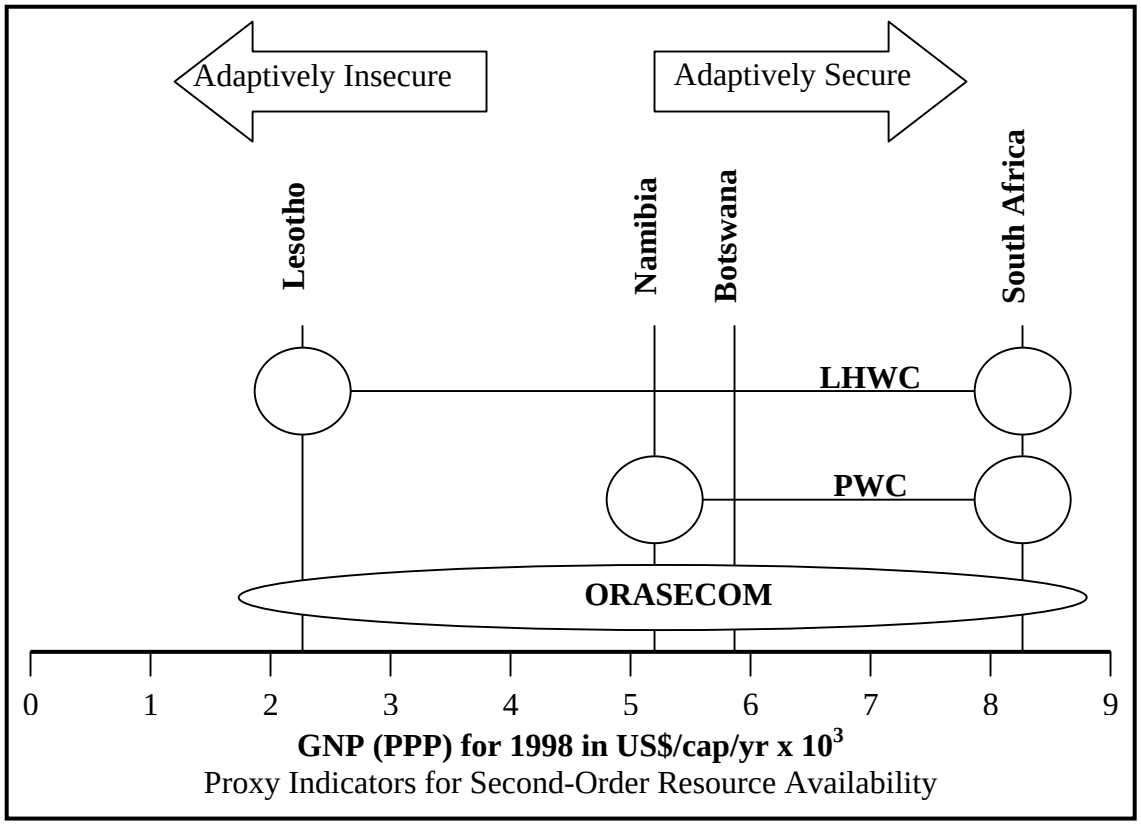
(d) *Hydrological data and regime creation:* The role of shared and uncontested hydrological data is clearly manifest in the Orange River basin. While the decision to make the ORRS an inclusive process was regarded with some misgiving at the time, it ultimately yielded a body of data that is transparent and uncontested. It can be argued that this aspect, combined with other factors such as the historic linkage between the

Namibian and South Africa Departments of Water Affairs, is one of the main reasons why the conflict potential in the Orange River basin remains well within manageable limits.

4.5.5 The Adaptive Security Spectrum in the Orange River Basin

Given the importance of second-order resource availability to the initial establishment and subsequent maintenance of a regime in an international river basin, it becomes instructive to contextualize the Orange River basin in terms of the Adaptive Security Spectrum for South Africa's Co-riparian States (see Figure 14). The adaptive security spectrum as it applies to the Orange River basin is presented in Figure 19.

Figure 19. The Adaptive Security Spectrum in the Orange River Basin.



Source: Drawn from World Bank 2000:42-43 data used in Turton & Warner 2002:65.

This finding challenges the conclusion by Wolf *et al* (2003:47) that the Orange River is a basin "at risk", because of all the international river basins in Southern Africa, the Orange has a functioning set of bilateral regimes, one of which is arguably the most sophisticated

in the SADC region (*Lesotho Highlands Water Project Treaty*), and a new but apparently healthy basin-wide regime (*ORASECOM Agreement*).

4.5.6 Conclusion Regarding the Orange River Basin

The Orange River basin has the most comprehensive history of successful regime creation in the entire Southern African region, with the *Lesotho Highlands Water Project Treaty* being the most complex bilateral arrangement in existence, placing it somewhat at odds with Wolf *et al's.*, (2003:47) classification. This reflects South African strategic needs for water, with regime creation having been driven largely by their own national interest. An interesting aspect of the basin is the role that was played by Namibia in driving the *ORASECOM Agreement* negotiations, which reflects the fact that downstream riparians with a high resource need have a vested interest in taking the lead in regime creation, because it is perceived to be in their own national interest. The Orange River basin thus illustrates 5 distinct hydropolitical tendencies.

(a) *Hydropolitical conditions favouring bilateral regimes:* Hegemonic states with a high resource need logically prefer to enter into bilateral arrangements, because under such conditions, they are more likely to have their national interest served.

(b) *Hydropolitical conditions favouring multilateral regimes:* Other states within a given international river basin, with high resource needs but in a low-order riparian position, logically prefer a multilateral basin-wide approach, with a preference for well-defined legal principles such as "equitable and reasonable" use and "significant harm" as central components, because these best serve their own national aspirations.

(c) *Emergence of a hydropolitical complex:* Certain riparian states with cross-cutting interests, such as those manifest by Botswana, which has a greater interest in other basins such as the Limpopo, Okavango and Zambezi, can maximize their strategic advantage by becoming involved in certain regime creation where they act as balancers of hydropolitical power. This can provide impetus to the emergence of a hydropolitical complex, clustered on pivotal river basins in which key riparian states have a high dependence on the resource-base for their long-term economic growth.

(d) *Hydrological data and regime creation:* The role of uncontested basin-wide hydrological data in the establishment of a climate of trust is a distinct feature of the

Orange River basin. This highlights the significance of second-order resources as a factor in the negotiation and maintenance of a regime in an international river basin.

(e) *Second-order resources as an independent variable:* The prognosis for the stability and success of ORASECOM in good, given the fact that the membership is mostly distributed across the upper end of the adaptive security spectrum, thereby challenging the conclusion by Wolf *et al* (2003:47) that the Orange River basin is "at risk".

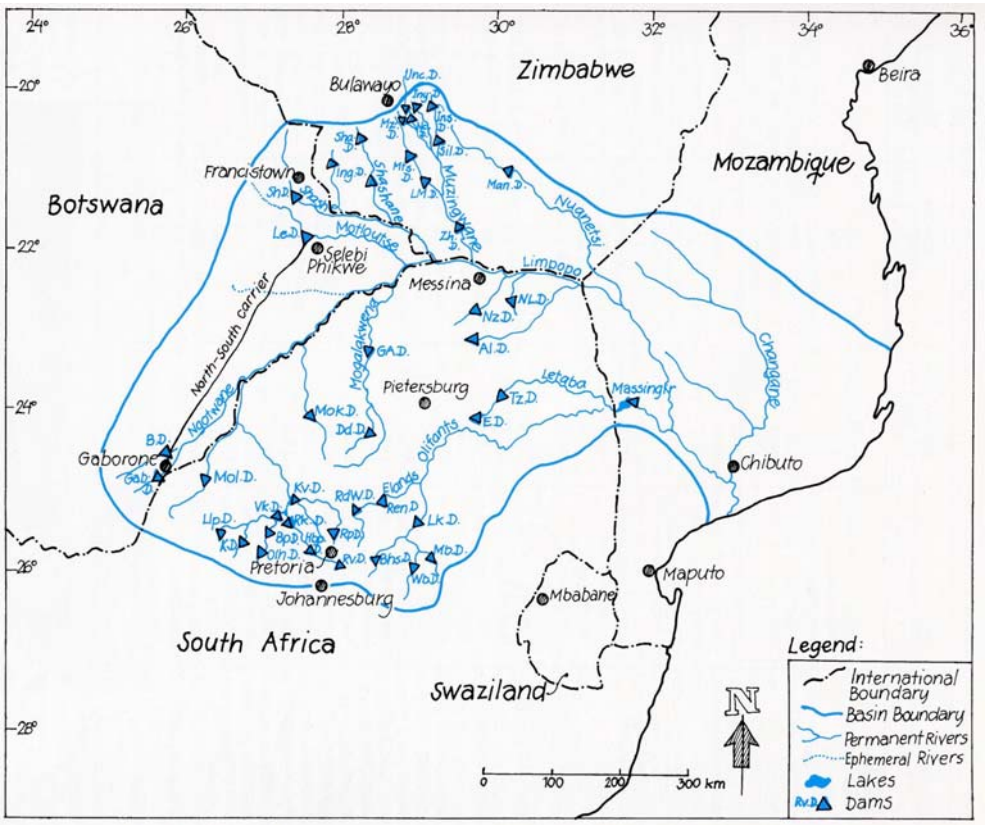
4.6 The Limpopo River Basin

The Limpopo River basin is highly developed, containing more than forty-three dams with a storage capacity in excess of 12 x 10^6m^3 each (3 in Botswana, 2 in Mozambique, twenty-six in South Africa and twelve in Zimbabwe) (see Map 12). No less than twelve of these dams have a storage capacity in excess of 100 x 10^6m^3 each (1 in Botswana, 1 in Mozambique, 7 in South Africa and 3 in Zimbabwe) (Heyns, 1995:7). The largest reservoir in the basin is behind the Loskop Dam, which has a storage capacity of 348 x 10^6m^3. Figure 17 shows the strategic importance of the Limpopo River basin for economic activities in the north of the country, with North West Province, Mpumalanga and the energy generation for Gauteng being serviced from that source. The Limpopo River basin is the second largest of all the international river basins in South Africa in terms of both surface area and MAR availability (see Table 15). The overall importance of this river basin is evident in the context of IBTs, with the Limpopo being a recipient basin for 4 IBTs; a donor basin for no IBTs; with 2 intra-basin transfers (see Table 16). The Limpopo River basin is considered to be "at risk" Wolf *et al* (2003:47).

4.6.1 Physical Description of the Limpopo River Basin

There are no major dams on the main stem of the river, a unique feature of this basin, which is also the border between South Africa and Botswana; and South Africa and Zimbabwe (see Map 12). The Limpopo has a total basin area of 183,000 km^2 with an annual MAR of 5,750 x 10^6m^3. There are 4 riparians, with 20% of the basin area lying in Botswana (upstream riparian), 45% lying in South Africa, 15% in Zimbabwe and 20% in Mozambique (downstream riparian) (Basson, 1999) (see Table 15). Contribution to MAR by each riparian state is disputed, with between 66%-88% coming from South Africa, 3%-6% coming from Botswana, 7%-16% coming from Zimbabwe and 9%-12% coming from Mozambique, depending on the sources used (see Table 15).

Map 12. The Limpopo River Basin.



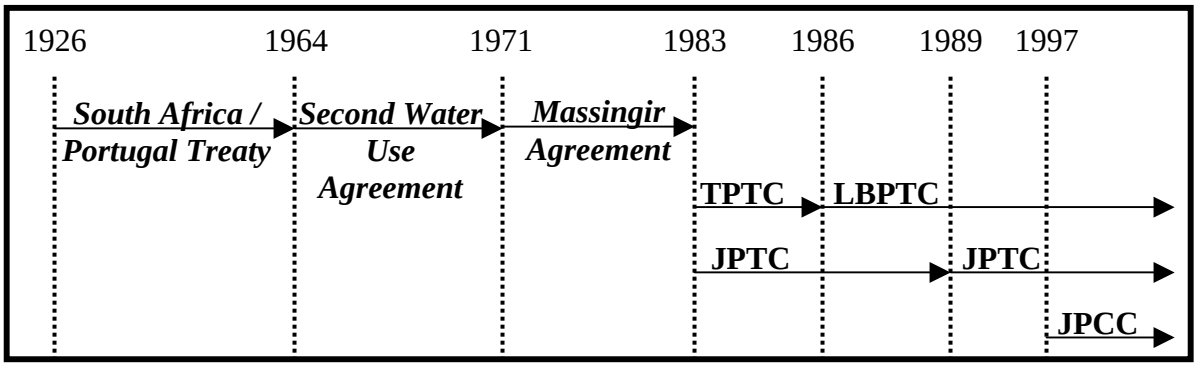
Source: Pallett *et al.*, 1997:83.

The water for Gaborone, the industrial hub of Botswana, was initially supplied from South Africa through the Molatedi Dam and associated pipeline, at a rate of 7.3 x $10^6m^3yr^{-1}$, although the design parameters will allow for the delivery of 9 x $10^6m^3yr^{-1}$ (Conley, 1995:13). A second source of supply has subsequently been developed through the NSC and the Letsibogo Dam on the Moutloutse River, which is a tributary of the Limpopo. The NSC can be extended northwards to receive water from the Zambezi River basin in future, with technical investigations currently under way (see Map 15). The basin is closed, with water use in the South African portion alone exceeding the yield potential by 800 x $10^6m^3yr^{-1}$, which is made up by importing water from the Vaal River as potable water, with the return flow of treated effluent augmenting supply for downstream users (Basson, 1999:6; Conley, 1995:14; Conley, 1996b:35; Heyns, 2002:164). Heyns (1995:8) notes that South Africa already has the capacity to transfer 700 x $10^6m^3yr^{-1}$ from various international river basins into the Limpopo as needed, giving an indication of the response to, and magnitude of, basin closure.

4.6.2 Historical Progression of Regime Creation in the Limpopo River Basin

Regime creation dates back to a general agreement in 1926 between South Africa and Portugal - known as the *South Africa / Portugal Treaty* - which laid the groundwork for the subsequent development of various river basins in Southern Africa, mostly to the benefit of the colonial powers at that time (Treaty, 1926) (see Figure 20).

Figure 20. Historic Overview of Regime Creation in the Limpopo River Basin.



During 1948 SARCCUS was established, with relevance to the Limpopo riparian states. A *Second Water Use Agreement* was signed in 1964 by South Africa and Portugal, building on the earlier *South Africa / Portugal Treaty*. The *Second Water Use Agreement* was a colonial agreement that spoke of rivers of "mutual interest" including the Cuvelai, Okavango, Limpopo, Maputo and Incomati, but which focused in detail on the Cunene (Heyns, 1995:5; Heyns, 1996:263; Treaty, 1964). Another formal agreement was reached between South Africa and Portugal in 1971 for the purposes of constructing the Massingir Dam 30-km downstream of the South African border in the Limpopo basin (Treaty, 1971). Known as the *Massingir Agreement*, it placed no restrictions on South Africa, recognizing that the inflow would decrease as South Africa developed more dams in the future (Conley, 1995:13). For the purposes of a detailed analysis, the basin has been divided into 3 distinct components - the upper, middle and lower basin - with international relations in the hydropolitical realm having been characterized by a series of attempts at creating a basin-wide regime, all of which have failed. Where functioning regimes do exist, they are strictly bilateral in configuration.

In February 1983 the *Agreement on the Establishment of the Tripartite Permanent Technical Committee* (TPTC) was formalized between Mozambique, South Africa and Swaziland, with the purpose of making recommendations on the management of the

water shortages being experienced in the Limpopo, Incomati and Maputo Rivers at that time (Treaty, 1983c; Ohlsson, 1995b:60; Chenje & Johnson, 1996:164; Pallett *et al.*, 1997:70). The TPTC was the first attempt at establishing something like a basin-wide regime in Southern Africa (see the Incomati and Maputo case study), but it was flawed from its inception in the context of the Limpopo because it excluded Zimbabwe, a state that was somewhat belligerent towards South Africa at that time. Consequently the TPTC did not function from its inception, because of the deteriorating political situation, but also because it was not an inclusive regime in the context of the Limpopo basin (Heyns, 1995:7; Ohlsson, 1995b:60; Vas & Pereira, 1998:119-120; Vas, 1999:65). Vas & Pereira (1998:120) attribute this failure, at least in part, to "the passive attitude of [the] DNA" (the Mozambican National Department of Water Affairs). Vas (1999:65) also notes that the lack of diplomatic representation between Mozambique, South Africa and the then colony of Rhodesia (which was engaged in a war involving Mozambique at the time) hindered the process.

Negotiations around the need to establish a functioning basin-wide regime were again attempted, which resulted in an *Agreement on the Establishment of the Limpopo Basin Permanent Technical Committee* (LBPTC) being reached during 1986 with Botswana, Mozambique, South Africa and Zimbabwe as parties (Chenje & Johnson, 1996:164; Mohammed, 2003:221; Pallett *et al.*, 1997:69; Treaty, 1986c; Vas & Pereira, 1998:120). This became the first basin-wide regime to be established in Southern Africa. The LBPTC did not function well, much like its predecessor the TPTC, even though it included all of the riparian states (Ohlsson 1995b:59). Given the history of failures in the Limpopo River basin, bilateral negotiations became the preferred route, which resulted in the uneven development of regimes in different parts of the basin.

4.6.2.1 The Upper Basin: South Africa and Botswana

The initial failure of the TPTC, which became apparent almost immediately after its launch in February 1983, combined with the critical need to establish a working arrangement, triggered bilateral negotiations between South Africa and Botswana. This was driven by 3 factors.

(a) *Prevailing security climate:* The deteriorating security climate in South Africa, and the accompanying *Total National Strategy* paradigm that it spawned, determined the need to engage Botswana in a series of agreements that would hopefully improve the security

situation in that sector. The Botswana government also seemed to resist pressures, mostly from the newly independent and highly militant Zimbabwe, to become one of the Frontline States, which sent signals to South Africa that the "carrot" (incentive) aspect of the two-pronged *Total National Strategy* approach would be most appropriate in this case, even though the "stick" (disincentive) of Special Forces reprisal was used where deemed tactically necessary.

(b) *Riparian position:* Botswana is upstream of South Africa in that part of the Limpopo basin, so uncontrolled water resource development in that country could impact negatively on future South African resource aspirations.

(c) S*trategic aspirations of the hegemon:* South Africa had strategic aspirations to gain access to water from either the Okavango or the Zambezi River at some time in the future if their economic growth was to be ensured in the medium to long-term (Basson, 1995:46; Borchert & Kemp, 1985; Borchert, 1987; Heyns, 1995:15; Heyns, 2002:164; Scudder *et al.*, 1993:268; Trolldalen, 1992:138; van der Riet, 1980; Williams, 1986). The only way that this objective could be reached would be to have an alliance with Botswana as all viable water delivery routes cross that country. Botswana also has a natural interest in investigating these projects, given the impact of water deficit on its own economic growth potential, so it could become a natural ally in such ambitious ventures.

An *Agreement on the Establishment of the Joint Permanent Technical Committee* (JPTC) was reached in November 1983 between the two countries to deal with matters of mutual interest (Treaty, 1983a; Chenje & Johnson, 1996:164; Pallett *et al.*, 1997:70). This functioned well and was consequently upgraded to a commission through the *Agreement on the Establishment of the Joint Permanent Technical Commission* on the Limpopo River basin as far as it constitutes the border between the two countries in June 1989 (Treaty, 1989; Chenje & Johnson, 1996:164; Pallett *et al.*, 1997:70). The JPTC is functioning well and has been responsible for the Joint Upper Limpopo Basin Study (JULBS), which is investigating a range of issues including 3 possible new dams at Cumberland, Martins Drift and Pont Drift (Heyns, 1995:7; JPTC, 1991).

Bilateral relations between South Africa and Botswana were further strengthened in 1997 with the *Agreement on the Establishment of the Joint Permanent Commission for Cooperation* (JPCC) (Treaty, 1997). This is a broad inter-governmental agreement aimed specifically at fostering closer cooperation in the following fields:

- Agriculture and livestock.
- Water affairs.
- Trade, industry and mining.
- Environmental cooperation.
- Monetary and financial arrangements.
- Transportation, roads, communication and other infrastructural development.
- Joint development and utilization of natural resources and energy.
- Health, education, development and utilization of human resources.
- Institutional development.
- Security and migration.

4.6.2.2 The Middle Basin: South Africa and Zimbabwe

There are no known bilateral agreements in existence between South Africa and Zimbabwe. This has been driven by 3 factors.

(a) *Nature of bilateral relations:* Relationships between the two countries, at least during the 1980s when agreements were being negotiated, were frosty at best, and openly hostile at worst. The newly independent Zimbabwe, with a self-confident and defiant Robert Mugabe as the Prime Minister, came as a surprise to the South African government. Zimbabwe's continued support for the liberation movements in South Africa, and its key role in launching SADCC as a structure to unite the Frontline States against the joint scourge of colonialism and apartheid, made negotiations difficult (Baynham, 1989:88; Treaty, 1992a:3-5).

(b) *Pattern of dam construction:* There has been relatively little dam construction on the main-stem of the Limpopo River, which forms the border between the two countries. All significant water resource development has taken place on the respective tributaries, and given the fact that in the middle reach of the river, South Africa and Zimbabwe are neither upstream nor downstream relative to one another, dam development in either country has not been seen to be a major threat, thereby negating the need for a specific agreement. In fact, dam construction in the Limpopo River basin in Zimbabwe will impact negatively on Mozambique, by reducing the available runoff, rather than on South Africa.

(c) *Sequencing of political transitions:* In post-apartheid South Africa, when the political climate favoured the normalization of inter-state relations, Zimbabwe was in a phase of political decay. The policies of the Mugabe government were controversial, and saw a steady implosion of the economy, accompanied by an erosion of governmental capacity to negotiate agreements. Seen from the perspective of a contemporary Zimbabwean political elite, the negotiation of a regime on an international river basin is low down the list of priorities.

4.6.2.3 The Lower Basin: South Africa and Mozambique

Unlike the case with the Upper Limpopo basin, there is no history of functioning bilateral regimes between South Africa and Mozambique. This can be attributed to 2 key factors, although a third is emerging that is likely to change this situation.

(a) *Revolutionary ideology:* During the political turmoil of the 1980s when regimes were actively being negotiated, Mozambique was one of the Frontline States in the war against apartheid and colonialism. Given the *Total National Strategy* thinking that was dominant in South Africa at the time, and the two-pronged approach that was central to this paradigm, the balance of outcomes tilted in favour of seeing Mozambique as a problem rather than a solution. Although poor, the Mozambique government stuck to its revolutionary ideals and continued to support the liberation movements in Rhodesia and South Africa, systematically refusing to be entrapped by offers of development assistance. This resulted in a number of Special Force reprisals, but the Mozambique government remained true to its ideals and maintained a hostile stance towards South Africa.

(b) *Riparian position:* Mozambique is a low-order riparian state *vis-à-vis* South Africa. This makes Mozambique hydropolitically weaker and more vulnerable to actions taken upstream, allowing South Africa to do as it wished. The Limpopo River basin is regarded as being one of the two most important water resources in Mozambique (the other being the Incomati) (Vas & Pereira, 1998:112). This made Mozambique more vulnerable, a fact that was actively exploited by the political elites in Pretoria at the time.

(c) *The WSSD as an emblematic event:* This situation is starting to change however. Mozambique has expressed concern over reduced runoff if the proposed new dams in the Upper Limpopo basin that the JULBS is investigating go ahead (Vas & Pereira,

1998:117). As a result, renewed attempts are being made to revive the defunct LBPTC, with meetings having been held between Mozambique and Zimbabwe on the issue (Heyns, 1995:7; Vas & Pereira, 1998:117). Commentators have noted that this is "clearly an opportunity that DNA must use to have … serious involvement and … active participation" in the development of functioning regimes (Vas & Pereira, 1998:120). This may herald in a new phase of cooperation and regime creation in the basin, having been encouraged by the *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* in the Incomati and Maputo River basins, and the subsequent signing of the *Incomaputo Agreement* during the WSSD (Treaty, 2002a; Treaty, 2002b).

4.6.3 The Limpopo River Basin within a Broader Regional Setting

The Limpopo River basin, like the Orange River basin, is an extremely important source of water for 3 of the 4 most economically developed states in the Southern African region - South Africa, Botswana and Zimbabwe - all of which face limitations to their future economic growth potential as the result of localized water deficit. The Limpopo basin is also critically important for Mozambique, particularly as it struggles to meet the needs of post-war reconstruction. Significantly, Botswana, Zimbabwe and Mozambique are also riparian states in the Zambezi River basin, but in all cases, the development of the resource is problematic. For Botswana, the absence of suitable geological features means that dam development is not practical; while Zimbabwe has a shortage of foreign currency to fund new projects, at the same time being confronted by geological complications that inhibit the easy development of the Zambezi; and Mozambique is still deeply indebted to Portugal and South Africa for the Cahora Bassa Dam, constraining any future aspirations in that basin. South Africa has had historic plans to gain access to the Zambezi River (Basson, 1995:46; Borchert & Kemp, 1985; Borchert, 1987; Heyns, 1995:15; Heyns, 2002:164; Midgley, 1987; Scudder *et al.*, 1993:268; Trolldalen, 1992:138; van der Riet, 1980; Williams, 1986).

This means that the Limpopo River basin cannot be seen in isolation, because it has links with so many other political, economic and hydrological parameters in the broader Southern African region. There are already physical linkages in the form of IBTs with other international river basins such as the Incomati and Maputo, all of which impact negatively on downstream Mozambique (see Table 16 & Map 11). The proposed new linkages to the Zambezi have strategic advantages to Botswana and Zimbabwe, because

both could receive water from such a project, while opening to door to South Africa to also become a partner in such a grand scheme (see Map 15) (Heyns, 2002:164). This means that the Limpopo River basin is likely to become increasingly important in the context of regional economic growth and integration - something that is central to the SADC spirit, having been clearly laid out in Paragraph 1(a) of Article 5 of the *Declaration Treaty and Protocol of the Southern African Development Community* (Treaty, 1992a).

4.6.4 Critical Hydropolitical Issues within the Limpopo River Basin

From the perspective of regime creation, there are 4 critical issues to note within the context of the Limpopo River basin.

(a) *Fundamental driver of regime creation:* While basin closure is a key factor, it is not the only driver of regime creation over time. A significant component of the need to create a regime was related to the South African *Total National Strategy*, which was primarily state security in orientation. This has shaped the nature of international relations, with patterns of amity and enmity in the Limpopo River basin mirroring the broader regional political struggle, and indeed, also the Cold War rivalry. As such the Limpopo basin is an interesting case study of the hydropolitical dynamics of conflict and cooperation. There are two distinct sub-elements to this aspect, both of which impact significantly on the contemporary situation:

> (i) *Hydrological data and regime creation:* Disputed hydrological data is a salient feature of the basin, with each riparian state offering a version that suits their own national political aspirations. This acts as a source of potential conflict and undermines attempts at developing a cooperative posture. This also hints at the relevance of second-order scarcity, because the state that is most impacted (Mozambique), also has the least capacity to provide data of sufficient quality in order to counter South African (and even Zimbabwean) claims.
>
> (ii) *Liberation struggle:* The early history of cooperation was between a colonial power and what was to become the South African Apartheid State, both of which are central elements in the founding of SADCC, acting as an ongoing unifying force between the Frontline States. This allowed Zimbabwe to oppose the South

African *Total National Strategy*, and kept Mozambique in the equation as a key ally in what was an ideological struggle linked to the Cold War.

(b) *Pattern of regime creation:* There is uneven regime creation within the Limpopo River basin. The bilateral regime between Botswana and South Africa has functioned well, and is in a healthy condition having grown in depth and sophistication over time. There are no other functioning bilateral regimes, with Mozambique being arguably in a weaker position today than it would have been had it chosen instead to cooperate with South Africa in the 1980s. This was not to be however, so it can be said that contemporary Mozambique is paying the price for having taken a principled political stance during the war on colonialism and apartheid. This is recognized by Vas (1999:66) who notes that one factor in the increased conflict potential within the basin is "the widespread feeling among the Mozambican population that they consented to enormous sacrifices for the radical political changes required in Zimbabwe and [South Africa] and, instead of gratitude, they receive less and less ... water". There is a rudimentary basin-wide regime in existence in the form of the LBPTC, but this has never truly functioned from its inception. This begs the question as to what the likely outcome will be? Clearly the JPTC is not going to be abandoned, so the likely result will be an arrangement such as ORASECOM, where existing bilateral arrangements are recognized while the larger basin-wide regime gets off the ground.

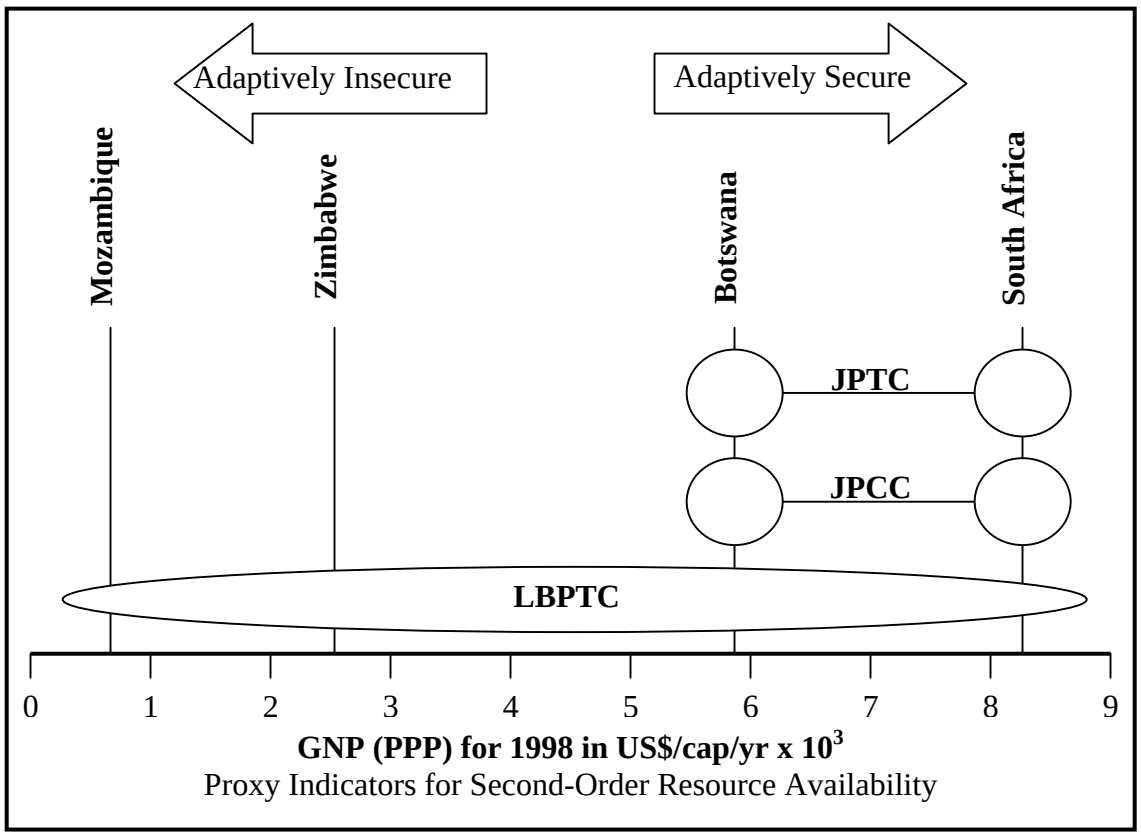
(c) *Emergence of a hydropolitical complex:* The Limpopo River basin is clearly an important component in a growing set of crosscutting linkages with other international river basins in the region. This is more so than the Orange River case, which lacks the deeper experience of the broader political conflict that was the manifestation of both the colonial experience and Cold War overlay. The relevance of this is likely to become more pertinent as plans to develop the Zambezi River for the purposes of supplying water to the city of Bulawayo in Zimbabwe, and linking into the existing NSC in Botswana, become more advanced. At least one permutation of this plan is for South Africa to become a joint developer, mobilizing both capital and expertise, to the possible mutual benefit of all 3 countries (see Map 15) (Heyns, 2002:164). The existing climate of mistrust is an important factor in the attainment of this objective, as downstream riparian states like Mozambique - already deeply suspicious of the intentions of Zimbabwe with whom it shares 3 other basins (Buzi, Pungué and Save), and South Africa with whom it has a long history of lopsided outcomes - continue to remain skeptical of the benefits to themselves.

(d) *Pattern of dam construction:* Given the fact that most of the water resource development is on the tributaries rather than on the main-stem of the river, the management of the dams is uncoordinated (Basson, 1999:16). The devastating impacts of this became abundantly clear during the flooding that occurred in 2000, where upstream developments and the resultant denudation of wetlands in South Africa, Zimbabwe and Botswana, were at least one factor that exacerbated the situation (Christie & Hanlon, 2001:118). The need for closer coordination, combined with the point raised in the above paragraph, suggest that there is significant impetus to regime creation at the basin level.

4.6.5 The Adaptive Security Spectrum in the Limpopo River Basin

The relative distribution of second-order resources within the Limpopo River basin has been reflected in the overall experience of regime creation. The adaptive security spectrum as it applies to the Limpopo River basin is presented in Figure 21.

Figure 21. The Adaptive Security Spectrum in the Limpopo River Basin.



Source: Drawn from World Bank 2000:42-43 data used in Turton & Warner 2002:65.

It is evident that the one bilateral water regime (JPTC) involves two of the most adaptively secure states in the entire SADC region. This is supported by the JPCC, which is a broader agreement that embraces more than just water resource management. This regime is working well, which is to be expected given the fact that it lies entirely in the adaptively secure end of the spectrum.

Membership of the multilateral LBPTC spans the entire spectrum, with two member states lying deep within the adaptive insecurity portion. Historic experience has shown that the LBPTC has been dysfunctional from its inception, with the prognosis for success being poor given the fact that the two riparian states with the highest level of second-order scarcity in the region need to be accommodated. Consequently, it seems prudent to predict that the bilateral JPTC will continue to be the main vehicle for cooperation in the Limpopo River basin, with a very real chance that the dynamics of desecuritization will not be easily invoked. This suggests that the finding by Wolf *et al* (2003:47) that the Limpopo is a basin "at risk" is indeed valid, given the history of regime failure in the basin, and the high level of second-order resource scarcity that is endemic.

4.6.6 Conclusion Regarding the Limpopo River Basin

The Limpopo River basin has a longer history of regime creation than the Orange River case, but these attempts correlate with South Africa's changing internal security situation more so than mere water deficit suggests. Therefore, like the Orange River case, attempts at regime creation in the Limpopo basin have been a reflection of the strategic needs of the hegemonic riparian state (South Africa). While the need to gain access to water for purposes of economic growth was a factor, it can be argued that this was never the major driver of the process. The flurry of negotiations in the 1980s coincided with a marked worsening of the internal security situation in South Africa, and the failure to reach agreement with 2 of the riparian states (Zimbabwe and Mozambique) can be directly attributed to their stance *vis-à-vis* the broader political struggle for the demise of colonialism and apartheid. The Limpopo River basin illustrates 5 distinct hydropolitical tendencies.

(a) *Fundamental driver of regime creation:* National interest is a key driver of regime creation. In this regard, hegemonic states seek to entrench their position of dominance, but this can be resisted, as occurred with both Mozambique and Zimbabwe. This has long-term implications for those states however.

(b) *Broader political context:* There is a strong linkage between regime creation and the broader political arena in which the given international river basin is enmeshed. Sometimes this political struggle supports regime creation, but this is usually when such a condition suits the national interest of the non-hegemon. The water supply to Gaborone through the Molatedi Dam can be seen in this context. It can therefore be concluded that patterns of regime creation reflect the broader political dynamics in which the respective riparian states are engaged, and is not merely a hydropolitical manifestation occurring in isolation.

(c) *Emergence of a hydropolitical complex:* Given that the Limpopo River basin is closed, combined with the fact that 3 of the riparian states are facing water deficit constraints to their future economic growth potential, it can be concluded that a hydropolitical complex is emerging as a distinct component of the broader Southern African Regional Security Complex originally identified by Buzan (1991:210).

(d) *Hydrological data and regime creation:* The correlation of the existence of disputed hydrological data with the non-functioning of a regime is noteworthy. This dispute over data simply reflects the existence of other, more profoundly political differences between the various riparian states. Significantly, where regime creation is at it's most advanced (JPTC) there have been joint country studies (JULBS) yielding uncontested data that has acted as a central focal point for confidence-building efforts. This also highlights the role of second-order resources as an important factor in stimulating the development, and subsequent maintenance of a regime. It can therefore be tentatively concluded that a second-order scarcity within a given riparian state can mitigate against effective and sustainable regime creation, because such a scarcity merely perpetuates the political environment of mistrust and inequity.

(e) *Second-order resources as an independent variable:* The wide spread of riparian states across the adaptive security spectrum suggests an inherently polarizing dynamic that is at work within the Limpopo River basin, with a critical mass of second-order scarcity in two of the riparian states remaining a stumbling block to the generation of uncontested basin-wide data. The likelihood of desecuritization occurring under these conditions is therefore unlikely in the short-term. This has implications for the classification by Wolf *et al* (2003:47) that the Limpopo River basin is "at risk" because these impediments will have to be overcome before a reclassification can occur. This has

wider ramifications than just the water sector however, as this perception of risk feeds into the financial markets and undermines investor confidence in the SADC region as a whole, making it an issue that is relevant to the New Partnership for Africa's Development (NEPAD).

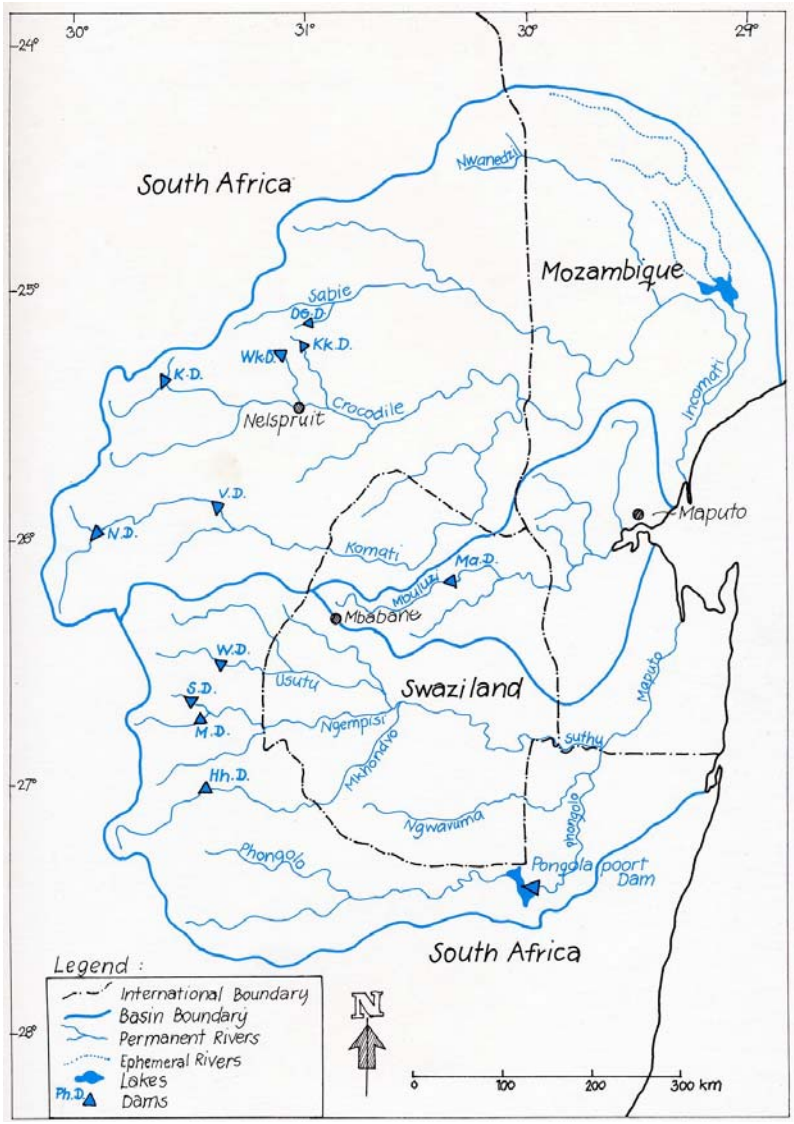
4.7 The Incomati and Maputo River Basin

The Incomati and Maputo River basins are managed as one entity, because the riparian states in both international river basins are the same (see Map 13). This fact is reflected in the signing of the *Incomaputo Agreement* during the WSSD, which served to formalize this natural arrangement (Treaty, 2002b). The Incomati is highly developed, but the Maputo (known at the Phongolo in South Africa) is the least developed of all international river basins to which South Africa is a riparian state, making it a logical target for future resource capture (see Map 8) (Basson, 1999:9). The Incomati and Maputo River basins are strategically important as a foundation for economic activities in the east of the country (see Figure 17). The Incomati and Maputo River basin is the smallest of all the international river basins in South Africa (see Table 15). The Maputo in particular has been identified as a source for future water transfers to adjacent basins in water deficit (see Map 8). The Incomati River is a recipient basin for no IBTs; a source basin for 1 IBT; with no intra-basin transfers; while the Maputo River is a recipient basin for no IBTs; a source basin for 2 IBTs; with no intra-basin transfers of any magnitude (see Table 16). After the Limpopo River, the Incomati is the second most important resource for Mozambique (Vas & Pereira, 1998:114). The Incomati basin in Mozambique lies in an area that is classified as being semi-arid, and the streamflow arising from endogenous water is equivalent to about 5% of the MAR, (Vas, 1999:62-64). This means that Mozambique is highly dependent on exogenous water that crosses the border from South Africa. Both the Incomati and Maputo basins are of great importance to Swaziland. The Incomati River basin is considered to be "at risk" (Wolf *et al.*, 2003:47).

4.7.1 Physical Description of the Incomati and Maputo River Basin

The Incomati River has a total basin area of 50,000 km^2 with an annual MAR of 3,600 x $10^6 m^3$ (Basson, 1999). There are 3 riparians, with 62% of the basin area lying in South Africa (upstream riparian), 5% lying in Swaziland, and 33% in Mozambique (downstream riparian) (see Table 15 & Map 13).

Map 13. The Incomati, Maputo and Umbeluzi River Basin.



Source: Pallett *et al.*, 1997:91.

Contribution to MAR by each riparian has been disputed, with 64%-81% coming from South Africa, 13%-20% coming from Swaziland, and 6%-16% coming from Mozambique, depending on whose data is being used (Basson, 1999; Savenije & van der Zaag, 1998:30) (see Table 15). This is partly because Mozambique did not get fully involved in the Joint Incomati Basin Study (JIBS) due to institutional problems and political tensions at the time (Vas & Pereira, 1998:119; Vas, 1999:64). Annex I of the *Incomaputo Agreement* has stipulated the various hydrological parameters in great detail, so the disputed nature of the data presented in Table 15 is likely to decline in

hydropolitical relevance. It is simply too early to predict with any degree of certainty however, given the history of basin-wide regime dysfunction in this international river basin. The recent instruction from the TPTC for an Integrated Scoping Study of the Maputo River basin suggests that there is a serious attempt to remove the obstacle caused by incomplete or disputed hydrological data (TPTC, 2003).

The Incomati basin is of great strategic importance to South Africa, because it supports a large amount of economic activity in that country. One of the key elements of this basin is the fact that an IBT is used to sustain the generation of electricity in the adjacent Olifants catchment (a tributary of the Limpopo River) on which a significant portion of the South African economy is dependent (Ohlsson 1995b:51). There are consequently a number of dams in this basin, with 10 in excess of 12 x 10^6m^3. The combined storage capacity of twenty-two dams in the basin is 400 x 10^6m^3, with 2 new dams under development, or having just been completed (Maguga and Driekoppies). The Sterkspruit Dam in South Africa has a storage capacity of 167 x 10^6m^3. The streamflow in this basin is highly variable, ranging in recorded time from 4,926 x $10^6m^3yr^{-1}$ during the 1954/55 hydrological year, to 28 x $10^6m^3yr^{-1}$ during the 1982/83 hydrological year (Conley, 1995:22; Heyns, 1995:6). One of the tributaries is the Sabie River, which sustains the Kruger National Park and is probably the most biologically diverse river in South Africa (Davies *et al.*, 1993:179). In Swaziland water is diverted into the Umbeluzi River in order to irrigate sugar cane (Heyns, 1995:7). An unusual aspect of this basin is that South Africa is both an upstream and downstream riparian relative to Swaziland, so dams built in that country increase the yield for subsequent release downstream, and are therefore to South Africa's advantage.

The Maputo River has a total basin area of 35,000 km^2 with an annual MAR of 3,900 x 10^6m^3 (see Table 15) (Basson, 1999). There are 3 riparians, with 56% of the basin area lying in South Africa (upstream riparian), 34% lying in Swaziland, and 10% in Mozambique (downstream riparian) (see Table 15). Contribution to MAR by each riparian is not disputed, with 56% coming from South Africa, 38% coming from Swaziland, and 6% coming from Mozambique (see Table 15). There are 6 dams with a storage capacity in excess of 12 x 10^6m^3, with the largest being Pongolapoort Dam in South Africa that inundates part of Swaziland. Ironically, the water that this dam stores has never been used for the purpose for which it was originally intended, but it serves to stake a claim over the resource for future development as a manifestation of the realist-styled hydropolitics during the *Total National Strategy* era in South Africa. Plans are

currently under consideration in South Africa to divert this water to other inland basins in water deficit, but no final decision has yet been taken. There is a significant IBT from the Usuthu catchment for industrial use and the cooling of the Electricity Supply Commission (ESCOM) power stations in the Limpopo and Orange River basins (Heyns, 1995:8). Given the overall importance of stable energy generation to the effective functioning and long-term growth of the national economy in South Africa, the Maputo River is considered to be a strategic resource by South African planners. The Maputo River can therefore be regarded as having been captured by South Africa for transfer elsewhere as the strategic need dictates (see Maps 8 & 9 and Table 16).

4.7.2 Historical Progression of Regime Creation in the Incomati and Maputo River Basin

Regime creation within these two basins is somewhat similar to that of the Limpopo, because of the historic legacy of Portuguese colonial rule (see Figures 20 & 22). There is evidence of close bilateral cooperation between South Africa and Swaziland, similar to that in existence between South Africa and Botswana in the Limpopo case. Regime creation in both the Incomati and Maputo River basins dates back to the *South Africa / Portugal Treaty* (Treaty, 1926). During 1948 SARCCUS was established, with relevance to the Incomati and Maputo riparian states. A *Second Water Use Agreement* was signed in 1964 by South Africa and Portugal, which spoke of rivers of mutual interest including the Cuvelai, Okavango, Limpopo, Maputo and Incomati, but which focused in detail on the Cunene (Treaty, 1964; Heyns, 1995:5; Heyns, 1996:263). Swaziland acceded to this agreement in 1967. During 1983 the TPTC became the first basin-wide regime in Southern Africa (see the Limpopo case study) applying to the Incomati and Maputo River, but this did not function because of institutional incapacity and political tension in Mozambique (Ohlsson, 1995b:60; Vas & Pereira, 1998:119; Vas, 1999:65). Significantly, this regime was negotiated during a time of heightened security risk for the South African government, when the *Total National Strategy* approach was at its zenith. This fact needs to be taken cognizance of in any analysis of the effectiveness of the TPTC. Vas (1999:65) notes that “the TPTC ... did not meet regularly ... due to the degradation of the political situation in Mozambique”.

During 1989 an attempt was made to revive the TPTC when negotiations were again resumed between all 3 riparian states. Driving this revival process was South Africa’s intention of building the Driekoppies Dam, and Swaziland’s intention of commencing

work on the construction of Maguga Dam (Vas, 1999:65). On 15 February 1991 the TPTC arrived at what became known as the *Piggs Peak Agreement*, which accepted the following (Treaty, 1991; Vas & Pereira, 1998:119; Vas, 1999:65):

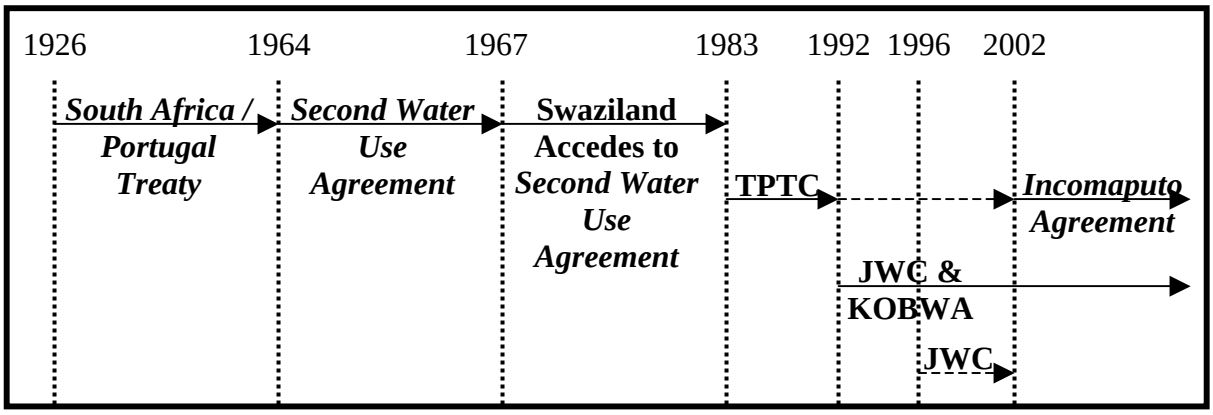
- Mozambique agreed to the construction of the Driekoppies and Maguga Dams.
- A study, known as the Joint Incomati Basin Study (JIBS), would be launched by all 3 riparian states to serve as a basis for future negotiations on water sharing.
- South Africa would refrain from constructing any major storage works upstream of Mozambique's Corumana Dam without prior consultation with the TPTC.
- As an interim water sharing measure South Africa would guarantee a minimum flow of $2m^3s^{-1}$ at the Ressano Garcia border.

The JIBS, which was conducted by a South African consultant initially in conjunction with a Mozambican counterpart, considered many alternatives, all of which "indicated that the water available to Mozambique would be insufficient to fully develop its potential in the basin if all considered developments in [South Africa] and Swaziland would take place" (Vas, 1999:64). This alarmed the Mozambican representatives to the TPTC. Mozambique consequently withheld its approval of the JIBS report, which seriously affected the collection of data from Mozambique (Poulsen, 2001:6.6). In the midst of this period of vacillation, South Africa announced its intention to construct the Injaka Dam, which the Mozambican officials interpreted as being a violation of the *Piggs Peak Agreement* (Vas, 1999:66). This saw the demise of the TPTC as a functioning entity, although it continued to exist as an intergovernmental structure.

The collapse of the TPTC into dysfunction saw a bilateral regime being negotiated between South Africa and Swaziland, which resulted in the Joint Water Commission (JWC) and the Komati Basin Water Authority (KOBWA) being formed through the *Joint Water Commission Agreement between South Africa and Swaziland* and the *KOBWA Agreement* respectively (Treaty, 1992d; Treaty, 1992e). A similar *Joint Water Commission Agreement between South Africa and Mozambique* failed (Treaty, 1996). Mozambique and Swaziland also entered into a bilateral arrangement on the Umbeluzi River (that lies between the Incomati and Maputo basins but in which South Africa has no direct interest - see Map 13), which was a mere one and a half pages in length with significant technically relevant omissions (Treaty, 1996; Treaty, 1999c;Vas, 1999:65). Both of these bilateral agreements became dysfunctional.

An overview of regime creation is presented in Figure 22. For the purposes of a detailed analysis, the two basins will be treated as one, and has been divided into 2 distinct components - the upper and lower basin - with international relations in the hydropolitical realm having been characterized by the creation of 1 functioning bilateral regime, and the initial failure and subsequent attempts to revive a basin-wide regime involving all 3 riparian states.

Figure 22. Historic Overview of Regime Creation in the Incomati and Maputo River Basin.



The ending of the Cold War and the collapse of the South African Apartheid State closed an important period of overlay, which allowed for a gradual normalization of relations between all riparian states. The *Incomaputo Agreement* that was signed during 2002 thus became an important milestone in the development of a potentially functioning basin-wide regime, but the effectiveness of this cannot be determined at this early stage. Of major importance however, the *Incomaputo Agreement* achieved 3 key breakthroughs:

(a) *Revival of the TPTC:* It served to revive the relevance of the TPTC, which had collapsed into dysfunction but had not ceased to exist as an intergovernmental structure, by passing a *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* (Treaty, 2002a). This created some confidence between all negotiators, thereby paving the way for an ending of the *impasse* over the *Piggs Peak Agreement*.

(b) *Hydrological data and regime creation:* It allowed agreement to be reached on the previously disputed hydrological data (see Table 15). As such is has removed a significant stumbling block that will probably allow for more confidence to be built between negotiators from all of the riparian states.

(c) *Agreed water sharing formula:* Annex I of the *Incomaputo Agreement* provides an agreed basis for the determination of water sharing between all of the riparian states. Of great significance in terms of confidence building for all delegations, Paragraph 4 of Article 9 of the *Incomaputo Agreement* recognizes the strategic importance of water from the Incomati and Maputo River basins for all riparian states (Treaty, 2002b:11). Arguably the most important breakthrough in terms of confidence building for the Mozambican delegation is the explicit recognition that the future augmentation of the water supply to the city of Maputo (which currently sources its water from the Umbeluzi River) must be secured, and has been reserved (see Map 13).

The *Incomaputo Agreement* suggests that the TPTC is likely to become more relevant again, with a good prognosis for its normalization as a water regime, serving the strategic needs of all riparian states. This also suggests that the basin may be in a transition phase out of the "at risk" category in which Wolf *et al* (2003:47) have placed it.

4.7.2.1 The Upper Basin: South Africa and Swaziland

The 1980s was a period of heightened political tensions in the Southern African region, with a dramatic resurgence in the activities of the various liberation movements. The South African approach to this set of problems was the dual policy of the "carrot" incentive and "stick" disincentive that was implicit in the *Total National Strategy*. Therefore, in response to the growing need to develop the water resources, and in recognition of the failure of the TPTC, two bilateral water-related agreements were reached between South Africa and Swaziland in 1992. A treaty was signed between South Africa and Swaziland establishing the Joint Water Commission (JWC) on 13 March 1992 acting as an advisory body for matters of common interest (Treaty, 1992d; Chenje & Johnson, 1996:165; Pallett *et al.*, 1997:70). KOBWA was established at the same time, but as a separate institution, and is responsible for the implementation of the Komati River Basin Development Project (Treaty, 1992e; Chenje & Johnson, 1996:165; Pallett *et al.*, 1997:70). A subsequent agreement between South Africa and the now defunct Bantustan Government of Kangwane forms a component of the *KOBWA Agreement*, and focuses on water resource development in the South African portion of the Incomati River basin that was formally part of the so-called "independent homelands" during the apartheid era (Treaty, 1992f). In keeping with the *Total National Strategy* approach of the South African government, these regimes were underscored by another infrastructural agreement involving the construction of a railway line in Swaziland

(Treaty, 1983b). These were designed to offer sufficient incentive to the Swaziland government not to allow their territory to be used by guerilla forces of the various liberation movements at the time.

The *KOBWA Agreement* is functioning well and is responsible for the construction of the Maguga Dam in Swaziland, which is part of a more complex water management scheme involving the recently constructed Driekoppies Dam. The renewed cooperation between all riparian states has opened up the thorny issue of water allocation between the various countries, but given the detailed attention to this complex problem in the *Incomaputo Agreement* - officially designated as an "interim agreement" - indications are that this matter will be resolved to the reasonable satisfaction of all riparian states.

4.7.2.2 The Lower Basin: South Africa and Mozambique

As previously noted, the 1980s was a period of heightened political tension in the Southern African region, particularly between South Africa and Mozambique, largely because of the support by the government of the latter for armed guerillas of the various liberation movements intent on toppling the Apartheid State. It is in this light that the bilateral relations between the two governments should be evaluated. The formation of the TPTC as a basin-wide regime in February 1983 was intended to be a foundation for inter-state cooperation, and in keeping with the *Total National Strategy* approach then in vogue, this was supported in rapid succession by two other significant agreements. During March 1984, the *Nkomati Peace Accords* - a non-aggression pact between South Africa and Mozambique - was followed by an agreement on the revival of the Cahora Bassa project, which had fallen into disuse as a result of ongoing sabotage to the power lines (Treaty, 1983c; Treaty, 1984a; Treaty, 1984b). This represented the incentive side of the two-pronged *Total National Strategy* approach, designed to induce the Mozambican government into a less threatening posture towards the embattled Apartheid State.

The *Piggs Peak Agreement* that established a flow rate of $2m^3s^{-1}$ at the border between South Africa and Mozambique was simply insufficient for Mozambique's needs. Mozambican delegates interpreted the subsequent announcement by South African delegates that they were proceeding with the construction of the Injaka Dam, despite their previous agreement to the contrary, as being in violation of the spirit of the *Piggs Peak Agreement* (Vas & Pereira, 1998:120; Vas, 1999:66). In addition to this, the Mozambican

delegates became alarmed when the initial JIBS study indicated that the water available to Mozambique would be insufficient to develop its potential in the basin if all considered developments in South Africa and Swaziland would take place (Vas & Pereira, 1998:120; Vas, 1999:64). In the face of these issues, the TPTC collapsed as a functioning entity, and remained in name only.

As a result of the collapse of the TPTC, and given Mozambique's critical need to secure the strategic supply of water to the capital city Maputo, a bilateral agreement creating the Joint Permanent Technical Water Commission (JPTWC) between Mozambique and Swaziland was finalized in 1999, but it failed (Chenje & Johnson, 1996: 164; Ohlsson, 1995:60; Pallett *et al.,* 1997:70; Treaty, 1999c). Vas (1999:65) attributes this collapse to the inexperienced DNA staff at that time, with many of the institutional resources having been drained by the ongoing civil war. To compound this situation, salinization of the Incomati estuary in Mozambique became a serious problem during periods of low flow, impacting negatively on ecological and socioeconomic aspects (Breen, 2000; Fakudze *et al.,* 2000; Peter *et al.,* 2000).

The renewed interest by Mozambican officials in reviving the TPTC should be interpreted in light of the fact that water resource scarcity in that country has now become an acute problem. If economic growth is not ensured, then post-war reconstruction could well be jeopardized, which in turn could trigger insecurity again for neighbouring Swaziland and upstream South Africa in the form of illegal immigrants and cross-border criminal activity such as drug trafficking and arms smuggling.

4.7.3 The Incomati and Maputo River Basin within a Broader Regional Setting

The Incomati River basin is relatively small when compared to either the Orange or Limpopo, but is extremely complex given the high reliance on this resource by all riparian states. The Maputo River basin, while less developed than the other international river basins under South African sovereign control, is strategically important as a source of future augmentation to inland rivers facing basin closure. It is therefore necessary to understand the Incomati and Maputo River basins as being part of a regional water resource that is increasingly becoming the subject of dispute, with resource capture being highly relevant as one of the fundamental hydropolitical drivers. There are already IBT links with both the Limpopo and Orange River basins (see table 16), with every indication that the magnitude of these transfers will grow in the future. The main

relevance of the Incomati and Maputo River basins therefore becomes evident in light of their respective role as donor basins (see Table 16 and Maps 8 & 9), and the basic clash of interests as national developmental priorities remain uncoordinated.

4.7.4 Critical Hydropolitical Issues Within the Incomati and Maputo River Basin

From the perspective of regime creation, there are 5 critical issues to note within the Incomati and Maputo River basin.

(a) *TPTC and existing bilateral regimes:* The relationship of the historically older but largely dysfunctional basin-wide regime (TPTC) with the more recent but highly functional bilateral JWC is not clear. Ideally, the bilateral regime should be incorporated into the multilateral regime if the latter is to be given a realistic chance of becoming effective, but the history of failures is likely to undermine this eventuality in the short-term. This means that the JWC will continue to exist, and probably even be broadened and deepened over time, simply because of the lower level of hydropolitical complexity being dealt with at the bilateral level, and the greater degree of harmonization of interests between the two riparian states. This has implications for Wolf *et al's.*, (2003:47) classification as being a basin "at risk" because one of the criteria in that classification is the absence of suitable basin-wide institutional structures.

(b) *Impact of basin closure:* Basin closure is an important issue, and in particular the increasing levels of insecurity that this condition unleashes for low-order riparian states such as Mozambique. Significantly, it is not so much the fact that the Incomati or Maputo basins are closed in their own right - the Maputo basin has a relatively large volume of unallocated water - but rather the fact that other basins inside South Africa are facing water deficit, with the Incomati and Maputo systems becoming the target of resource capture (see Maps 8 & 9). The cascading of insecurity that arises from water deficit, either downstream within a given river basin, or into adjacent international river basins that have been linked through IBTs, is thus a salient feature of the Incomati and Maputo River basin case study. This factor is therefore likely to become a fundamental driver of hydropolitical conflict in the future that will need to be dealt with if any regime is to be truly effective. This is an example of demand-induced scarcity in South Africa, impacting negatively on Mozambique in the form of structural scarcity.

(c) *Water and economic growth potential of the state:* The role of water as a basic necessity for any sustained economic growth and development is clearly highlighted in the Incomati and Maputo River basins. This raises the complex issue of SWE. Clearly there is insufficient water to meet the current needs of all 3 riparian states, particularly in the Incomati basin, based as they are on irrigated agriculture for job creation purposes. It is plainly evident that South Africa will need to downscale its aspirations by introducing inter-sectoral allocative efficiency policies if Mozambique is to have a realistic chance of meeting its own post-war reconstruction needs. This in turn raises the very complex issue of sovereignty, and in particular the right of government to choose its own developmental priorities without outside interference.

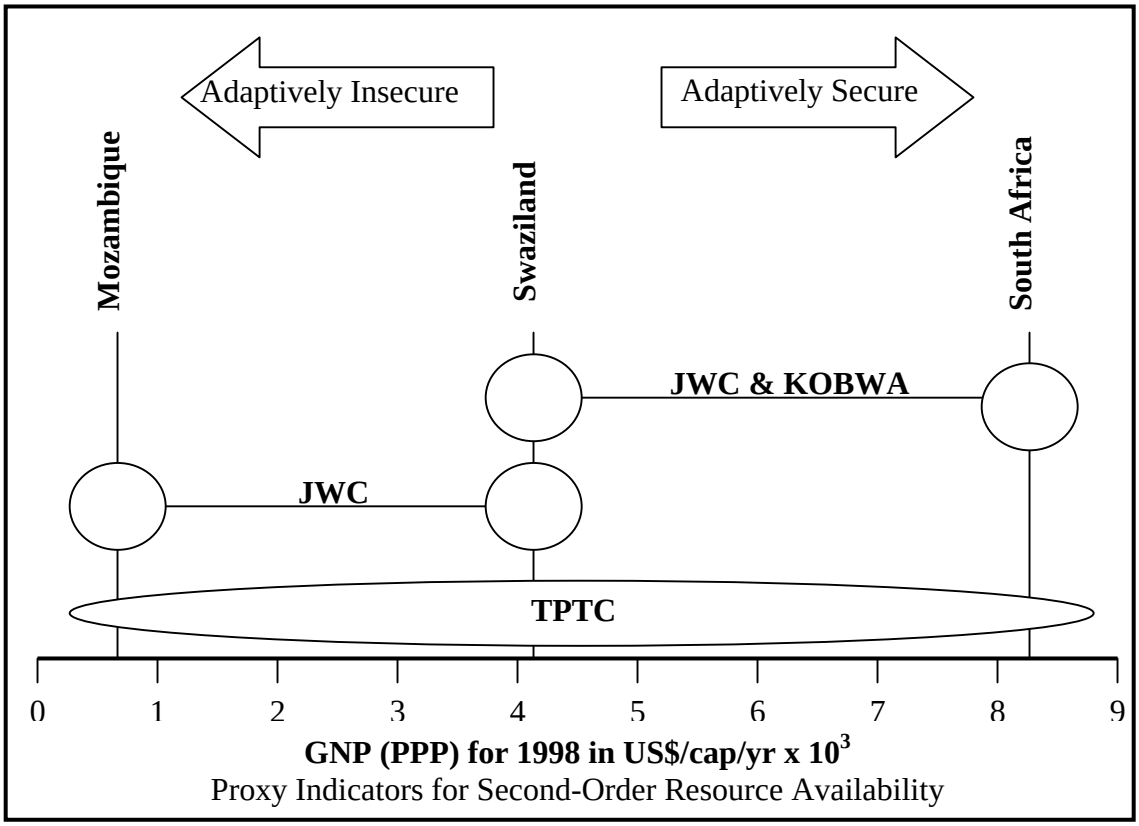
(d) *Equity as a fundamental driver of conflict:* The previous point raises the issue of equity within any given international river basin. It is plainly obvious that South Africa as the hegemonic riparian state has monopolized its access to the water. While this is a hydrological fact, it is not necessarily morally correct, but what role does morality play in international relations? The answer to this question is complex indeed, and will not even be attempted here because it is outside the scope of this research, save to say that the perpetuation of inequity will in all likelihood remain a fundamental driver of conflict potential, and as such needs to be addressed by any regime if that structure is to remain effective. This means that a major challenge facing any water regime in the Incomati and Maputo River basin is the harmonization of currently conflicting national interests and national development priorities.

(e) *Second-order resources as an independent variable:* The Incomati and Maputo basin case study illustrates the relevance of second-order resources in the maintenance of a water regime. Mozambique has been ravaged by a long war of liberation, followed by decades of civil war, and it can be considered a classic example of a riparian state that is confronted with both a first-order scarcity and a second-order scarcity simultaneously. This is a debilitating situation called water poverty (WP) (see Figure 13). It is this second-order scarcity that prevented Mozambique from fully participating in the JIBS project, and it is this same form of scarcity that has prevented them from effectively articulating their interests within the TPTC. It is also this form of scarcity that has resulted in the basin being classified as being “at risk” (Wolf *et al.*, 2003:47). This will have major consequences for the maintenance of the water regime over time.

4.7.5 The Adaptive Security Spectrum in the Incomati and Maputo River Basin

The relative distribution of second-order resources between the respective riparian states in the Incomati and Maputo River basin reflects somewhat of a mixed pattern. Mozambique, as the most second-order resource poor riparian state in the entire SADC region had a dysfunctional bilateral regime with Swaziland (JWC), itself at the threshold of adaptive insecurity (see Figures 14 & 23). Even more significantly, but unfortunately beyond the scope of the current analysis, Mozambique has also been involved in a failed arrangement with Zimbabwe on the Pungué River (Granit, 2000:9). Interpreted in light of the adaptive security spectrum, this is consistent with the broad thrust of the model.

Figure 23. The Adaptive Security Spectrum in the Incomati and Maputo River Basin.



Source: Drawn from World Bank 2000:42-43 data used in Turton & Warner 2002:65.

Membership of the multilateral TPTC covers the two extremes of the adaptive security spectrum. This suggests that while the apparent resuscitation of the TPTC as a result of the *Incomaputo Agreement* is encouraging, it does not necessarily mean that the regime will automatically become functional. On the contrary, the severe second-order scarcity

problem confronting Mozambique is likely to remain a significant impediment to the development of equitable water sharing arrangements for the foreseeable future, suggesting that the dynamics of securitization have not yet been fully attenuated. This supports the classification by Wolf *et al* (2003:47) that the Incomati River basin is "at risk".

4.7.6 Conclusion Regarding the Incomati and Maputo River Basin

The Incomati and Maputo River basin presents an interesting profile, making it an excellent case study in hydropolitical dynamics. The experience with the establishment of a basin-wide regime has been checkered, with initial failure of the TPTC. Recent developments, particularly regarding the *Incomaputo Agreement*, indicate the emergence of what is potentially a relatively sophisticated regime that embraces complexities not found in any other basin-wide regime in existence in Southern Africa at this time. This suggests that there is institutional learning taking place as the respective negotiators use expertise gained elsewhere. The Incomati and Maputo River basin thus illustrates 6 distinct hydropolitical tendencies.

(a) *Definition of national interest:* National interest is a key driver of regime creation. Significantly, those national interests are more broadly defined than merely cooperation over water resource management. The initial creation of the TPTC was closely linked with, and subsequently supported by, other security and economic cooperation agreements. When the TPTC failed, the JWC and KOBWA were negotiated on a bilateral basis and were also linked with, and supported by, other security and economic cooperation agreements.

(b) *Range of complexity:* Bilateral regimes are easier to manage and sustain than multilateral regimes, because they present a greater chance for the harmonization of national interests, and the smaller range of issues being dealt with increases the likelihood of reaching consensus.

(c) *Role of the hegemonic power:* While regime creation is driven by the national interest of the hegemonic riparian state within any given basin, the success of that regime is not guaranteed. The regime succeeds only when the non-hegemonic power perceives that its own national interest is being served by such an arrangement.

(d) *Hydrological data and regime creation:* The role of shared and uncontested hydrological data in forming a foundation of future consensus between riparian states should not be underestimated. As with the Orange River case, the existence of shared basin-wide data served to provide the political climate in which an agreement could ultimately be reached, even if the *Incomaputo Agreement* is only an interim arrangement as the formal name implies. Even though the JIBS was initially a contested process with Mozambique withdrawing its support, the data that was yielded ultimately became a key factor in breaking the *impasse* created by the failure of the *Piggs Peak Agreement*, and became a vital component of the *Incomaputo Agreement*. This brings the relevance of second-order resources into clear focus, with an excellent correlation between second-order scarcity and regime collapse. Mozambique has been unable to sustain any of the bilateral regimes it had entered into between both South Africa and Swaziland (a situation that is also found in the Pungué and Save River basins that it shares with Zimbabwe but that are not part of the current research focus). Conversely, the capacity of the hegemonic state to develop data that supports it own national interest, and thereby sustain its dominance within any set of negotiations, is nothing more than a manifestation of the power configuration within any given international river basin.

(e) *Basin closure as a driver of insecurity:* Basin closure can be closely linked with increasing levels of insecurity, particularly for low-order riparian states that are also confronted by a second-order scarcity situation. In this regard, the lack of capacity to generate data with which to counter the claims of the hegemonic state increases the perceptions of insecurity, and ultimately becomes one of the drivers of conflict potential within the basin. The natural outcome of this is a gradual process of securitization in a number of fields, including water resource management.

(f) *Second-order resources as an independent variable:* The spread of riparian states across the adaptive security spectrum suggests that the natural dynamics of securitization are likely to persist while one (or more) of the actors are confronted by a chronic second-order resource scarcity. This supports Wolf *et al's.*, (2003:47) classification of the Incomati River basin as being "at risk", and the mere existence of the *Incomaputo Agreement* on its own is unlikely to change the *status quo* until the impact of the debilitating scarcity of second-order resources has been overcome.

4.8 Conclusion

Arising from the South African case study 9 conclusions can be reached.

(a) *Hydropolitics as a sub-set of international relations:* There is a linkage between the creation of a water regime within any given international river basin and the broader political processes at work between the respective riparian states outside the realm of hydropolitics. It can thus be concluded that hydropolitics remains subordinate to those broader political dynamics. It therefore becomes a meaningless exercise to try and analyze hydropolitical processes on their own as if they were occurring in a vacuum. This is an oversimplification that results in false conclusions. This also means that the securitization of water resource management in international river basins occurs as the result of the broader political setting in which those river basins are embedded. In this regard, there is clear evidence of the securitization of water resource management in South Africa's international river basins, particularly those in which one or more of the riparian states were perceived to be a threat by virtue of their support for guerilla forces of the respective liberation movements during the anti-colonial and anti-apartheid struggle. In fact evidence from the South African case study suggests that the initial desire to create a water regime was closely correlated with threat perceptions inside the hegemonic state, which in this case, chose to adopt a *Total National Strategy* as a policy choice. All water regimes, whether bilateral or multilateral, were initially created during a period of heightened political stress, and the increasing international isolation of South Africa. While it cannot be determined from the available data if this is merely a coincidence, when viewed within the broader picture of the international relations of that time, the balance of probability suggests that the creation of water regimes was driven more by security considerations than by a more narrowly defined water deficit situation.

(b) *Basin closure as a driver of insecurity:* Basin closure can result in feelings of insecurity, particularly for a low-order riparian state that is being confronted with a second-order scarcity simultaneously. Given the linkage between hydropolitics and the broader set of political dynamics in which it is enmeshed, this sense of hydropolitical insecurity therefore feeds into the overall threat perception of the state. Seen in this light, basin closure can become a factor that contributes to the securitization of water resource management, but is not the sole driver of that process.

(c) *Securitization dynamics:* Where the securitization of water resource management starts to occur, a zero-sum outcome is likely. For example, Mozambique and Zimbabwe are arguably worse off from a hydropolitical perspective now than they could have been, had they chosen to cooperate with the regional hegemon in the creation of a basin-wide water regime two decades ago. Given the nature of the complex linkage between hydropolitics and the broader range of political processes, this zero-sum outcome is not only the result of hydropolitical dynamics, but also the result of factors such as internal political upheaval and civil war. Conversely, Botswana and Swaziland are arguably better off from a hydropolitical perspective than they could have been, had they chosen not to cooperate with the regional hegemon in the creation of the respective water regimes in which they are involved. In fact it can be argued that Botswana in particular, has succeeded in expanding its range of future strategic options as a direct result of participation in regime creation. Significantly too, Botswana is adaptively secure, thereby able to create strategic opportunities to its own advantage.

(d) *Desecuritization dynamics:* The role of data as a fundamental driver of the desecuritization of water resource management is clearly evident. The correlation of functioning regimes with the existence of uncontested data is high, and the role of joint efforts such as the ORRS, JULBS and JIBS in creating a climate conducive to consensus building cannot be overemphasized. It can be argued that where uncontested basin-wide data exists, a plus-sum outcome is more likely to occur.

(e) *Hydrological data and regime creation:* Given the important role that uncontested hydrological data plays as a builder of consensus between different riparian states, the correlation between the existence of contested data and regime failure is more than mere coincidence. It takes a considerable range of second-order resources to generate uncontested data in the first place, and the existence of a second-order scarcity is nothing more than one manifestation of the broader configuration of political power. Where regime failure has occurred, one of the riparian states involved was always being confronted by institutional failures outside of the water sector. Mozambique, and increasingly contemporary Zimbabwe, provide examples of institutional failure in one form or another. This is manifest as the inability to generate hydrological data, which is translated to a weaker negotiating position and consequently to the probability of regime failure and a minus-sum outcome.

(f) *Second-order resources as an independent variable:* The adaptive security spectrum offers a potentially useful analytical tool in the field of hydropolitics. In this regard historic evidence supports the fact that adaptively secure riparian states have systematically been able to create strategic opportunities for themselves - this is after all what being a hegemon is all about - thereby increasing their range of long-term options. Historic evidence also shows that adaptively insecure riparian states are unable to dictate the terms of negotiation, and can only defect from any arrangement when the situation becomes politically intolerable. Adaptively insecure riparian states are merely reactive to events such as basin closure, while adaptively secure riparian states are proactive to the point of using basin closure to their long-term strategic advantage.

(g) *Comparative hydropolitics:* When compared with the Jordan River case study, there are both similarities and differences.

> (i) Similarities relate to the linkage with hydropolitics and the broader political environment in which the respective role-players are embroiled. This means that the securitization of water resource management has occurred as a result of other issues of a high politics nature, and not only because of a first-order resource scarcity.
>
> (ii) Differences relate to the level of securitization. In the South African case, even at the height of perceived threats to national security, water resource management was less securitized than the Jordan River case. While the SSC was an important institution that defined the overall parameters in which the various regimes were created, it did not issue direct decrees such as those in existence in the Jordan basin. Similarly, hydrological data, while being regarded as being extremely sensitive, was not classified as secret in the South African case.

(h) *Pattern of regime creation:* The sequencing of regime creation has had an impact on regime viability in the South African case study.

> (i) Where multilateral basin-wide regimes have been created before successful bilateral experiences in any given international river basin, they have simply failed. This is manifest in the Limpopo basin, where the LBPTC has never managed to live up to expectations, and in the Incomati and Maputo River basin where the TPTC has had a patchy history of failure. A factor contributing to this

failure could be the element of broader securitization that was evident in both these cases, which could have made the non-hegemonic riparian states reluctant to cooperate, and prone to defection.

(ii) Where bilateral regimes have been successful in any given international river basin, the prognosis for the creation of a subsequent multilateral basin-wide regime seems to be better. This is manifest in the Orange River basin where ORASECOM was formed after the successful creation of two other bilateral regimes (LHWC and PWC); and in the Incomati and Maputo River basin, where the revival of the TPTC follows after the successful launching of the JWC and KOBWA. This suggests that the role of institutional learning is an important factor in regime maintenance over time.

(i) *Basins "at risk" classification:* The results from this more detailed analysis of the various South African international river basins than that conducted by Wolf *et al* (2003) has shown that:

(i) The Orange River *cannot* be considered to be a basin "at risk" because it has the most comprehensive set of regimes in the study area, and arguably in the entire SADC region (although this is strictly beyond the scope of the current study). There is also a solid history of regime creation and evolution with no evidence of regime failure of the type or magnitude evident elsewhere in the study area. The adaptive security spectrum in this basin also suggests that the second-order resource capacity is there with which to deepen and broaden the regimes that already exist.

(ii) The Limpopo River *can* be considered to be "at risk" because it has a long history of regime failure, and of all the international river basins that are the subject of this study, displays the least movement towards a more optimistic prognosis. The adaptive security spectrum in this basin also suggests that the second-order resource capacity is lacking, so existing regimes are unlikely to be deepened or widened until this condition has been effectively resolved.

(iii) The Incomati River *can* be considered to be a basin "at risk", but the recent developments regarding the *Incomaputo Agreement* are an encouraging *caveat*. This suggests that the basin may be going through a transition of sorts, but the

adaptive security spectrum in the basin indicates that the second-order resource scarcities that exist are likely to remain serious threats to this transition. This opens the door to third party involvement, which in this case may be appropriate.

Chapter 5

THE ANALYSIS OF KEY HYDROPOLITICAL PROCESSES IN THE SOUTH AFRICAN CASE STUDY

5.1 Introduction

This study has shown that increasing levels of insecurity often arise from basin closure. This was subsequently shown to be the situation in the South African case study, particularly in the Incomati River basin and to a lesser extent the Limpopo River basin. This study has also shown that these increasing levels of insecurity could result in the securitization of water resource management, which the South African case study supported, but qualified by showing that hydropolitics is subordinate to the broader set of political interactions in which the respective basin states are enmeshed. It was also shown that alternatives do exist to the securitization of water resource management, and the South African case study showed that there are indeed elements of desecuritization taking place, particularly after the ending of the Cold War and the collapse of the apartheid system in South Africa. Significantly, this is taking place in the Incomati River basin, which has a high level of insecurity. Furthermore, it was shown that second-order resources are an important element of regime creation, with failed regimes being correlated with the existence of endemic second-order scarcity in one of the riparian states involved. What now remains is to analyze and assess the South African case study in light of 3 important sets of parameters: securitization processes; regime creation processes; and institutional development processes. This chapter consequently focuses on the hydropolitical processes that have been evident in South Africa's international river basins with a view to analyzing the political aspects of institutional development in the water sector.

5.2 An Analysis of the Key Hydropolitical Processes in the Orange River Basin

The Orange River basin has 2 functioning bilateral regimes - the *Treaty on the Lesotho Highlands Water Project* and the *Agreement on the Establishment of a Permanent Water Commission* - with a recently created multilateral basin-wide regime in the form of the *ORASECOM Agreement*. South African relations with Lesotho have been troubled at times, particularly when guerilla forces from the various liberation movements started operating from that country, ostensibly with the support of the Lesotho government.

South African relations with Botswana have generally been good, although there were fears at one time that guerilla forces were operating out of that country. South African relations with Namibia have always been good, given the fact that the latter was being administered by South Africa under a League of Nations mandate. These aspects have been relevant to the processes of securitization and regime creation within the Orange River basin.

5.2.1 Securitization Processes

In order to assess the securitization processes in the Orange River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

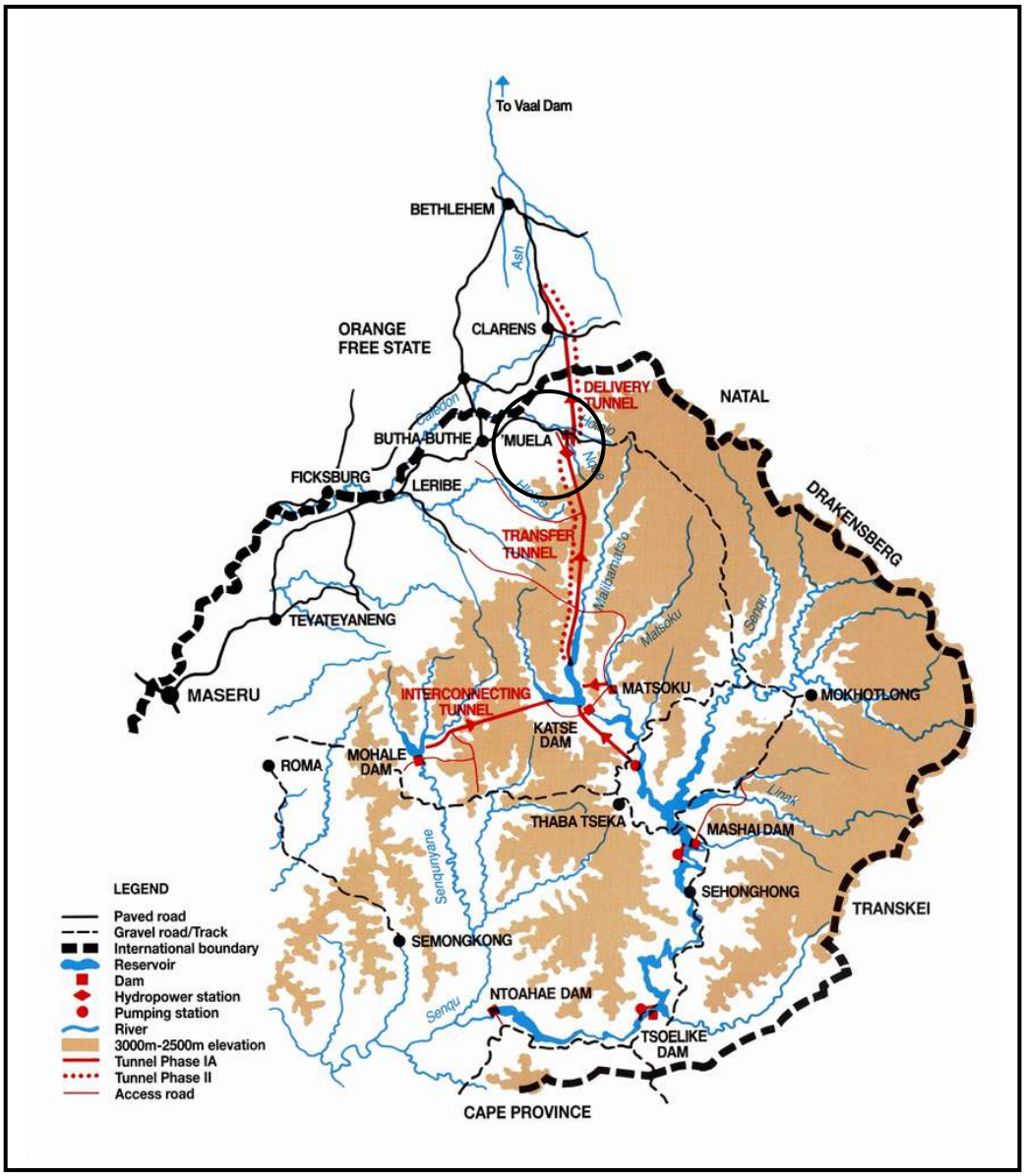
(a) Is there evidence of the securitization of water resource management in the Orange River basin?

The most strategically important portion of the Orange River basin from a South African perspective is the upper basin reach that is shared with Lesotho. It is therefore highly significant that the most complex regime in the entire country (and indeed within the whole Southern African region) is located there. During the initial founding of the Apartheid State, the NP that came to power was primarily focused on economic growth and development. This was the result of the debilitating effects of the Anglo-Boer War that left many people landless, followed by the Great Depression that merely exacerbated this situation. After the 1948 election victory, it was felt by many NP elites that political power was sterile if it was not supported by economic power - a sentiment that was to be reiterated by African Nationalists half a century later. Yet in semi-arid South Africa, economic development of any great magnitude would need a secure supply of water if it was to have any realistic chance of succeeding. This gave rise to the South African hydraulic mission with early reconnaissance studies on the feasibility of importing water from outside the country, such as that performed by Ninham Shand (1956), with the later work by others merely building on this central theme (Carter, 1965; Heyns, 2003:24; Midgley, 1987; Young, 1961). There was no significant securitization of water resource management at this early stage.

It was only when Chief Leabua Jonathan, who became the Prime Minister of Lesotho in 1966, started to publicly support the liberation movements in their quest to topple the

Apartheid State that early elements of securitization started to occur. A series of politically relevant events happened in quick succession, laying the foundation for securitization. During 1970 the Jonathan government was toppled in a *coup d'état*, followed shortly afterwards by the formation of the SSC in South Africa during 1972 and the publishing of the first *White Paper on Defence* that started to develop the *Total National Strategy* as an official policy a year later.

Map 14. The Lesotho Highlands Water Project.



Source: LHDA 1995:4.

It was the SSC that became the custodian of the *Total National Strategy* approach as it became increasingly responsible for all domestic and foreign policy-making. It was the coincidence of these various events, each having little direct relevance to water resource management *per se*, that started the process of securitization, not only of the water sector, but of all aspects of South African life that were deemed to be strategically relevant to the survival of the Apartheid State in general, and to the welfare of the Afrikaner as an ethnic nation in particular. It is against this background of high politics that the formation of the ostensibly narrowly focused JTC in 1978 must be evaluated.

It was therefore inevitable that the subsequent LHWP had a strong security element in it. Evidence of this can be seen in the final design of the project (see Map 11), with the Muela Power Station, that supplies all of its electricity to Lesotho, being strategically located downstream of the control valves of the delivery tunnels to South Africa, which means that if a belligerent government in Lesotho decided to "close the taps" as a hostile act, they would lose their entire supply of electricity in the process. This is a hydropolitical equivalent of the concept of mutually assured destruction (MAD) found in deterrence theory.

In the lower basin area, there is no evidence of the securitization of water resource management. This is because Namibia has never posed a threat to South Africa, and was administered as a *de facto* province during the period of time that the SSC was in charge of South African policy-making. Given the fact that the PWC was formed after the collapse of the Apartheid State, the prime cause of securitization had been removed from the hydropolitical equation.

> (i) If so, who are the main securitizing actors and what are their long-term objectives?

The main securitizing actor was the SSC, which had, as its long-term objective, the survival of the Apartheid State, which implied the survival of the Afrikaner ethnic nation and the growth of the economy needed to sustain that survival. DWAF was not the main securitizing actor, but the parameters in which it was expected to meet its mandate had been determined by the SSC and filtered through the government, reducing DWAF to pawns on the larger strategic chessboard confronting the Apartheid State.

(ii) If so, what is the referent object that is being existentially threatened; by whom is it being threatened; and what is the nature of that threat?

The referent object that was being threatened, at least in terms of the prevailing threat perception that was inherent to the *Total National Strategy* frame of mind, was state sovereignty (specifically the right of the minority government to make and implement domestic policies without outside interference), national identity (specifically of the Afrikaner as an ethnic group under the collective label of the "*volk*") and the economic stability of the Apartheid State. There is no evidence to suggest that the environment was ever a referent object in its own right.

(iii) Who are the functional actors, support actors and veto actors; what are their long-term objectives; and what is the nature of the relationship between them?

The only functional actor that can de identified, at least during the *Total National Strategy* period, was the SADF and the DMI, which were in essence the "hawkish" elements of the Apartheid State that enjoyed privileged access to the Office of the President (PW Botha) and were thus able to influence policy-making by entrenching a specific threat perception. There are no support actors or veto actors that are readily discernable from the available data.

(b) Is there evidence that water scarcity can have an impact on the economic growth potential and social stability in any of the riparian states found in the Orange River basin?

There is evidence to show that water scarcity does have a significant impact on the economic growth potential and social stability of all of the Orange Basin riparians. While Lesotho is exporting water to South Africa, representing one of its major sources of foreign revenue, it remains a highly water scarce state. Falkenmark (1989b:113) lists Lesotho as being water stressed with a high level of technological input needed to maintain basic food self-sufficiency, let alone macroeconomic growth. The mountainous nature of Lesotho also means that water availability in the highlands is far removed from the existing human population, who mostly live in the lowlands. Lesotho displays signs of structural scarcity, which has a severe impact on economic development at the household level.

The majority of the South African economy is supported by the Orange River as a resource (see Figure 17). Prof. Kader Asmal, in his capacity as Minister of Water Affairs and Forestry, announced in 1995, that South Africa would deplete available water resources within the next fifteen years. Asmal specifically mentioned Gauteng Province, which at that time generated 40% of the GDP that supported 27% of the jobs within the country. In this speech, Asmal noted specifically that "the limiting constraint on the region's continued economic growth is water" (Financial Mail, 1995:20-23), an observation that is supported by a retired Director of Strategic Planning in DWAF (Conley, 1995:3; Conley, 1996a:19; Conley, 1996b). Botswana does not use water from the Orange River basin, but it is a water scarce state, similar to Namibia, both of which have no perennial rivers flowing on their soil, with all readily exploitable rivers forming borders with neighbouring states. Botswana therefore views the Orange River basin as an unexploited strategic reserve for the future, while the southern portion of the Namibian economy is totally reliant on the Fish River (a tributary of the Orange) (see Map 11). All of the Orange River basin riparian states thus face water scarcity constraints to their economic growth potential, and consequently their social stability.

This raises an extremely important strategic issue. Water scarcity is relative and a highly nuanced condition, and is not as absolute as the concept suggests at first glance. South Africa is only water scarce as a country if it continues to rely on agricultural self-sufficiency. Agriculture as an economic sector, has a low SWE - a fact that is well established (Allan, 2000:185-187; Conley, 1995:3; Conley, 1996a:19; Conley, 1996b). If a country that is being confronted by water deficit as a limitation to its economic growth potential allocates water to economic activities with a higher SWE, then the water budget can be balanced by importing cereals, and paying for those imports by the increased efficiency of the national economy. This is the virtual water thesis that is now entering the water resource management literature and becoming part of accepted practice (Allan, 2000; Conley, 1995:3; Conley, 1996a:19; Conley, 1996b). Being based on notions of comparative advantage, and in particular on the economic efficiency inherent in inter-sectoral allocation of water, this solution impacts directly on the economic growth potential of the state and as such is a driver of potential securitization unless water allocation between riparian states is fully institutionalized.

Central to the virtual water thesis is the level of development of the second-order resource-base of the economy, because this increased economic activity is what opens a wider range of strategic options and generates the foreign currency that enables the

importation of cereals in the first place. Given the fact that 3 of the Orange River basin riparian states are adaptively secure (see Figures 14 & 19), the transition from national self-sufficiency to food security can in most probability be managed successfully. Under these conditions, water scarcity becomes a relative constraint to the economic growth potential of the state, and consequently not a finite barrier.

(i) If so, what is the nature of that impact and how is this threat perception being articulated?

The nature of the impact is directly related to a limitation of the economic growth potential of the state in all cases. This is an over-simplification of reality however, because land security, and access to unfettered economic activities arising from this, for the previously advantaged White minority communities of both South Africa and Namibia, is becoming an important issue with strategic significance for national security. The current land reform process in Zimbabwe is adding strong securitization elements to this dynamic process in South Africa and Namibia.

Historically the South African government has articulated the threat perception in 2 distinct ways over time. During the *Total National Strategy* era of White minority rule, the threat perception was clearly focused on economic stability insofar as it was a necessary condition for the survival of the South African state and the somewhat unique national identity that the Apartheid State provided to the political elite within the minority Afrikaner ethnic group.

With the collapse of the Apartheid State, the threat perception changed somewhat, but still retained the central element of economic stability. Stated simplistically, if the democratic experiment is to succeed in post-apartheid South Africa, then the skewed nature of economic development that water had brought to the White ethnic minority, has to be redistributed to the now enfranchised but largely landless and economically marginalized Black majority. For example, Principle B.2 of the *Discussion Document on Water Law Principles* (DWAF, 1996:4) states that there will be no ownership of water, while Principle B.3 states that the ownership of land no longer confers preferential rights to water that is riparian to that land. Principle 4 of the *White Paper on Water Policy* (DWAF, 1997) revokes the riparian right principle that land ownership automatically conferred preferential rights to land owners. This is also clearly spelled out in the Preamble to the *National Water Act*, which recognizes that “while water is a natural

resource that belongs to all people, the discriminatory laws and practices of the past have prevented equal access to water, and use of water resources". This sentiment is further supported in Chapter 1, Paragraph 2(c), which states that the purpose of the *National Water Act* must take account, amongst other factors, of the need to redress the results of past racial and gender discriminations. It can therefore be argued that the demise of the Apartheid State did not immediately end the process of securitization with elements of this still in existence, albeit under a changed guise.

The earlier sentiment expressed by Afrikaner Nationalists that to achieve economic power was as important as political power, is again being articulated by African Nationalists. Water resource management in South Africa is therefore still linked to issues of a high politics nature, which is likely to remain a driver of securitization for some time to come, despite the overall desire to normalize relations with neighbouring states. The highly emotive issue of land reform is extremely sensitive. Land is given its economic value only by means of the availability of water, so the fact that Chapter 1, Paragraph 4(4) of the *National Water Act* removes the automatic right that land owners used to have to groundwater under their property, or surface water flowing in rivers or streams over their property, has changed the balance of hydropolitical privilege in a fundamental way that impacts on individual perceptions of personal security. The resurgence of Rightwing extremism, supported by rhetoric linking their struggle to the land (in a manner similar to the ideological component of Zionism that was reviewed in the Jordan River basin case study), is still a potential driver of securitization within the Orange River basin.

The use of inter-sectoral allocative efficiency as a tool for managing water scarcity, implies increased industrialization and mechanization in a drive for improved efficiency - an outcome that is not necessarily conducive to rapid job creation. There are thus 2 contradictory forces at work within the post-apartheid securitization dynamic that were not in existence during the rise to prominence of Afrikaner Nationalism. The fact that South Africa is at the upper end of the adaptive security spectrum (see Figures 14 & 19) suggests that in terms of the balance of probability, the desecuritization dynamic will prevail, even though elements of securitization will persist.

(c) Is there any evidence of the desecuritization of water resource management in the Orange River basin?

After the collapse of the Apartheid State, which saw the demise of the SSC as the major securitizing actor, South African water policy seemed set for a rapid desecuritization. Principle C.5 of the *Discussion Document on Water Law Principles* says that allocations agreed for downstream countries in international river basins should be respected. This is codified in Chapter 1, Paragraph 2(i) of the *National Water Act* as official South African policy in international river basins. The existence of uncontested basin-wide hydrological data that was the product of the ORRS and related studies, combined with what appear to be relatively sophisticated bilateral regimes, is also a significant driver of desecuritization. The fact that the balance of hydropolitical interaction between the respective actors occurs within the upper range of the adaptive security spectrum (see Figure 19) also suggests that the desecuritization dynamic will be dominant.

(i) If so, who are the functional actors, and what are their long-term objectives?

There are no functional actors in the narrow sense of the concept applicable to the desecuritization of water resource management in South Africa. It can be argued that DWAF, as a government department, is reflecting the national political sentiment by seeking to normalize relations with neighbouring states, and as such is functioning in the role of a desecuritizing actor. Therein lies the contradiction however. While desecuritizing water resource management at the official level, DWAF is also supporting the official South African government policy of redistributing hydropolitical privilege in South African society while reallocating water to stimulate economic growth. In so doing DWAF is unintentionally securitizing water resource management by placing the issue in such a high order of importance that it is undebatable, and therefore removed from the normal political domain. It is in a sense jumping the queue on normal political processes by being made non-debatable, which is a classic securitization move. As such, DWAF has as a long-term objective, the redistribution of rights and privileges associated with access to water, such as the right to share in the economic growth of the country. The struggle to achieve this noble goal is far from over.

(ii) Is there any evidence that regimes are acting as potential desecuritizing agents?

The 3 regimes in existence are acting as potential desecuritizing agents because they all limit the range of arbitrary action by any one of the role-players. By so doing, they introduce rules in the formal sense of the concept, prescribing specific types of action that

are permissible. They also provide a source of certainty in an otherwise unpredictable world by generating uncontested hydrological data. The institutionalization of knowledge is also likely to result in a changed perception of the core problem being managed, given the high level of adaptive security within the Orange River basin (see Figure 19).

(d) Is there any evidence that a hydropolitical security complex is emerging, or is likely to emerge, within the Orange River basin in the near future?

There is no evidence that a hydropolitical security complex is emerging because hydropolitical dynamics do not yet constitute both a necessary and sufficient condition for securitization in the water sector. However, given the fact that the Orange River basin links 3 of the 4 most economically developed states in the Southern African region (South Africa, Botswana and Namibia), combined with the fact that it is linked with other international river basins through IBTs, suggests that what can be called an immature hydropolitical complex is emerging as a distinct component of the regional security complex initially identified by Buzan (1991:210). In this regard, the mooted hydropolitical complex is sufficiently structured as to reflect distinct patterns of amity and enmity between the respective riparian states as to offer a meaningful explanation of international relations in a regional context, but this is not necessarily based on security considerations alone. It is therefore not a hydropolitical security complex, but it is a hydropolitical complex, which in turn is a component of a regional security complex.

(i) If so, what are the main drivers of this process?

The main drivers of this process are the co-riparian status of 3 of the 4 most economically developed states in the SADC region, all of which are facing water scarcity limitations to their future economic growth potential in the Orange River basin. This is supported by the fact that IBTs are an essential component of water resource management in those 3 countries, thereby creating a physical linkage between international river basins by cascading perceptions of insecurity into other donor basins. The land reform / water resource nexus is also a potential crosscutting linkage that can become a driver in future.

(ii) If so, can the emergent hydropolitical security complex be regarded as being a component of a broader regional security complex?

The emergent hydropolitical complex can be regarded as being a component of the broader regional security complex because it provides a coherent way of analyzing patterns of amity and enmity that mediate between the unit and the international subsystem level of analysis (see Figure 5).

5.2.2 Regime Creation Processes

In order to assess the regime creation processes in the Orange River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) How do actors define the situation?

During the apartheid and Cold War era of international hydropolitics, the main actor in regime creation was also the securitizing actor in the form of the SSC. This actor defined the prevailing situation in terms of a *total onslaught* against the norms, values and principles of the minority-defined state, which served to provide a substantial policy framework in which securitization was an inevitability. The other actor in the creation of the JPTC (the Lesotho government) defined the situation in terms of development advantages to Lesotho, a particular angle that suited the *Total National Strategy* approach of the South Africans at the time. The same applied to the JTC, which was established between South Africa and the Transitional Government of South West Africa. In this case both actors were from the same government, with one masquerading as an independent actor working on behalf of the former South West Africa. In this case the actor's definition of the situation was also framed in terms of the *Total National Strategy* paradigm, with the potential benefits of cooperation being presented in terms of mutual economic development. This situation largely prevailed with the creation of the JWC, although by this stage Namibia had gained its independence. Consequently the Namibian actors had more of an independent definition of the situation, but were essentially in a weaker position because of their lower-order riparian status, so they focused on gaining a degree of assurance from South Africa about water volumes and associated rules.

This situation had changed dramatically by the time that the *ORASECOM Agreement* was negotiated. By the time the final agreement was reached, South Africa had overturned apartheid and had already secured its main strategic interest upstream with Lesotho, so

they were able to adopt a wider definition of the problems. This meant that consensus was achieved between all actors on legal concepts inherent in the *Helsinki Rules*, the *United Nations Convention on the Non-Navigational Uses of International Watercourses* and the *SADC Protocol on Shared Watercourse Systems.* The fact that the *ORASECOM Agreement* does not limit any existing bilateral regimes means that South Africa still retains hegemonic status, thereby offering sufficient inducement not to defect from the arrangement.

(b) What changes do the role-players make in their definitions of the situation and their preference structure?

During the apartheid and Cold War era of hydropolitics, there was such a heavy emphasis placed on national security that this influenced the preference structure. In this regard, water resource management was subordinated to national security, and all decision-making with respect to regime creation reflected this bias. Given the gross differences in power and capabilities between the different actors, the hegemon's preference structure remained dominant.

With the dawn of the post-apartheid period, the preference structure changed to reflect the increased role of regional structures and instruments such as the SADC Tribunal and the *SADC Protocol on Shared Watercourse Systems*. This situation was possibly promoted by the intention of the South African negotiators to distance themselves from any possible apartheid stigmatization, resulting in a temporary political climate that was conducive to non-hegemonic state attempts at maximizing their respective position. This was also supported by the South African desire to re-integrate the country into the regional political structures that had so vehemently opposed it before. This after all, was proof that South Africa, having rid itself of the blight of apartheid, could again resume its place in the body of sovereign states at the international systems level.

(c) What vision do governments and all of the other relevant actors have?

During the apartheid and Cold War era of international hydropolitics in the Orange River basin, the South African government had an official view centered on CONSAS, embracing a common economic, political and security approach by all participating states, which happened to coincide with vision of the hegemonic state in the basin (Geldenhuys, 1984:41). Insofar as this suited the development aspirations of the Lesotho

government at the time, negotiators played along in the creation of the JPTC, but it is clear that they did not share this grand vision with much conviction. In the post-apartheid era, this vision has changed somewhat, with more of an economic focus to it.

5.2.3 Institutional Development Processes

In order to assess the institutional development processes in the Orange River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) Is there hydrological data that has been institutionalized?

The *Agreement on the Establishment of a Permanent Water Commission* makes no mention of the institutionalization of any hydrological data. The *Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Schemes* does contain some hydrological data, and in particular provides for the diversion of 20 x $10^6 m^3 yr^{-1}$, which is subject to rules that have been agreed between the parties. The *Treaty on the Lesotho Highlands Water Project* and subsequent *Protocol VI of the Lesotho Highlands Water Project Treaty* contain a complex array of hydrological data that pertains to the yield, supply and management of the LHWP. Article 5 of the *ORASECOM Agreement* makes specific mention of the need to coordinate all hydrological investigations by standardizing the method of collecting, processing and distributing data. With the strong focus on methodology, this is likely to result in the generation of knowledge and institutional learning. Given the fact that all bilateral regimes are supposed to become harmonized with ORASECOM, the data that has been institutionalized in the respective bilateral regimes will remain relevant and become increasingly institutionalized.

(b) Is this data uncontested and therefore seen as a legitimate basis for future agreements between the respective riparian states?

There is no significant contestation of hydrological data in the LHWC, PWC or ORASECOM. This is a specific characteristic of the Orange River basin when compared with other international river basins under review.

(c) Are there agreed-upon rules and procedures?

Both the LHWC and the PWC, as major bilateral regimes in the overall management of the Orange River basin, are based on sophisticated rules and procedures. Given the structure of ORASECOM, these will automatically become part of that institutional arrangement.

(i) If so, have they been formalized, or do they exist only as a loose arrangement?

These rules and procedures have been formalized in *Protocol VI of the Lesotho Highlands Water Project Treaty*, the *Agreement on the Establishment of a Permanent Water Commission* and in the *ORASECOM Agreement*, but they are also supported by normative developments in the SADC region including the evolution of the SADC Tribunal and the *SADC Protocol on Shared Watercourse Systems*.

(d) Is there a dedicated conflict resolution mechanism as part of the overall institutional arrangement?

Article 16 of the *Treaty on the Lesotho Highlands Water Project* defines the conflict resolution mechanism that has been incorporated into the LHWC. Neither the JTC nor the PWC have dedicated conflict resolution mechanisms, but the VNJIS does have a conflict resolution mechanism in the form of an Arbitral Tribunal. The *ORASECOM Agreement* has a more sophisticated conflict resolution mechanism, with formal recourse to the SADC Tribunal, thereby harmonizing ORASECOM with the regional structures in a way that was hitherto absent in the 2 earlier bilateral regimes.

(i) If so, has it been used and what has been the outcome?

These dispute resolution mechanisms have not been used to date.

(e) Has there been a re-definition of the core management problem away from perceiving water scarcity in an absolute sense, to perceiving water scarcity in a relative sense?

There is no evidence that a re-definition of the core management problem has taken place. All available evidence shows that the respective riparian states are functioning primarily in terms of a supply-sided management approach. There is some evidence that the Lesotho delegation is actively opposing WDM policies being introduced as these would reduce their revenue and weaken their overall position.

(i) To what extent has WDM become one of the institutional objectives?

There is no mention made of WDM in any substantial sense of the concept. It seems unlikely that any of the regimes within the Orange River basin will adopt a demand-sided management approach in the near future, although the existence of a relatively high degree of adaptive security in the basin (see Figure 19) suggests that there is considerable room for the introduction of WDM as an element of a future coping strategy. Namibia would have to take the lead in this regard as they would benefit the most. Lesotho on the other hand, would probably oppose such an approach, as it would limit their future revenue on the sale of water to South Africa.

(ii) Is there any evidence of inter-sectoral allocative efficiency being a policy objective?

There is no evidence of inter-sectoral allocative efficiency being a policy objective in either of the regimes under review. The introduction of such a policy instrument would provide empirical evidence of a transition from a supply-sided management approach to a demand-sided management approach. Given the relatively high degree of adaptive security in the basin (see Figure 19), the likelihood of adopting such a policy option is good.

(f) Is there a mechanism to sanction non-compliant actors?

There is no mechanism to sanction non-compliant actors in either of the regimes under review.

(i) If so, has it been used and what has been the outcome?

This question is not relevant to the Orange River basin.

(g) Has there been any redistribution of water resources between the various riparian states directly as the result of the regime, and if so what has been the outcome?

There has been no redistribution of water resources between any of the riparian states as a direct result of the regime.

(h) Is there any evidence of regime resilience?

There is evidence of resilience in the LHWC in the form of consensus on the core problem being managed. This is also manifest to a lesser extent in the PWC, so by default it is evident in ORASECOM.

(i) Is there any evidence of regime robustness?

There is no empirical evidence of robustness in any of the regimes under review because there has never been any substantial challenge.

(j) Is there any evidence of regime effectiveness?

There is some empirical evidence of effectiveness in all of the regimes under review because no riparian state has materially breached any of the norms or rules. Furthermore, the ORRS was a successful exercise, resulting in a number of data collection initiatives within the basin. These have all combined to create an uncontested dataset for the entire basin, which is not found in any of the other basins under review. Furthermore, given the engineering complexity of the overall problem being managed in the case of the LHWP, the LHWC is highly effective, but in a narrow sense of that concept. This is also the case with the PWC and the VNJIS, but in this regard regime effectiveness would conceivably include a redistributive component to it (at least when viewed from a Namibian perspective), which has not been the case thus far.

(k) Is there any evidence of the growth and development of institutional knowledge or institutional learning as the result of the regime?

There is some evidence that the experience gained bilaterally between South Africa and Lesotho in the LHWC; and between South Africa and Namibia in the PWC, has started to contribute to the growth of institutional knowledge. A specific component of this process was the ORRS, which created a basin-wide set of relatively undisputed hydrological data. Article 5 of the *ORASECOM Agreement* contains a number of measures that are conducive to the process of institutional learning and the development of knowledge in a narrow definition of that concept.

(i) If so, to what extent has this become a confidence-building and unifying factor?

It seems as if the ORRS project played a significant role in building confidence between all relevant actors in the basin under review.

(l) Can the existing water management arrangements within the Orange River basin be called a regime?

It seems as if the 3 existing water management arrangements within the Orange River basin can be called a regime because they all contain specific principles and norms that have created a convergence in the expectation of the relevant actors, even if each actor has been motivated by a different set of priorities and interests, in a specific area of international relations. Furthermore, the growth in complexity of both the LHWC and the PWC over time, along with the subsequent formation of ORASECOM, all indicate the same tendency towards a general harmonization of principles, norms, rules and procedures to the mutual benefit of all actors. These arrangements cannot be called an institution in the narrow sense of that concept, because while they contain both formal and informal rules, there is an absence of any enforcement arrangement for non-compliance.

5.2.4 Conclusion Regarding the Orange River Basin

The Orange River basin contains good examples of regime creation with respect to the management of water resources in an international river basin that is closed. While the initial stimulus for regime creation was driven primarily by security concerns inside South Africa, subsequent changes to the overall political configuration of the basin suggest that they can play an important role in the desecuritization of water resource management, primarily by restricting the range of independent action, and by decreasing the level of uncertainty thorough the knowledge, norms and rules that they codify. The Orange River basin also shows the critical role that uncontested data plays in desecuritization, with some evidence of the emergence of knowledge in the narrow sense of that concept. The desecuritization dynamic is complex however, and despite the overt intentions of the democratically elected South African government to normalize relations with other riparian states, this may not automatically result in desecuritization. This implies that desecuritization is not an automatic outcome, and will have to be actively

worked on if a genuine plus-sum outcome is to be achieved in the basin. The balance of probability suggests that the desecuritization dynamic will prevail however. The role of uncontested data in building confidence, and specifically in redefining the core problem being managed by creating durable knowledge, is likely to become a good indicator of regime resilience in the future.

5.3 An Analysis of the Key Hydropolitical Processes in the Limpopo River Basin

The Limpopo River basin has one functioning bilateral regime - the *Agreement on the Establishment of the Joint Permanent Technical Commission*, which is also supported by the separate but related *Agreement on the Establishment of the Joint Permanent Commission for Cooperation* - with a failed multilateral basin-wide regime (*Agreement on the Establishment of the Limpopo Basin Permanent Technical Committee*). South African relations with Botswana were generally good, although guerilla forces were sometimes being infiltrated into South Africa from Zimbabwe through Botswana, making this a theatre for SADF Special Forces retaliation on occasion. South African relations with both Zimbabwe and Mozambique have mostly been troubled, particularly when open support was given to guerilla forces from the various liberation movements, which started operating from there into South Africa. These aspects have been relevant to the processes of securitization and regime creation within the Limpopo River basin.

5.3.1 Securitization Processes

In order to assess the securitization processes in the Limpopo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) Is there evidence of the securitization of water resource management in the Limpopo River basin?

The most strategically important portion of the Limpopo River basin from a South African perspective is the upper basin reach that is shared with Botswana. It is therefore significant that the most complex level of regime creation is found in this area of the basin. As with the Orange River case economic growth and development were South African priorities before Botswana gained its independence in 1966. The birth of the early South African hydraulic mission saw reconnaissance studies on the feasibility of

importing water from the Okavango and Zimbabwe River basins, all of which would have of necessity involved Botswana (Basson, 1995:46; Borchert & Kemp, 1985; Borchert, 1987; Heyns, 1995:15; Heyns, 2002:164; Heyns, 2003:34; Midgley, 1987; Scudder *et al.*, 1993:268; Trolldalen, 1992:138; van der Riet, 1980; Williams, 1986). This consequently became an important factor in the subsequent securitization within the Limpopo River basin, given this strategic access as part of the overall South African survival strategy at the time, although this was never a driver in its own right.

The main impetus for securitization arose from the worsening security situation that started to occur after the hasty Portuguese withdrawal from Mozambique in the mid 1970s. This opened up what was in effect a war zone in the Limpopo River basin, with the Rhodesian Bush War taking on a new ferocity as guerilla forces opened a second front along the Mozambican border. South Africa quickly became embroiled in this, with military support being given to Rhodesia, and with SADF Special Forces operations being launched into Mozambique itself. After Zimbabwean independence, the South African SSC was deeply alarmed at the deteriorating security situation in the whole basin, with the likelihood of guerilla infiltration from Zimbabwe through Botswana, and from Mozambique through Swaziland, becoming a growing reality. The hastily convened TPTC that excluded Zimbabwe but sought to address the Limpopo issue as one of "common interest"; the infrastructural agreement with Swaziland; the *Nkomati Peace Accords*; and the revival of the Cahora Bassa Project must all be evaluated against this background of high politics. It therefore comes as no surprise that there is a lot of evidence of the securitization of water resource management, particularly in the middle and lower basin involving both Zimbabwe and Mozambique. It was highly improbable for any other outcome to arise given the gravity of the overall situation, and the chosen response to CONSAS by those 2 countries.

The importance of the Zimbabwean and Mozambican support to the liberation struggle has left a lasting legacy within the Limpopo River basin. Vas (1999:66) refers to Mozambican support during these troubled years and raises the notion of the expectation of political payback by the now democratic South Africa. Given the fact that the Limpopo River basin is closed, combined with the high priority that the post-apartheid government has placed on economic empowerment for the historically disadvantaged Black majority, many of whom live in the Limpopo basin, means that payback is likely to fall short of expectation, thereby contributing to a possible perpetuation of the securitization process within the basin. This assessment is supported by the wide spread of the respective

riparian states across the adaptive security spectrum (see Figure 21), and the resultant propensity towards polarization that arises from this condition.

(i) If so, who are the main securitizing actors and what are their long-term objectives?

As with the Orange River case the main securitizing actor was the SSC, which had as its long-term objective, the survival of the Apartheid State, which implied the survival of the Afrikaner nation as an ethnically distinct entity under the banner of the "*volk*", and the economy needed to support that survival. Given the absence of a viable desecuritizing actor in the post-apartheid era, the incompatible national development priorities of the lower basin riparian states are likely to continue driving the securitization process.

(ii) If so, what is the referent object that is being existentially threatened; by whom is it being threatened; and what is the nature of that threat?

As with the Orange River case the referent object was state sovereignty, national identity and the economic stability of the Apartheid State. The prevailing threat perception at that time played a major role in determining the referent object. The environment never became a referent object in its own right. In the post-apartheid era, incompatible national development priorities continue to make the referent object state sovereignty and economic stability.

(iii) Who are the functional actors, support actors and veto actors; what are their long-term objectives; and what is the nature of the relationship between them?

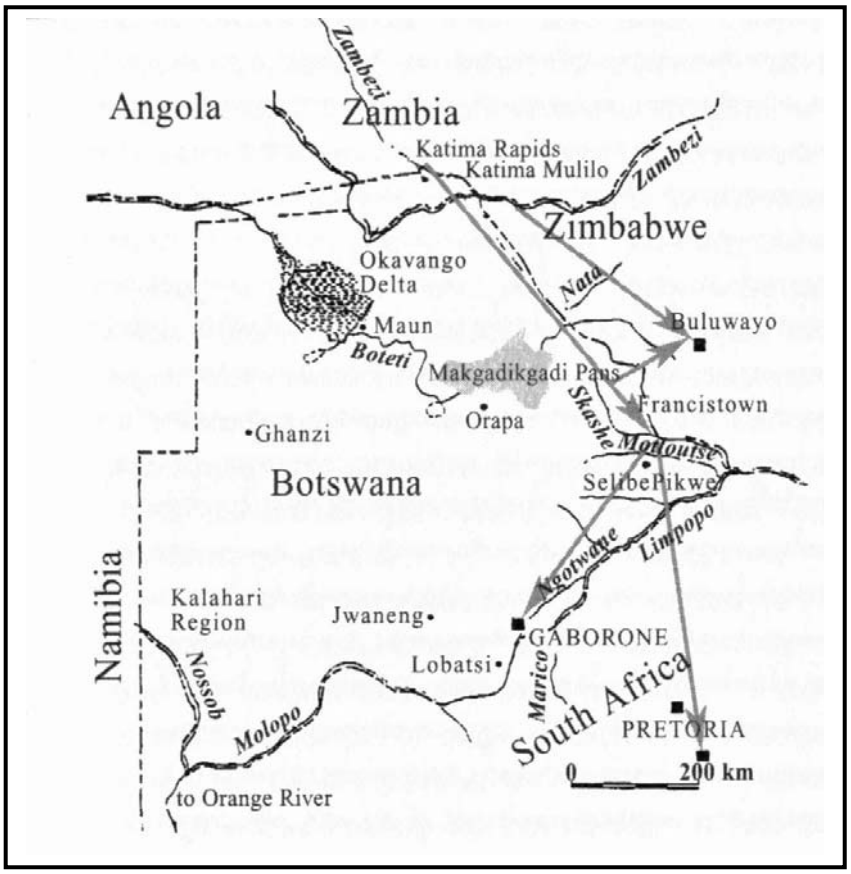
As with the Orange River case the only functional actor was the South African military establishment during the period of heightened securitization.

(b) Is there evidence that water scarcity can have an impact on the economic growth potential and social stability in any of the riparian states found in the Limpopo River basin?

There is evidence to show that water scarcity does have a significant impact on the economic growth potential of all 4 Limpopo River basin riparians. Botswana is currently sourcing its strategic supply for the NSC from the Limpopo basin, with plans to extend

this to the Zambezi River in order to either service Botswana alone, or to service both Zimbabwe and Botswana as a joint venture, with South Africa as a potential beneficiary (Heyns, 2002:167) (see Map 15).

Map 15. The Botswana National Water Plan.



Source: Heyns 2002:167.

While current water needs for the industrializing hub around Gaborone have been catered for, future economic growth will be impacted unless a secure strategic supply can be guaranteed, probably from outside the Limpopo basin. The unknown impact of global climate change is likely to exacerbate the problem by increasing the range of variability in existing precipitation patterns. The Zimbabwean economy is already in a state of decline, and the increasing pariah status of that country will impact negatively on the mobilization of funds for future infrastructural developments. The area lying within the Limpopo basin in Zimbabwe is semi-arid and approaching the limit of its sustainable utilization. The Mozambican economy is in a phase of rapid growth as post-war reconstruction occurs, with both water scarcity and occasional flooding in the Limpopo basin being a definite limitation to sustainable growth. Existing patterns of flooding and

drought are likely to increase in severity as a result of global climate change, with strategic importance to the sustainability of the current economic growth trend. A number of former Bantustans are located in the South African portion of the basin, raising the need for rapid economic development. In short, for all riparian states water scarcity poses a definite limitation to economic growth and development, a fact that is exacerbated by the existence of significant levels of adaptive insecurity within the basin (see Figure 21).

(i) If so, what is the nature of that impact and how is this threat perception being articulated?

The land reform issue is probably more pressing in the Limpopo basin than in the Orange River case. This arises from the Zimbabwean crisis in which land reform is a central feature. The fact that in the former Bantustan areas of South Africa, there is a high population density with low economic growth, coexisting alongside large commercial farms that are mostly White owned and managed, makes this an explosive issue. The implementation of the CMAs that the *National Water Act* calls for, combined with the political complexity of inter-sectoral allocative efficiency measures that will have to be introduced if water deficit is to be managed sustainably, makes this a potential hotbed of future securitization. One particular permutation of this threat perception that will be politically stressful is the land reform / water resource / race nexus. While the *National Water Act* is clearly an instrument of redistribution and equity, this can be interpreted as being unnecessarily discriminatory and an example of reverse racism, which would undermine the integrity of the process. The sensitivities arising from South Africa's experience with racism should not be underestimated as a continued driver of conflict in the basin.

(c) Is there any evidence of the desecuritization of water resource management in the Limpopo River basin?

As with the Orange River case, the demise of the SSC as a major securitizing actor set the scene for the potential desecuritization of water resource management. The existence of a high level of adaptive insecurity in the Limpopo River basin acts as a mitigating factor (see Figure 21).

(i) If so, who are the functional actors, and what are their long-term objectives?

As with the Orange River case there are no functional actors. As noted earlier, the application of current policy can become a securitizing factor in its own right, even though this is clearly unintended.

(ii) Is there any evidence that regimes are acting as potential desecuritizing agents?

There is no functioning basin-wide regime in the Limpopo River, even though the LBPTC exists as an entity. This means that their role as potential desecuritization agents cannot be brought to bear on the problem, specifically in the portion of the basin that is dominated by adaptive insecurity (see Figure 21). The well functioning JPTC and JPCC are both acting as a desecuritizing agent in the portion of the basin that is dominated by adaptive security (see Figure 21).

(d) Is there any evidence that a hydropolitical security complex is emerging, or is likely to emerge, within the Limpopo River basin in the near future?

As with the Orange River case there is no evidence of a hydropolitical security complex emerging, but there is strong evidence to suggest that within the Limpopo and Orange River basins combined, there is an immature hydropolitical complex. This is coalescing around the 4 most economically developed states (South Africa, Botswana, Namibia and Zimbabwe) and the 2 international river basins to which they are all riparian (Orange and Limpopo).

(i) If so, what are the main drivers of this process?

The main drivers relate to the co-riparian status of 3 of the 4 most economically developed states in the SADC region (South Africa, Botswana and Zimbabwe), all of which are facing water scarcity limitations to their future economic growth potential. Additional support for this relates to crosscutting linkages such as IBTs, which cascade perceptions of insecurity elsewhere, and the land reform / water resource / race nexus that is highly relevant in the Limpopo River basin.

(ii) If so, can the emergent hydropolitical security complex be regarded as being a component of a broader regional security complex?

This emergent hydropolitical complex can be regarded as being a component of the broader regional security complex for the same reasons previously given in respect of the Orange River basin.

5.3.2 Regime Creation Processes

In order to assess the regime creation processes in the Limpopo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) How do actors define the situation?

As previously discussed in the Orange River case, during the apartheid and Cold War era of international hydropolitics, the main actor in regime creation was also the securitizing actor in the form of the SSC. This actor defined the prevailing situation in terms of a *total onslaught* against the norms, values and principles of the minority-defined state, which served to provide a substantial policy framework in which securitization was an inevitability. The other actor in the creation of the JPTC (the Botswana government) defined the situation in terms of development advantages to Botswana, a particular angle that suited the *Total National Strategy* approach of the South Africans at the time. While the acute need for security considerations had declined by the time that the JPCC was formed, it was still a consideration, but this time being one of a range of issues of mutual concern to both Botswana and South Africa. The existence of a high level of adaptive security in the portion of the basin that is shared by these 2 riparian states means that a greater harmonization of national development priorities is possible.

The strong securitization approach by the South African government did not resonate with either Zimbabwe or Mozambique at the time. Zimbabwe defined its fundamental position as a vanguard in the anti-colonial liberation struggle, and somewhat of a leader in the Southern African region. For this reason Zimbabwe chose to throw in its support for the creation of SADCC in direct opposition to South African plans to launch CONSAS. While aspiring to less of a regional leadership role, Mozambique remained deeply committed to the liberation struggle. Given these irreconcilable positions in the areas of high politics, there was little to be negotiated in the water sector.

While the overall circumstances had changed dramatically at the end of the millennium, these attitudes proved to be somewhat enduring, with evidence of deep rifts still in existence during talks to revive the LBPTC, a fact that the persistence of adaptive insecurity in this particular portion of the basin has done little to alter in the post-apartheid era. Minutes from a meeting held in 1999 show that Zimbabwe had failed to send delegates to various meetings, while Mozambique was perceived to be particularly pedantic by South African negotiators (LBPTC, 1999). This is understandable as the Mozambican experience with South Africa, poignantly defined in the *Piggs Peak Agreement* debacle, was consistently negative, thereby causing the delegation to be reluctant to engage in a process that had a patently asymmetrical configuration.

(b) What changes do the role-players make in their definitions of the situation and their preference structure?

As noted in the Orange River case the main emphasis was on national security concerns, which influenced the preference structure accordingly. In the South African case, water resource management was subordinated to national security, while in Zimbabwe the persistent belligerent stance prevented any institutional development in the water sector. To a certain extent this was mirrored by the Mozambique experience, but in this case they had less capacity than Zimbabwe and were victimized more as a result. In the Limpopo River basin case there is strong evidence to show that the hegemon's preference structure does not always end in the realization of that preference structure. This has hardened attitudes and has mitigated against a major change in their preference structure, even after the Apartheid State collapsed and South Africa became part of SADC.

(c) What vision do governments and all of the other relevant actors have?

The strongly articulated South African CONSAS vision of a joint economic and security community was vehemently opposed by Zimbabwe (Geldenhuys, 1984:41). This became a fundamental driver of hydropolitical and other processes in the Limpopo River basin, and indeed within the Southern African region as a whole. While the Botswana government allowed itself to be drawn into the *Agreement on the Establishment of the Joint Permanent Technical Committee* with South Africa, ostensibly because it would benefit materially as a result, the latter abandoned the grand CONSAS vision and resorted instead to the "carrot" and "stick" approach inherent in the *Total National Strategy*. The post-apartheid vision has shifted to more of an economic integration of the whole SADC

region, but the persistence of high levels of adaptive insecurity in the basin (see Figure 21) increases the complexity of making this a reality.

5.3.3 Institutional Development Processes

In order to assess the institutional development processes in the Limpopo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) Is there hydrological data that has been institutionalized?

Neither the *Agreement on the Establishment of the Limpopo Basin Permanent Technical Committee*, nor the *Agreement on the Establishment of the Joint Permanent Technical Commission* makes specific mention of the institutionalization of hydrological data. The JULBS has yielded a substantial amount of data however, which has been shared between South Africa and Botswana. This indicates that within the JPTC, there is a natural process involving the institutionalization of data under way, a fact that is supported by the high level of adaptive security in the upper basin reach of the river (see Figure 21).

(b) Is this data uncontested and therefore seen as a legitimate basis for future agreements between the respective riparian states?

The existence of contested data in the Limpopo River basin, specifically regarding Mozambique and Zimbabwe, is problematic (see Table 15). The JULBS has resulted in uncontested data between South Africa and Botswana, but little evidence exists that the nature of this contestation is likely to change with either Zimbabwe or Mozambique in the short-term, given the persistence of high levels of adaptive insecurity in the portion of the basin shared by these 2 riparian states (see Figure 21). Recent developments in the Incomati and Maputo River basin, particularly in the form of the *Incomaputo Agreement*, may serve to attenuate this problem for Mozambique, and become relevant to the Limpopo River basin as well.

(c) Are there agreed-upon rules and procedures?

Given the rudimentary nature of the LBPTC, combined with the fact that it has been dysfunctional for most of its existence, there are no agreed-upon rules and procedures.

The JPTC is a little more sophisticated in this regard, but certainly nowhere near the level of development found in the Orange River basin.

(i) If so, have they been formalized, or do they exist only as a loose arrangement?

Formalized rules are not a feature of the Limpopo River basin, except in the bilateral *Agreement on the Establishment of the Joint Permanent Technical Commission* between South Africa and Botswana, in which case a significant portion of those rules are part of a loose arrangement.

(d) Is there a dedicated conflict resolution mechanism as part of the overall institutional arrangement?

There is no dedicated conflict resolution mechanism in the LBPTC, with Article 7 of the *Agreement on the Establishment of the Limpopo Basin Permanent Technical Committee* stating that rules of procedures are still to be established, an outcome that failed to materialize given the inherent dysfunctionality of the regime.

(i) If so, has it been used and what has been the outcome?

Given the dysfunctional nature of the LBPTC, the non-existent conflict resolution mechanism has clearly failed. Within the JPTC, there has been no need to resort to any conflict resolution mechanism.

(e) Has there been a re-definition of the core management problem away from perceiving water scarcity in an absolute sense, to perceiving water scarcity in a relative sense?

Given the dysfunctional nature of the LBPTC, there has never been any redefinition of the core management problem. In fact the core problem is currently related to removing the causes of dysfunctionality within the regime, rather than redefining the problem being confronted by that regime. Within the JPTC, there has also not been any redefinition of the core problem with a strictly supply-sided management approach being the best way to describe the regime throughout its existence.

(i) To what extent has WDM become one of the institutional objectives?

WDM is not part of the institutional objectives in either the dysfunctional LBPTC or the functional JPTC.

(ii) Is there any evidence of inter-sectoral allocative efficiency being a policy objective?

There is no evidence of inter-sectoral allocative efficiency being a policy objective in either of the regimes under review.

(f) Is there a mechanism to sanction non-compliant actors?

There is no mechanism to sanction non-compliant actors in either of the regimes under review.

(i) If so, has it been used and what has been the outcome?

This question is not relevant to the Limpopo River basin.

(g) Has there been any redistribution of water resources between the various riparian states directly as the result of the regime, and if so what has been the outcome?

There has been no redistribution of water resources between any of the riparian states as a direct result of the regime.

(h) Is there any evidence of regime resilience?

There is evidence of resilience in the JPTC in the form of consensus on the need to generate uncontested data, with the JULBS being a manifestation of this. There is no evidence of resilience in the LBPTC, which collapsed into dysfunction almost immediately after its initial creation.

(i) Is there any evidence of regime robustness?

The dysfunctionality of the LBPTC suggests an absence of robustness. The JPTC has shown remarkable robustness however, because it has managed to withstand the rigors that were encountered in the Limpopo River basin during the *Total National Strategy*

period, and has even grown from Committee (Treaty, 1983a) to Commission (Treaty, 1989) status over time.

(j) Is there any evidence of regime effectiveness?

The collapse into dysfunctionality of the LBPTC indicates an absence of effectiveness. The JPTC presents evidence of effectiveness in the form of ongoing compliance with norms and rules during a difficult period of time, as well as in the collection and institutionalization of uncontested hydrological data that arose from the JULBS.

(k) Is there any evidence of the growth and development of institutional knowledge or institutional learning as the result of the regime?

There is no evidence for the growth of institutionalized knowledge in the LBPTC. The JULBS has made a major contribution to the development of institutionalized knowledge in the context of the JPTC, with not only data, but also the methodologies used to collect, process and interpret those data contributing to this growth.

> (i) If so, to what extent has this become a confidence-building and unifying factor?

The uncontested nature of data in the JPTC has resulted in a high level of confidence between actors, with advanced plans on the future construction of 3 new dams having resulted. Conversely, the absence of uncontested data in the LBPTC has prevented the growth of institutional knowledge, which in turn has become a factor inhibiting the regeneration of confidence that was so undermined during the anti-colonial and anti-apartheid liberation struggle.

(l) Can the existing water management arrangements within the Limpopo River basin be called a regime?

The LBPTC is dysfunctional, but it does still exist as a *de facto* entity. It can be considered to be a regime because there is evidence of the convergence of actor's expectations (at least between some riparian states) at various moments in historic time, and because efforts are actively under way to revive it. The LBPTC is not a well-defined regime however. Similarly, the JPTC is definitely a regime because it contains specific

norms and principles that have created a strong convergence in the expectation of the relevant actors. Neither the LBPTC nor the JPTC can be regarded as being an institution in the narrow sense of that concept, because they have no enforcement arrangement for non-compliance.

5.3.4 Conclusion Regarding the Limpopo River Basin

The Limpopo River basin provides an excellent example of the complexity surrounding regime creation when there are issues of a high politics nature impacting on the development of more narrowly-defined water resource management agreements. This complexity is exacerbated by the high level of adaptive insecurity that is somewhat of a unique feature of this basin. The basin also provides an example of the likelihood of bilateral regimes to be more easily negotiated in the face of divisive issues of a high politics nature impacting at the basin level, and in the face of persistent adaptive insecurity. As with the Orange River basin, the primary stimulus for regime creation was national security, but unlike the Orange River basin there is little real evidence of desecuritization outside of the bilateral arrangement between South Africa and Botswana, both being riparian states that are adaptively secure. Significantly, the stark difference between the upper and lower basin highlights the role that uncontested data plays in the creation of confidence between potentially antagonistic riparian states. Consequently, there is evidence of the development of institutionalized knowledge in the upper basin, but nothing in the middle and lower reaches of the river. This has been to the detriment of the downstream riparian (Mozambique), which has a high dependence on the resource and finds itself marginalized in all existing institutional arrangements due to historic factors. The Limpopo River basin thus displays a plus-sum outcome in the upper reaches (where adaptive security is the norm) and a zero-sum outcome in the lower reaches (where adaptive insecurity is the norm), and can be considered a classic case in this regard.

5.4 An Analysis of the Key Hydropolitical Processes in the Incomati and Maputo River Basin

The Incomati and Maputo River basin has 1 functioning bilateral regime (the *Joint Water Commission Agreement between South Africa and Swaziland*); 1 failed bilateral regime (the *Joint Water Commission Agreement between South Africa and Mozambique*); with a failed and recently revived multilateral basin-wide regime (*Agreement on the*

Establishment of the Tripartite Permanent Technical Committee). South African relations with Swaziland have generally been good, although guerilla forces were operating out of that country during the anti-apartheid liberation struggle. South African relations with Mozambique have been troubled, particularly when open support was given to guerilla forces from the various liberation movements, which started operating from there into South Africa, sometimes through Swaziland. These aspects have been relevant to the processes of securitization and regime creation within the Incomati and Maputo River basin.

5.4.1 Securitization Processes

In order to assess the securitization processes in the Incomati and Maputo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) Is there evidence of the securitization of water resource management in the Incomati and Maputo River basin?

The Incomati River basin is strategically important for South Africa, in part because it supports a significant amount of economic activity within the basin, and partly because it is a source of high quality water that is needed to support industrial processes outside of the basin. The Maputo River has been less important for South Africa in the past, partly because it is more difficult to exploit relative to the volumes involved, and partly because it has been kept as a strategic reserve (see Map 8). Both the Incomati and Maputo River basins are sources of IBTs (see Table 16), a factor that increases their strategic significance to South Africa as a whole. As such the South African hydraulic mission has impacted on both of these international river basins, linking them with the hydropolitical dynamics of the Orange and Limpopo.

The main impetus for securitization within the Incomati and Maputo River basin arose from the deteriorating security climate that occurred in Mozambique, particularly after the rapid withdrawal of the Portuguese in the mid 1970s. Similar to the Limpopo basin case, the lower Incomati River basin became the theatre of a localized low intensity war. The second front that was opened with Rhodesia saw increased military activity in both the Limpopo and Incomati Basin within Mozambique. After Zimbabwean independence in 1980, the same areas became theatres of military operations against the Apartheid

State. The launching of the TPTC must be seen against this background and in light of the *Total National Strategy* approach that South Africa had chosen to adopt. Similarly, the Swaziland infrastructural agreement, the *Nkomati Peace Accords* that was signed in the Incomati River basin and the revival of the Cahora Bassa Project were all a manifestation of the high politics of the time. Under such conditions, water resource management became subordinated to national security considerations. One of the manifestations of this securitization was regime creation in the water sector, in an attempt to offer the incentive of development as a countermeasure to the support by the governments of Mozambique and Swaziland of the anti-apartheid liberation struggle. This has left an indelible imprint on the hydropolitical dynamics of the Incomati and Maputo River basin.

In the post-apartheid era, the structural scarcity that has arisen from earlier South African developments, and in particular from the IBTs that support economic activities in the adjacent Limpopo and Orange River basins, will continue to act as a fundamental driver of conflict potential and therefore securitization. The high level of expectation for political payback that is manifest in Mozambique, is unlikely to be met because of South African priorities towards so-called "emerging irrigation farmers" (Article 9, Paragraph 4(c) of the *Incomaputo Agreement*), so this could also be a factor in the continued securitization within the basin.

> (i) If so, who are the main securitizing actors and what are their long-term objectives?

The main securitizing actor was the SSC during the period of the *Total National Strategy* approach by South Africa. The long-term objective of the SSC was the survival of the Apartheid State, which implied the survival of the Afrikaner nation and the economy needed to support that survival. The need for rapid economic growth to redress the historic inequity of apartheid means that economic development has remained a priority for South Africa. This priority is also manifest in Mozambique as post-war reconstruction is attempted.

> (ii) If so, what is the referent object that is being existentially threatened; by whom is it being threatened; and what is the nature of that threat?

The referent object was state sovereignty, national identity and economic stability in the Apartheid State. The environment never became a referent object in its own right. In the

post-apartheid era, economic development has become the referent object for all 3 of the riparian states.

> (iii) Who are the functional actors, support actors and veto actors; what are their long-term objectives; and what is the nature of the relationship between them?

The only functional actor was the South African military establishment during the period of heightened securitization.

(b) Is there evidence that water scarcity can have an impact on the economic growth potential and social stability in any of the riparian states found in the Incomati and Maputo River basin?

The economic growth potential within both the Incomati and Maputo River basin is highly dependent on water. Given the fact that the Incomati and Maputo River basin is a strategic source of water for the entire South African economy, a fact that becomes evident when one examines the destination of that water. Given the high quality of the water in the Incomati and Maputo River basins, it is fed directly into ESCOM generating sets located at the coalfields in the Limpopo and Orange River basins, which produce the raw power on which the industrial stability of the entire country is based (see Table 16). The fact that the Maputo River basin has been earmarked as a strategic reserve for the future increases the significance of this resource (see Maps 8 & 9).

The Incomati and Maputo River basins form the foundation for the entire economic development of Swaziland. This will become increasingly significant after the completion of the Maguga Dam, which will also be a source of electricity for Swaziland, making it more independent of the regional electricity grid, similar to Lesotho in the LHWP case. In Mozambique, the Incomati River lies in an area with a high population density and will become the second source of supply for the capital city of Maputo in the future. In the case of Mozambique, structural scarcity is a specific feature impacting negatively on its own economic growth potential. All 3 riparian states are thus impacted negatively as the result of water scarcity, making water a strategic issue within the Incomati and Maputo River basin during the post-apartheid and post-war reconstruction era.

This in turn raises the issue of SWE. As previously discussed, virtual water is an accepted way of balancing out strategic water deficits at the national level, but this is second-order

resource dependent. Both Mozambique and Swaziland have second-order scarcity problems, so they are unlikely to be able to resort to virtual water trade as a remedy to endemic water deficit. This is not the case in South Africa however, where second-order resource abundance gives strategic planners in that country a wider range of options. This is also manifest in the adaptive security spectrum that shows Mozambique to be extremely insecure, with Swaziland hovering on the threshold of insecurity (see Figure 23). This raises a series of complex issues that will need a robust institution in the narrow sense of that concept, if it is to be managed successfully.

(i) If so, what is the nature of that impact and how is this threat perception being articulated?

The answer to this question is similar to that previously given in respect of the Orange River basin, so it will not be repeated here. Mozambique, with its inherent second-order scarcity constraints, will probably continue to articulate this threat perception in terms of first-order resource availability only. South Africa, with its relative degree of second-order resource abundance, will be in a position to shift this threat perception away from simply sharing water as a first-order resource focus, to sharing benefits as a second-order resource focus. This will require a robust water regime and a sophisticated river basin management institution if it is to occur in a sustainable manner.

(c) Is there any evidence of the desecuritization of water resource management in the Incomati and Maputo River basin?

The response given in respect of the Orange River basin is also relevant here and will not be repeated. In addition to this, the *Incomaputo Agreement* can be regarded as being a significant instrument for the desecuritization of water resource management. The reason for this is the fact that Mozambique's strategic needs have been acknowledged in Paragraph 4(a) of Article 9 of the *Incomaputo Agreement* and the whole agreement is being regarded as an interim one only - a fact that is reflected in the official title of the document. This implies that future negotiations will have the realistic likelihood of achieving an equitable water sharing agreement that is enforceable, which in its own right is a driver of potential desecuritization. The existence of a high level of adaptive insecurity in the basin (see Figure 23) may mitigate against this likelihood however, so second-order scarcity continues to be a salient feature.

(i) If so, who are the functional actors, and what are their long-term objectives?

Unlike any of the other international river basins under review, the Incomati and Maputo River basin provides an example of functional actors at work in regime creation in the context of desecuritization. The Incomati River basin has attracted international attention, partly because of media interest in the plight of Mozambique during the flood event of 2000 (Matlou, 2000:28; Christie & Hanlon, 2001), partly because of media interest in the collapse of the Apartheid State, and partly because of the resurgence of global interest in IWRM as a concept. There are consequently some examples of third party involvement in the desecuritization of water resource management in the Incomati and Maputo River basin.

The Swedish government became involved in the Incomati River basin through a SIDA funded project that was called the Shared Rivers Initiative (SAWB, 2000:12; Turton & Quinn, 2000). This project sought to bring scientists together from all 3 Incomati riparian states in a collaborative venture that was designed to determine what the "real" issues within the river basin were (i.e. issues that affect the people rather than those being expressed officially by the government). Government officials who were directly responsible for negotiations within the context of the TPTC were deliberately avoided, because it was felt that they would articulate the interests of their specific governments too strongly. The TPTC was briefed on the progress of the project however (SRI, 2000). The Shared Rivers Initiative succeeded in taking scientists from all 3 riparian states and exposing them to actual conditions in the different reaches of the river (SAWB, 2000:12). This served to sensitize them to the range of problems being encountered, and resulted in a report being made public (Breen, 2000; Fakudze *et al.*, 2000; Leestemaker *et al.*, 2000; Peter *et al.*, 2000; Quinn *et al.*, 2000). Elements of this entered the South African water research community by virtue of the involvement of South African scientists in the Shared Rivers Initiative (Breen *et al.*, 2002).

The Dutch Foreign Ministry became involved when 2 missions were sent to Mozambique during October 1999 and June 2000. As a result of this, the Incomati and its adjacent coastal zone was identified as a high priority by the Mozambican government (Proposal, 2000). Given the fact that the Dutch government hosted the Second World Water Forum during 2000, combined with the high media coverage that the Mozambican flooding had been given simultaneously, created an opportunity for functional actor involvement.

The International Water Management Institute (IWMI), an international non-governmental organization with close funding links to the Dutch Foreign Ministry, also became involved (IWMI, 2002a; IWMI, 2002b; IWMI, 2002c). Significantly, IWMI involvement is in direct support of the *Incomaputo Agreement* and is designed to give some impetus to the desecuritization of water resource management within the Incomati and Maputo River basin.

The long-term objective of SIDA and the Dutch Foreign Ministry centre on the projection of political influence in the SADC region, specifically incorporating potential commercial spin-offs that may arise, while the long-term objective of IWMI relates to the stimulation of capacity in the field of water resource management in the developing world.

(ii) Is there any evidence that regimes are acting as potential desecuritizing agents?

In the context of the Incomati and Maputo River basin there is no evidence that the TPTC ever acted as a desecuritizing agent during the *Total National Strategy* period of history. The *Piggs Peak Agreement* was flagrantly violated by South Africa, resulting in a deep sense of insecurity for Mozambique that has persisted since then (Vas & Pereira, 1998:119; Vas, 1999:65). The apparent rejuvenation of the TPTC, possibly as the result of the activities of the functional actors previously noted, allowed for the *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* to be reached. The timing of this agreement, occurring as it did during the run up to the WSSD that was hosted by South Africa, was significant because it allowed the *Incomaputo Agreement* to be signed in public under the full scrutiny of the international media. While it is too early to determine with any degree of certainty, it is likely that the rejuvenated TPTC will contribute substantially to the desecuritization of water resource management in the basin.

The bilateral JWC and KOBWA did act as a desecuritizing agent during periods of heightened political tensions in the region, by limiting the range of arbitrary actions that could be taken by any of the role-players. This provided a sense of predictability in a period of heightened risk and uncertainty.

(d) Is there any evidence that a hydropolitical security complex is emerging, or is likely to emerge, within the Incomati and Maputo River basin in the near future?

There is no evidence of a hydropolitical security complex emerging because hydropolitics are not a necessary and sufficient condition for securitization. The Incomati and Maputo River basin does provide evidence that a hydropolitical complex is becoming a distinct element of the Southern African regional security complex that was initially identified by Buzan (1991:210). The evidence from the Incomati and Maputo River basin suggests that the actions of the hegemon within the international river basin impacts directly on the less-developed and economically weaker low-order riparian state by limiting the range of options open to them. In this regarded Mozambique can be regarded as being an example of an impacted state, while South Africa can be regarded as being a pivotal state.

(i) If so, what are the main drivers of this process?

The main drivers of this process relate to the co-riparian status of the economically most developed and least developed states in the SADC region in any given international river basin. The higher level of second-order resources that the hegemonic state is able to muster, enables it to extend its influence into international river basins that are also the primary source of water for the less developed state. As such, the asymmetrical hydropolitical power relations within the international river basin are nothing more than a manifestation of the overall power configuration in the region. This is starkly evident in terms of the adaptive security spectrum (see Figures 14 & 23).

(ii) If so, can the emergent hydropolitical security complex be regarded as being a component of a broader regional security complex?

The emergent hydropolitical complex can be regarded as being a component of the broader regional security complex because it provides a coherent way of analyzing patterns of amity and enmity that mediate between the unit and the international subsystem level of analysis.

5.4.2 Regime Creation Processes

In order to assess the regime creation processes in the Incomati and Maputo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) How do actors define the situation?

As previously noted prior to 1994 the SSC was the main actor in regime creation. The SSC defined the situation in terms of a *total onslaught* against the norms, values and principles of the minority-defined state. Within the context of the TPTC, Mozambique resisted this approach vehemently, with a degree of commitment that brought the country into a debilitating civil war. The South African military establishment sponsored the rebel RENAMO movement, at least until a year before the full democratization of South Africa, in flagrant violation of the *Nkomati Peace Accords*. It can therefore be concluded that Mozambique defined the situation in terms of an ideological paradigm involving both the anti-colonial and the anti-capitalist liberation struggles. Significantly, the JWC between South Africa and Mozambique, which was agreed after the collapse of apartheid and in the face of the moribund TPTC after the *Piggs Peak Agreement* debacle, makes no mention of "the Peoples Republic of Mozambique" in the official title of the agreement, suggesting that the ideological element was being de-emphasized at that stage. Swaziland on the other hand, chose to avoid the ideological conflict, and to define the situation in terms of its own direct needs for infrastructural improvement, job creation and economic development. The bilateral *Joint Water Commission Agreement between South Africa and Swaziland* saw a general harmonization of interests.

(b) What changes do the role-players make in their definitions of the situation and their preference structure?

During the apartheid and Cold War hydropolitical era, the major emphasis was on national security, which influenced the preference structure. As with other international river basins, the South African preference was to subordinate water resource management to national security. The Mozambican government adopted a persistent confrontational posture, motivated as they were by their predominantly ideological stance, which prevented any significant institutional development in the water sector. The Swaziland preference structure was defined by what they could get out of the regime in terms of hard infrastructural and economic development. The consistent bad experience within the multilateral TPTC, juxtaposed against the consistently good experience within the bilateral JWC, meant that both South Africa and Swaziland eventually opted for a preference structure that was defined by this bilateral form of regime.

(c) What vision do governments and all of the other relevant actors have?

Mozambique, with its strong ideological commitment to the anti-colonial and anti-capitalist liberation struggle, received moral support from Zimbabwe in its opposition to the South African promoted CONSAS. Given the fact that both Mozambique and Zimbabwe are co-riparians with South Africa in the Limpopo River basin, there was a degree of spillover from one international river basin to the other. This broader ideological struggle consequently became one of the key defining parameters in the Incomati and Maputo River basin. Consequently, South Africa persisted with the "carrot" and "stick" approach that was inherent to the *Total National Strategy*, while Mozambique doggedly adhered to its ideologically-defined stance, resulting in a sharply polarized vision. This process of polarization was further enhanced by the wide spread of the respective riparian states across the adaptive security spectrum. Swaziland, hovering as it were on the threshold of adaptive insecurity itself, was drawn into the South African camp, being rewarded with a series of development projects that have persisted into the post-apartheid era, resonating somewhat with the contemporary SADC vision of regional economic integration enshrined in the *Declaration Treaty and Protocol of the Southern African Development Community*.

5.4.3 Institutional Development Processes

In order to assess the institutional development processes in the Incomati and Maputo River basin in greater detail, the key questions that were presented as part of the research design (see Chapter 1) form the basis for the following analysis and discussion.

(a) Is there hydrological data that has been institutionalized?

The initial basin-wide *Agreement on the Establishment of the Tripartite Permanent Technical Committee* makes no mention of hydrological data as a specific entity, focusing instead on "measures to be undertaken to alleviate short-term problems regarding water shortages on rivers of common interest during drought periods". The *Piggs Peak Agreement* makes reference to the need for data, calling for the joint study of the whole basin - what subsequently became JIBS - with South Africa offering to finance the entire project. The *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* devotes itself entirely to the institutionalization of hydrological data; with specific timeframes (Paragraph 2.2); specific parameters to be

monitored (Appendix A); specific polluting substances to be monitored (Appendix E); specific hydrometric monitoring stations involved (Appendix B); and sampling methods and analysis (Appendix D) all receiving individual attention. The *Incomaputo Agreement* calls for the open exchange of information and data between all parties (Article 2), with the specific requirement for all parties to exchange data on the ecological state of both the Incomati and Maputo Rivers (Paragraph 6 of Article 2). This is the first example of specific attempts to institutionalize data, and in particular data needed to sustain ecological functioning of the river, as part of a regime in any of the international river basins under review.

The bilateral *Joint Water Commission Agreement between South Africa and Mozambique* makes mention only of "technical matters relating to the joint or separate investigation by the Parties of the development of any water resource of common interest" (Article 3, Paragraph 1(b).

The *Joint Water Commission Agreement between South Africa and Swaziland* makes no specific mention of hydrological data, but Article 3 calls for separate or joint investigation needed for the development of water resources (Paragraph 1(b)), along with the development of criteria to be adopted in the allocation of water between the parties (Paragraph 1(d)). Subsequent agreements go into great detail about water allocation and water data, specifically as this pertains to the apportionment of capital cost (Annex 3 of the *KOBWA Agreement*).

(b) Is this data uncontested and therefore seen as a legitimate basis for future agreements between the respective riparian states?

The data in the Incomati River basin has a history of contestation, specifically during the anti-colonial and anti-apartheid liberation struggle period. The collapse of the *Piggs Peak Agreement* saw an increase in the level of contestation over data and loss in confidence by Mozambique. The *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* became a watershed, with the subsequent harmonization of data that was presented in Article 4 ending the period of bitter disagreement between South Africa and Mozambique. The JIBS programme, while being the source of initial contestation, ultimately became the main vehicle for the de-escalation of conflict over the hydrological data. There is no history of data being contested between South Africa and Swaziland.

(c) Are there agreed-upon rules and procedures?

Given the rudimentary nature of the TPTC, combined with the fact that it has been dysfunctional for most of its existence, there were no agreed upon rules and procedures until the *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality*, and subsequent *Incomaputo Agreement*. The *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* provides specific rules and procedures of a technical nature with respect to water quality. The *Incomaputo Agreement* introduces rules on the protection of the environment (Article 6), with specific details of the IFR rules to be applied to different sub-basins in the whole Incomati system (Article 5 of Annex I) and in the whole Maputo system (Article 7 of Annex I), along with the specific stipulation of flow regimes (Article 9 and Annex I). This represents the most detailed set of rules and procedures in any of the international river basins under review.

Given the complex nature of KOBWA as the infrastructural component of the JWC, there are more elaborate rules and procedures than was initially the case in the TPTC. The subsequent *KOBWA Agreement* consists of 19 Articles and 3 Annexes, all of which relate to a specific set of rules and procedures.

(i) If so, have they been formalized, or do they exist only as a loose arrangement?

These rules and procedures were not formalized in the TPTC until the signing of the *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* and subsequent *Incomaputo Agreement*. The rules in the JWC have always been formalized in terms of the *Joint Water Commission Agreement between South Africa and Swaziland* and the *KOBWA Agreement*.

(d) Is there a dedicated conflict resolution mechanism as part of the overall institutional arrangement?

There was no dedicated conflict resolution mechanism in the TPTC at the time of its inception. Article 15 of the *Incomaputo Agreement* refers to arbitration procedures, ultimately incorporating the SADC Tribunal, with the Office of the President of the International Court of Justice (ICJ) also being recognized under specific circumstances.

Article 7 of the *Joint Water Commission Agreement between South Africa and Swaziland* makes provision for dispute resolution through the offices of an arbitrator that is mutually agreed by both parties, with the UN Secretary General being recognized in the event that agreement cannot be reached on the appointment of the arbitrator. Article 8 of the *Joint Water Commission Agreement between South Africa and Mozambique* calls for negotiation between the parties with no other formal conflict resolution mechanism being stipulated.

(i) If so, has it been used and what has been the outcome?

The TPTC became dysfunctional with the collapse of the *Piggs Peak Agreement* and no official conflict resolution mechanism was used. The revival of the TPTC was not the result of any official conflict resolution mechanism, but can be attributed, at least in part, to the activities of the functional actors previously noted, as well as the emblematic event that arose in the form of the WSSD. With regards to the latter, the South African government, as hosts of the global event, used the opportunity to showcase their commitment to sustainable development - a fact reflected in the detail of the *Incomaputo Agreement*, specifically with respect to IFR rules as a management parameter for the sustainable utilization of watercourse systems.

(e) Has there been a re-definition of the core management problem away from perceiving water scarcity in an absolute sense, to perceiving water scarcity in a relative sense?

The TPTC offers the only empirical evidence of the re-definition of the core management problem as a specific component of any water regime under review. Article 8 of Annex I of the *Incomaputo Agreement* makes mention of “better management practices or other water conservation measures, including pricing policies”. This represents the first tangible proof that a demand-sided management approach is starting to be recognized in the domain of what has traditionally been supply-sided management approach dominant.

(i) To what extent has WDM become one of the institutional objectives?

While WDM is not specifically mentioned by name in any of the regime agreements under review, the recognition of water pricing as an example of “water conservation measures” and “better management practices” in Article 8 of Annex I of the *Incomaputo Agreement* is an integral component of WDM. This is a small but important step in the

growth of the TPTC as a regime, and in particular, towards the evolution of a more sophisticated policy that is based on equity and sustainability.

(ii) Is there any evidence of inter-sectoral allocative efficiency being a policy objective?

There is no evidence of inter-sectoral allocative efficiency being a policy objective in any of the regimes under review.

(f) Is there a mechanism to sanction non-compliant actors?

There is no mechanism to sanction non-compliant actors in any of the regimes under review.

(i) If so, has it been used and what has been the outcome?

This question is not relevant to the Incomati and Maputo River basin.

(g) Has there been any redistribution of water resources between the various riparian states directly as the result of the regime, and if so what has been the outcome?

There has been no significant redistribution of water resources in any of the regimes under review. The *Incomaputo Agreement* recognizes the *Piggs Peak Agreement*, which gives Mozambique $2m^3s^{-1}$ at the Ressano Garcia border (Vas & Pereira, 1998:119; Vas, 1999:65). While it does not deviate from this allocation, the *Incomaputo Agreement* does lay the foundation for the reallocation of water to be negotiated by recognizing the rights of Mozambique to water for the capital city Maputo (Paragraph 4(a) of Article 9), and by introducing reference projects (Annex II). The full official title of the *Incomaputo Agreement* also gives recognition to the fact that this is an interim agreement, further suggesting that the redistribution of water between riparian states is a probability at some time in the future.

There is no redistribution of water between South Africa and Swaziland under the *Joint Water Commission Agreement between South Africa and Swaziland*, but the initial allocation to both South Africa and Swaziland is determined by Article 12 of the *KOBWA Agreement*.

(h) Is there any evidence of regime resilience?

Despite the initial collapse of the TPTC into dysfunction, it has continued to exist as a *de facto* entity. The fact that the *Incomaputo Agreement* could finally be reached, despite the history of bitter conflict over issues of a high politics nature, provides some of the strongest empirical evidence of resilience in any of the regimes under review.

(i) Is there any evidence of regime robustness?

The TPTC has endured a baptism of fire over 2 decades of ideological struggle, much of which had a military dimension to it. It can be argued that the very fact that the TPTC survived at all makes it more robust than any of the bilateral regimes in existence in either of the international river basins under review.

(j) Is there any evidence of regime effectiveness?

The TPTC provides significant evidence of the material breach of norms and rules over time. It also provides strong indications, through the *Resolution of the Tripartite Permanent Technical Committee on Exchange of Information and Water Quality* and the *Incomaputo Agreement* of regime resilience and robustness, both factors that contribute to effectiveness. The TPTC is an example of a regime that initially failed, but that managed to endure enormous challenges over time, which improves the prognosis for future effectiveness. The detail contained within the *Incomaputo Agreement*, covering both hydrological parameters and the realities of shared political experiences, suggest that the TPTC is set on a path of greatly enhanced effectiveness. It can be argued that the trial by fire that the TPTC has undergone, extending over 2 decades of bitter struggle of a high politics nature, has increased its potential for effectiveness. The actual effectiveness cannot yet be determined beyond the empirical fact that the TPTC has been revived; has been given data as a consensus-building element; and has been transformed in an institutional sense in a way that suggests it will become more effective in the near future. The existence of high levels of adaptive insecurity in the basin acts as a real threat to future effectiveness however, and will have to be given special attention, particularly by the hegemonic state, if the current goodwill is to be sustained (see Figure 23).

(k) Is there any evidence of the growth and development of institutional knowledge or institutional learning as the result of the regime?

The TPTC provides a dramatic example of the growth and development of institutional knowledge. The initial *Agreement on the Establishment of the Tripartite Permanent Technical Committee* established a relatively crude regime with no implicit mention of the institutionalization of knowledge. The *Incomaputo Agreement* on the other hand, provides strong evidence of 2 specific aspects.

Firstly, the revival of the TPTC reflects the experiences of all the riparian states in other regimes, both positive and negative. The positive experiences relate to regimes such as the *Treaty on the Lesotho Highlands Water Project*; the *Joint Water Commission Agreement between South Africa and Swaziland* and the *KOBWA Agreement* between the same parties; the *Permanent Water Commission Agreement between South Africa and Namibia* and *Vioolsdrift and Noordoewer Joint Irrigation Scheme Agreement* between the same parties; the *SADC Protocol on Shared Watercourse Systems*; and the *ORASECOM Agreement*, all of which have been successful. The negative experiences relate to regimes such as the *Agreement on the Establishment of the Limpopo Basin Permanent Technical Committee* and the *Joint Water Commission Agreement between South Africa and Mozambique*, both of which have been failures to date.

Secondly, the central role of uncontested data as a critical element in the effective management of the complexity that is inherent to international river basins facing closure is highlighted. This provides empirical evidence of the development of knowledge in the narrowly defined meaning of the concept.

> (i) If so, to what extent has this become a confidence-building and unifying factor?

The revival of the TPTC, sustained as it were by the institutionalization of knowledge, would not have been possible without the agreement on fundamental hydrological data and the methodologies used to process those data into meaningful management responses in the form of policy. While the JIBS process was initially contested - an aspect that was also evident in the ORRS - it ultimately became the one vital initiative that generated the kind of information that was needed for consensus between riparian states that had previously been divided over seemingly irreconcilable ideological issues.

(l) Can the existing water management arrangements within the Incomati and Maputo River basin be called a regime?

The TPTC has existed for 2 decades that were characterized by intense conflict of a primarily ideological nature. The JWC between South Africa and Swaziland has also survived the rigours of the anti-colonial and anti-apartheid liberation struggle that rendered the TPTC impotent for so long. Both the TPTC and the JWC meet the formal definition of a regime. In fact the TPTC is a particularly good example of a regime because it has been so robust and resilient, even if it has not been very effective for most of its existence. Neither the TPTC nor the JWC can be considered as being an institution however, because neither has an enforcement arrangement for non-compliance.

5.4.4 Conclusion Regarding the Incomati and Maputo River Basin

The Incomati and Maputo River basin provides an excellent example of the dynamics of a water regime. The complexity related to the creation of a regime in the face of conflict of a high politics nature, is highlighted by the collapse into dysfunction of the TPTC during the years of anti-colonial and anti-apartheid liberation struggle, and its subsequent revival in recent times. Despite the seeming irreconcilability of the ideologically-defined positions of the various riparian states, the TPTC endured as a *de facto* institution in the broadest sense of that concept, ultimately reviving itself into a regime that seems to have all the key ingredients of success. The primary stimulation for regime creation was national security, with the main threat perception being articulated by high-order riparian South Africa. It can be argued that the primary stimulus for the revival of the regime was also national security, with the main threat perception being articulated by low-order riparian Mozambique, this time in the guise of a threat to its economic growth potential in a time of post-war reconstruction. Security concerns, no matter whether they are interpreted as being national or economic security in orientation, therefore seem to be a primary driver of regime creation. The Incomati and Maputo River basin also provides an example of the unifying role that hydrological data can play as a potentially desecuritizing agent. An interesting correlation between patterns of regime support and long-term outcomes is presented in the Incomati and Maputo River basin case. Swaziland, as the state in the low-order riparian position that chose to define its situation *vis-à-vis* the regime being offered by the hegemonic power in terms of national self-interest, seemed to benefit because of this. This resulted in a plus-sum outcome in the

upper basin area. Conversely Mozambique, as a state in a low-order riparian position that chose to define its situation *vis-à-vis* the regime being offered by the hegemonic power in terms of broader ideological issues, never benefited from the arrangement. In fact, Mozambique seemed to become progressively more marginalized to the extent that it was finally confronted by a *fait accompli* that could best be described as being a zero-sum outcome.

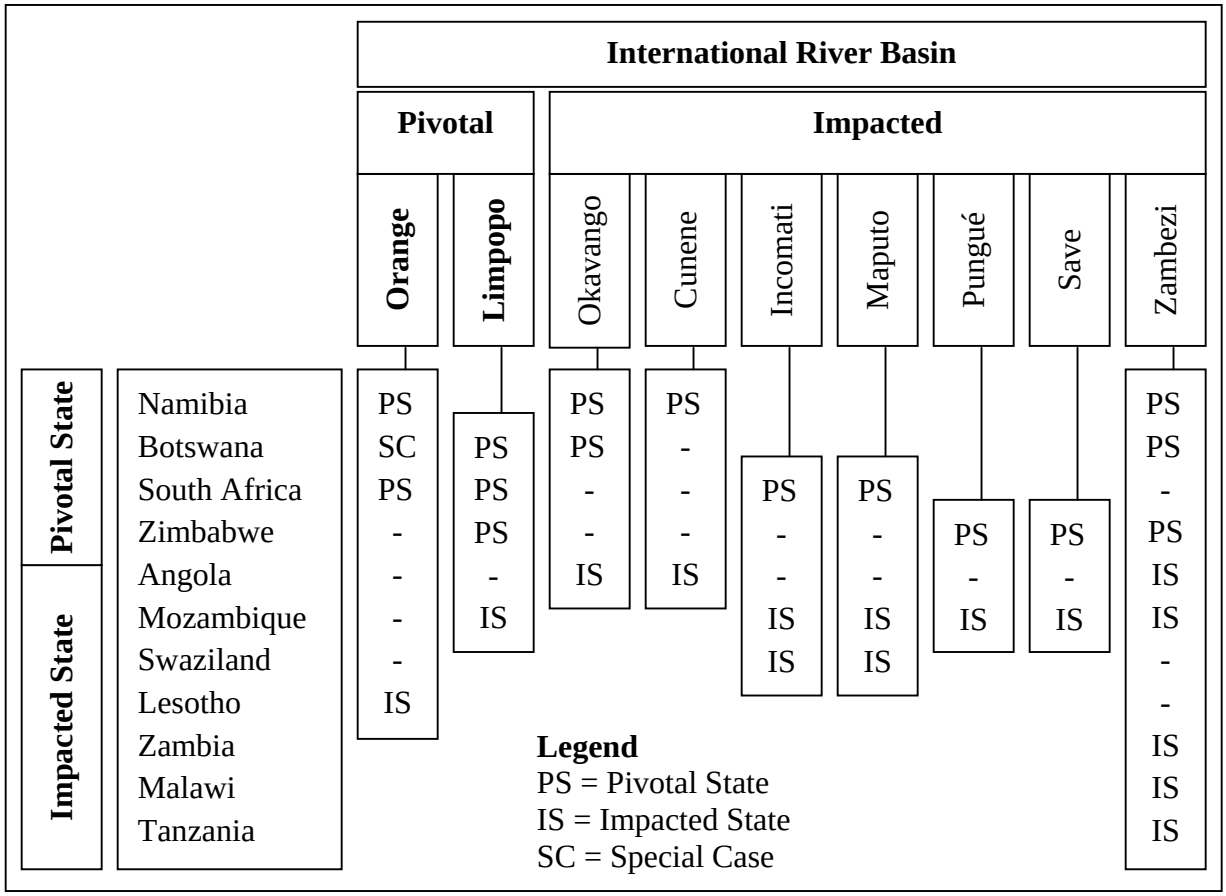
5.5 Water as an Element of a Regional Security Complex in Southern Africa

The analysis of the South African case study has shown that water is indeed an element in the international relations of the SADC region. Four of the economically most developed states in the region - South Africa, Botswana, Namibia and Zimbabwe - are all co-riparians with each other in 2 international river basins - the Orange and the Limpopo. In this regard Zimbabwe is somewhat of an anomaly however, having been the economically second most developed state in the region until recent government policies plunged the economy into decline, a factor that is represented as adaptive insecurity (see Figures 14 & 21). Nonetheless, all of these countries are being confronted by water scarcity in these 2 international river basins as a potential limiting factor to their long-term economic growth potential. These 4 countries (South Africa, Botswana, Namibia and Zimbabwe) can therefore be called “pivotal states”, with the 2 international river basins to which they are all co-riparians (Orange and Limpopo) being called “pivotal basins”. Other international river basins that have either of these pivotal states as riparians can therefore be called “impacted basins” with the other co-riparian states being called “impacted states”. When combined, these make up a hydropolitical complex (see Figure 24).

This enables a deeper understanding of the changing patterns of amity and enmity to be developed as population growth continues to outstrip the ability of water resource managers to secure sufficient supply. The South African case study has shown that water scarcity on its own has never been a fundamental driver of securitization, which means that a hydropolitical security complex is not emerging as in the Tigris and Euphrates Basin (Schulz, 1995). There is consequently a difference between a hydropolitical security complex, with the primary focus on water resource management as a driver of state security concerns, and a hydropolitical complex, which is embedded in the broader network of regional security concerns and is consequently a component of a regional security complex. A hydropolitical security complex thus sees water as being an

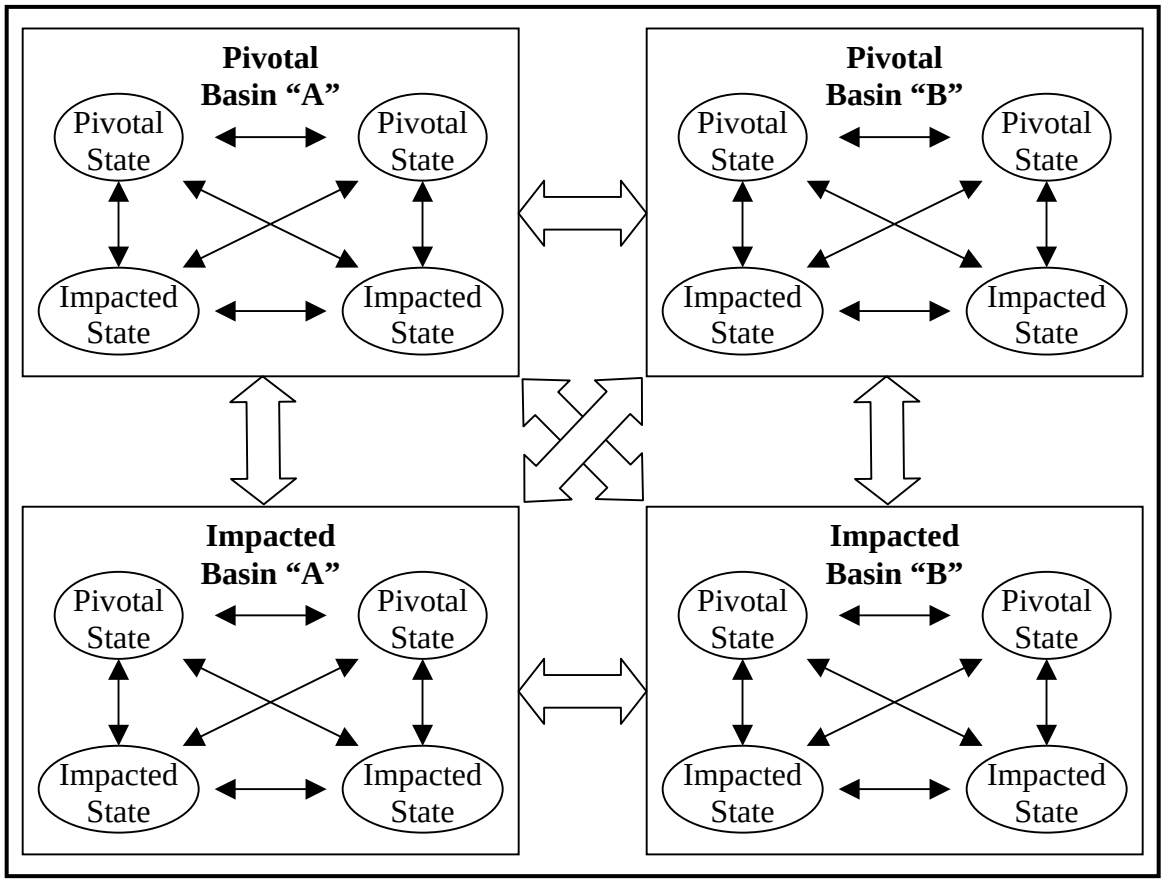
independent variable, whereas a hydropolitical complex sees water as being just another set of patterns of amity and enmity between states in a given international river basin and is therefore a component of a more clearly defined regional security complex.

Figure 24. T**he Southern African Hydropolitical Complex.**



In the context of a hydropolitical complex as defined above, water scarcity is emerging as an important enough feature to impact on the international relations of states within the SADC region, with distinct patterns of amity and enmity being driven by interaction between pivotal state and pivotal state; between pivotal state and impacted state; between impacted state and impacted state; between pivotal basin and pivotal basin; between impacted basin and impacted basin; and between pivotal basin and impacted basin. The complex patterns of potential amity and enmity can occur at specific levels of scale making SCT an appropriate analytical tool (see Figure 25).

Figure 25. Potential Patterns of Political Interaction Between Different Components of a Hydropolitical Complex.



In order to formalize the concept of a hydropolitical complex as being a distinct component of the Southern African Regional Security Complex that Buzan (1991:210) identified, the following key definitions have been developed from this analysis:

(a) *Pivotal state:* Pivotal states are those riparian states with a high level of economic development that also have a high reliance on international river basins for strategic sources of water supply. In the context of Southern Africa, there are 4 states in this category - the Republic of South Africa, Botswana, Namibia and Zimbabwe - although the decline of the latter into recent political decay makes its status as a pivotal state less clear-cut than the rest.

(b) *Impacted state:* Impacted states are those riparian states that have a critical need for access to water from international river basins that are shared with a pivotal state for their own economic and social development, but by virtue of the unequal power relations

within the basin concerned, are unable to negotiate what they consider to be an equitable allocation of water. In the context of Southern Africa, there are seven states in this category - Angola, Mozambique, Swaziland, Lesotho, Zambia, Malawi and Tanzania.

(c) *Pivotal basin:* Pivotal basins are those international river basins facing closure that are also strategically important to any one (or all) of the pivotal states by virtue of the range and magnitude of economic activity that they support. In the context of Southern Africa, there are at least 2 basins in this category - the Orange and the Limpopo - with additional research needed to categorize other basins in this fashion.

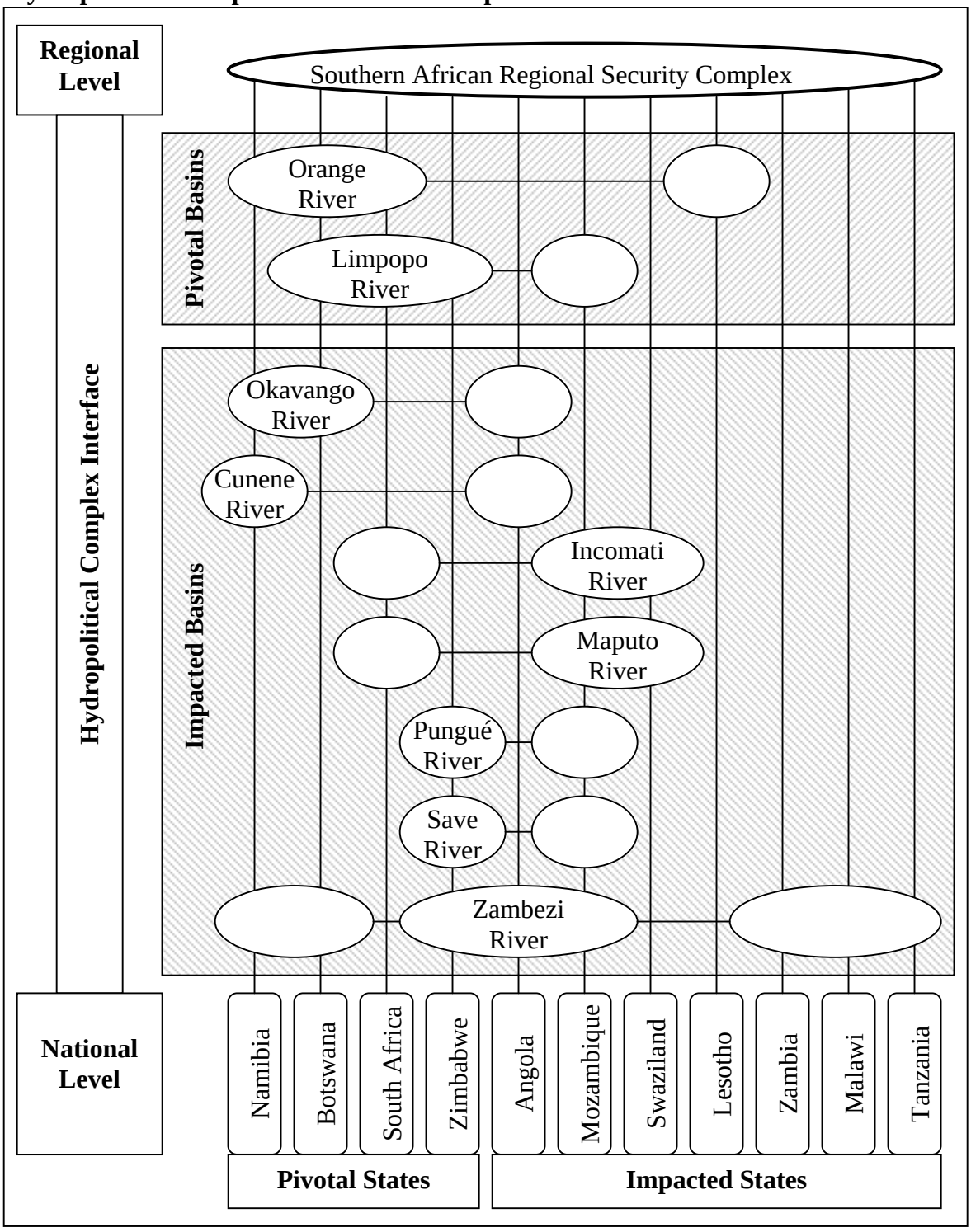
(d) *Impacted basin:* Impacted basins are those international river basins that have at least one (or more) of the pivotal states as co-riparians, which in turn reduces the freedom of choice for the impacted states to develop their water resources in a manner that they deem to be fair and equitable. In the context of Southern Africa, there are seven basins in this category - Zambezi, Cunene, Okavango, Incomati, Maputo, Pungué and Save.

The specific relationship of the various components of the Southern African Hydropolitical Complex with one another (pivotal states and pivotal basins); and the relationship between the mooted hydropolitical complex and the regional security complex is presented in Figure 26. Specific attention is drawn to the levels of analysis that Buzan *et al* (1998:5-6) have developed (see Figure 5) and the hydropolitical complex that has arisen from the analysis of the South African case study (see Figure 26). Similarly, the patterns of possible hydropolitical interaction that were presented, can also embrace different levels of analysis (see Figure 25). This also provides a more nuanced way of understanding Wolf *et al's* (2003) classification of the Orange, Limpopo and Incomati River basins as being "at risk".

The hydropolitical complex can be understood as being a layer of political interaction, across levels and between units, centered on patterns of amity and enmity in the broad sense, but amplified specifically with respect to water resource management. By using this conceptual tool, it enables a nuanced understanding of international relations *within* the regional grouping (in this case SADC). So for example, a pivotal state has a set of relationships with more than one unit, and this set of relationships is defined not only about water cooperation, but also about a broader set of issues. This means that pivotal states have a specific set of issues that they prioritize, and this acts as a sufficiently

cohesive driver to be viewed on its own. The same holds true for impacted states, but the type of relationship differs, and the range of possible options is more limited.

Figure 26. The Southern African Regional Security Complex Showing the Hydropolitical Complex as a Distinct Component.



Buzan *et al* (1998:13) show that there are 3 components of essential structure in a security complex, namely the arrangement of the units and the differentiation among them; patterns of amity and enmity; and the distribution of power among the principal units. All 3 of these components have been shown to exist in the South African case study:

The arrangement of the units is geographically fixed within the context of an international river basin. While factors driving political coalitions such as ideological struggles come and go, riparian states will always be riparian states in any given international river basin.

The patterns of amity and enmity between the respective units have been played out at the basin level, and the legacy of this dynamic process continues to be manifest at that level long after the fundamental drivers have changed. In addition to this, water deficit in a given international river basin is often the result of abstraction by a pivotal state through the application of technical ingenuity over which an impacted state has no control. It can also be argued that this abstraction has become a driver of international relations in its own right, when perceptions of insecurity are cascaded downstream and across watersheds through IBTs.

The hydraulic mission of the hegemonic riparian state is a manifestation of power, with the level of technical ingenuity that a given state can muster being a good indicator of that power. This is reflected in the subsequent adaptive security spectrum. The more adaptively secure states within any given international river basin can create strategic opportunities for themselves by leveraging advantage out of any regime that the hegemon offers. Conversely, the less adaptively secure states have fewer options open to them, and can choose either to cooperate or defect, with the South African case study providing good examples of both.

Finally, in support of the mooted hydropolitical complex, the empirical evidence presented in the South African case study reflects the Widstrand (1980) and Schulz (1995:102) typology of potential water conflict.

5.6 Summary of the Analysis of the South African Case Study

The detailed analysis of the South African case study, particularly by filtering the raw data through the fine conceptual net provided by the respective key questions, has provided a nuanced picture of the processes of securitization, regime creation and institutional development. In this regard it has provided a detailed insight into the political aspects of institutional development in the water sector by focusing on South Africa and its international river basins. From this analysis a number of conclusions have been drawn, which together can be summarized as follows:

In all cases studied, regime creation was driven primarily by the national security concerns of the hegemonic state (South Africa). The water regime, once having been created, always provided a degree of certainty between riparian states, provided that the non-hegemonic power accepted the terms of the regime in the first place. As such regimes can be considered to be a desecuritizing element when seen in the context of the broader set of high politics issues that confront the riparian states.

The way that actors define the situation, and in particular changes that were made to the definition of the situation over time, were a key determinant of the final outcome. As a result, riparian states that chose to define the situation in terms of national self-interest, have always benefited from the regime with a plus-sum outcome occurring in all cases of this nature. This category includes Lesotho, Swaziland and Botswana during the anti-colonial and anti-apartheid period of hydropolitical history. Namibia can also be included in this category, although it entered into the process of regime creation after these major struggles had been waged. Conversely, riparian states that chose to define the situation in terms of an ideological struggle against colonialism and capitalism, have never benefited from the regime with a zero-sum outcome occurring in all cases of this nature. This includes Zimbabwe and Mozambique, with the latter having been particularly hard hit by virtue of its near total marginalization in all of the international river basins shared with South Africa. Significantly, albeit beyond the scope of this specific analysis, Mozambique has also been marginalized in other international river basins that it shares with Zimbabwe.

Regimes have been remarkably durable once established, surviving intense rivalry of a high politics nature. This means that while a regime such as the TPTC appears to have failed, when viewed over a longer timeframe, the fact that it has survived at all actually

makes it potentially more sophisticated once revitalized. The TPTC is the best example of a dysfunctional regime that was resuscitated and has emerged into what is potentially one of the more sophisticated arrangements in existence, at least when compared with the other regimes in the study area. Along the same lines, it can be said that bilateral regimes, which initially appear to be rather sophisticated, are not subject to the dramatic range of exogenous factors, and consequently evolve in a more narrowly defined way.

Data plays a crucial role in building consensus between otherwise hostile riparian states. In all cases where there is basin-wide data in existence, even if it is contested initially, there has been significant regime evolution. Similarly, in all cases presented, the process of basin-wide data collection was complex, and prone to disruption on occasion. However, once these disruptions had been overcome, and in spite of the existence of other divisive issues, the basin-wide data finally became a central point in achieving consensus. Hydrological data can thus become knowledge in the narrowly defined sense of that concept, and can contribute to the evolution of an institution in the narrowly defined sense of that concept.

Regimes are clearly capable of institutional learning, and the role played by the contestation and ultimate acceptance of basin-wide hydrological data has been patently manifest. The importance of second-order resources in this process is revealing. Riparian states that have a second-order scarcity and that choose to define the situation in terms of an ideological dimension, seem to be incapable of contributing to the institutional learning within the regime concerned. Under these conditions, bilateral regimes have been the approach that has yielded the greatest reward for the participating actors, but this has tended to exclude the defecting state to its long-term detriment.

Regimes cannot be divorced from the humans that negotiate them in the first place. The case study shows that those humans are also capable of learning from experiences gained in other settings. There is consequently strong evidence to show that regimes have become more sophisticated when viewed along a timeline, with the revived TPTC displaying the most evidence of this tendency. It can be concluded that the intensity of the political friction that arose from the persistence of ideological drivers between the riparian states, ultimately gave the actors more exposure to opposing viewpoints, and that this exposure eventually allowed for the regime to take account of the political complexity in which it is embedded.

Given the complexity of both the political and hydropolitical domains in contemporary Southern Africa, a hydropolitical complex is a useful analytical tool. This hydropolitical complex is being driven by 3 specific factors. Given the persistence of these factors; the high level of complexity that they result in; and the general scarcity of second-order resources in the Southern African region, the demands that are likely to be placed on these water regimes in the future are high. These 3 factors are:

(a) *Heavy reliance on IBTs:* The existence of IBTs as a strategic component in the economic security of the pivotal states is a unique feature of Southern Africa, making local hydropolitical dynamics different to those found elsewhere in the world. While each of the pivotal states already has a number of IBTs, indications are that they are likely to expand in the medium to long-term future, crossing international borders and linking pivotal basins to impacted basins in an increasingly complex web of crosscutting linkages. In this regard the word "embedded" or "enmeshed" becomes a useful way to describe hydropolitics as a specific form of inter-state interaction within the context of a broader regional security complex.

(b) *Clashing national development priorities:* One of the primary drivers of conflict in both pivotal basins and impacted basins in the hydropolitical complex is the clash of national development priorities, which becomes relevant only once closure has occurred and there is insufficient water left to meet the development aspirations of the respective riparian states. In this regard, harmonization of these competing national development plans will be essential if the dynamics of securitization are to be attenuated. This will place great demands on water regimes in general, and on the development of second-order resources in particular.

(c) *Consequences of basin closure:* Given the fact that basin closure is a key feature of both pivotal basins and impacted basins, an increase in the level of complexity that needs to be managed by a water regime will be a logical result. One outcome with possibly grave consequences is the threshold effect of ecosystem collapse. This means that the management of ecosystem integrity within international river basins will become an important function that any water regime will have to perform, and can be regarded as being an indicator of resilience and effectiveness in future analyses of institutional development.

Regimes provide elements of certainty in an otherwise complex and uncertain world. As such they have played an increasingly important role in desecuritization and institutional development in the international river basins under review.

5.7 Assessment of Regimes in the Context of the South African Case Study

Having developed a detailed analysis of the key hydropolitical processes at work within the South African case study, it is now possible to answer the key questions about regimes that were posed in Chapter 1.

(a) How do regimes originate and change?

In the context of the 4 South African international river basins, the water regimes all originated as a result of national security threats to the hegemonic riparian. This means that the water regimes are in fact a form of security regime with the preference structure having been defined by South Africa as the hegemonic state. Significantly, in all cases where the non-hegemonic riparian chose to accept the conditions of the regime, and where they chose to define their situation in terms of national self-interest, the resultant outcome was a greater degree of security for all actors. Once created, the regime always tended to deliver a collective good in the form of certainty or security, at least in terms of the range of issues covered by the regime. This was not the situation when the non-hegemonic riparian chose to reject the conditions of the regime, and in particular when they chose to define the situation in terms of an ideological dimension. Under these circumstances, the non-hegemonic riparian became increasingly marginalized to the point where they were ultimately worse off than had they participated.

When the conditions of overlay changed materially, after the collapse of apartheid and the ending of the Cold War, the non-participating riparians (Zimbabwe and Mozambique) were extremely isolated, but there was a renewed attempt to rejuvenate the regime. In the case of the TPTC this created a more complex regime than before, with every indication that it will function to the mutual benefit of all riparian states, provided that the second-order resource scarcity problems can be overcome. In the case of the LBPTC, this rejuvenation has yet to occur, but indications are that this will follow a similar pattern to the former as a result of experience gained by the respective negotiators, many of who will be the same in both cases. This raises the central question of the policy contingency.

Available data suggests that when the non-hegemonic state chose to define the position in terms of an ideological dimension, the resultant rift was simply too wide for South Africa to develop a position that would induce their co-riparian not to defect. Significantly, when this did occur, the non-hegemonic state ended up in a materially worse off position than before, and within the timeframe of the study, has failed to recover from this situation.

In conclusion therefore, it seems as if water regimes in international river basins facing closure are created by the hegemonic state, and they function to the mutual benefit of all participants provided that a specific threshold at which the policy contingent becomes relevant is maintained within a range that prevents defection.

(b) What structural principles explain regimes?

In the South African case study, interdependence became the price to be paid for the degree of security needed by the hegemonic state. In all cases where the regime functioned after being established, there were definite material benefits to the non-hegemonic actor. While these benefits were of a mutual nature, it can be argued exactly to what extent the non-hegemon benefited. Where the regime persisted in delivering the required services (mutual security in whatever form needed by the specific riparian), the non-hegemon decided through their definition of the situation, whether to defect or not. In all cases where the basin-wide regime fell into dysfunction, it was replaced by a bilateral arrangement, which benefited the participating non-hegemon and served to further marginalize the defecting actor, often with long-term implications. It can therefore be concluded that the water regimes under review saw a delicate balance between hegemony and coalition, with the exact balance being defined in terms of the policy contingency threshold. That threshold in turn, was related to the way that the non-hegemonic actor defined the situation, with 2 possible outcomes. A plus-sum outcome resulted when the non-hegemon chose to define the situation in terms of national self-interest, whereas a zero-sum outcome occurred when the non-hegemon chose to define the situation in terms of ideology.

(c) How do regimes work?

In the case of the water regimes under review, all of the participating actors benefited materially, even if their range of self-help was curtailed as a result. In fact it can be

concluded that while the non-hegemon was always in a weaker position, they were not entirely powerless and they could maximize their benefits through bargaining and negotiating. The specific case of Botswana in the Orange River basin presents a unique example of benefit maximization through goal-directed negotiation and potential coalition formation. This also raises the relevance of second-order resources, with Mozambique being an excellent example. Mozambique chose to define its situation in terms of an ideological dimension and therefore tended to defect from agreement on the broader issues of national security that were outside the domain of the water regime, but which were one of the fundamental drivers of the process. Mozambique has very limited institutional capacity as a result of the protracted conflict on its own soil, but it is also the only non-English speaking state in the study area. The combination of critical shortfalls in technical expertise and the weaker negotiating skills caused by language barriers, served to systematically marginalize Mozambique and frustrate South African negotiators, who often misinterpreted this as being deliberate obstructionism. Perceptions thus play a role in regime creation and maintenance in a number of forms, and not only at the level of threat perception.

(d) What purposes do regimes serve?

This depends on the way that individual actors define their situation. In all cases, the hegemonic power defined the strategic situation in terms of national security concerns, which subordinated all subsequent negotiations in the water sector to this overriding issue. Significantly, the engineers who actually negotiated the specific agreements, tended to view the regime in more narrowly defined terms of water resource management. Where non-hegemon actors chose to define the situation in terms of non-ideological national self-interest, then the resultant water regime enabled sufficient range for negotiation to develop a solution to the mutual benefit of both actors. In the case of Botswana, Swaziland and Lesotho, the regime has served as a useful vehicle through which national economic development has been stimulated. In the specific case of Botswana in the Orange River basin, participation in the regime has opened up a wider range of strategic options than it previously enjoyed, with potential benefit in future negotiations over water resources from the Zambezi and Okavango in terms of the hydropolitical complex being highly likely. In this regard Botswana can be considered a balancer of hydropolitical power because one of the possible strategic outcomes of this process is that they succeed in changing their status as a water recipient from South Africa (a vulnerable position to be in), to a water donor to South Africa (see Map 15).

Seen in this light, the specific regime will have increased Botswana's overall power position in the Southern African Regional Security Complex.

5.8 Conclusion

The analysis of the key hydropolitical processes in the South African case study has provided deep insight into the political dynamics of institutional development in the water sector. A useful way of understanding these processes is through the conceptual lens of a hydropolitical complex, which is seen as a specific set of inter-state relationships occurring between states and the regional security complex centered on the control of access to strategic water resources. Seen in this light, the political aspects of institutional development are intimately linked with high politics, magnified through the prevailing threat perception, and manifesting ultimately as a pattern of amity and enmity over the distribution of water resources found in international river basins. Regime creation has been an active element of the South African case, even during the height of the securitization period. Significantly, once created regimes have been somewhat durable, and have allowed the zero-sum outcome of basin closure to be transformed to a plus-sum outcome, thereby attenuating the effects of other issues of a high politics nature. Regimes are consequently a powerful tool in the desecuritization of water resource management.

Chapter 6

ASSESSMENT AND PRESCRIPTION

> "Thirty years is a rather short transitional period for the necessary major adjustments in water policies to be developed in response to limited water availability" (Allan, 2000:3).

6.1 Introduction

The linkages between the hydropolitical processes of securitization, desecuritization and regime creation in the international river basins in South Africa have been established in the preceding chapter. In short, the political aspects of institutional development in the water sector can now be assessed by means of the study on South Africa and its international river basins. What remains is to return to the statement of the problem, the various sub-problems and the respective hypotheses in order to determine their validity.

6.2 Statement of the Problem

In order to determine what the political aspects of institutional development in the water sector are, and in particular how the dynamic interaction between core aspects takes place, two opposing trends have been assessed as they pertain to South Africa's international river basins. The first trend is related to a zero-sum outcome, which involves the process of securitization, while the second is related to a plus-sum outcome, which involves the process of desecuritization by means of regime creation. This has been captured in the fundamental research question: how can the potential zero-sum outcome of basin closure be transformed into a plus-sum outcome in South Africa's international river basins?

Based on the empirical evidence provided in the case study, regime creation has been an effective instrument for the transformation of a potential zero-sum outcome into a plus-sum outcome under conditions of basin closure in all of South Africa's international river basins, provided that two specific conditions have been met:

- The non-hegemonic state within the given international river basin chose to accept the terms of the regime offered by South Africa.

- The actors chose to define their situation in terms of national self-interest and sought to maximize their material gains from the cooperative endeavour.

Empirical evidence shows that when these two conditions have not been met, then a zero-sum outcome persisted, always to the long-term detriment of the non-hegemonic state.

The literature review and *selected theoretical dimensions*, and the subsequent *practical applications of the theory* in the empirical case study, has provided sufficient data and analytical tools in order to test the validity of the various hypotheses.

6.2.1 The First Sub-problem and Hypothesis

(a) *First sub-problem:* What are the possible consequences of basin closure in an international river basin?

(b) *First hypothesis:* If basin closure is left unchecked then it can give rise to an increasing level of insecurity in different riparian states within the given international river basin, which can translate into a fundamental national security concern when the economic growth potential of the state depends on secure access to that water.

The empirical data from the South African case study has shown that national security concerns played a dominant role in driving perceptions of insecurity. This national security concern was first articulated by the hegemonic power in the particular international river basin in the form of economic growth potential that was likely to be curtailed as the result of water scarcity. This gave rise to the early South African hydraulic mission, which saw a number of reconnaissance studies being done in order to determine the feasibility of importing water from international river basins such as the Okavango and the Zambezi. In terms of this threat perception, endemic water scarcity posed a natural limitation to the economic growth potential of South Africa, establishing a linkage between water availability and economic security. This was not seen in terms of a political problem, but rather in terms of a challenge to human technical ingenuity, so the proposed solutions were entirely of a technical engineering nature. Stated simplistically, a first-order resource scarcity simply demanded sufficient technical ingenuity if it was to be resolved in terms of this approach. The entire *problematique* was thus couched in rhetoric that was primarily first-order resource in focus.

It was only when the anti-colonial and anti-apartheid struggle took root in Southern Africa, that a linkage was created between water scarcity, basin closure and national security. The dynamics of this process can be understood in terms of second-order resources, with the application of technical ingenuity to the solution of the problem arising from a first-order scarcity within a given river basin. This is not dissimilar to the arms race, where increasing levels of technical ingenuity are applied to the solution of a perceived problem, until such time as the one party to the race is forced to withdraw as it runs increasingly into second-order scarcity problems. In the South African case, it was the application of technical ingenuity solutions in the form of dams, water transfer schemes and IBTs, that became the instrument by which insecurity was cascaded downstream into lower-order riparian states. It is for this reason that Mozambique is now confronted with a serious limitation to its economic growth potential, simply because the successive application of technical ingenuity to the solution of a perceived first-order scarcity problem by South Africa, has resulted in structural scarcity, which can be regarded as being a specific form of induced scarcity.

There is no evidence that basin closure became a primary driver of insecurity in its own right, at least for the hegemonic state. This means that water scarcity is not an independent variable, but is impacted on *via* threat perceptions, which in turn derive their primary stimulus from outside of the water sector. Threat perceptions are thus an important interceding variable, because it interprets water scarcity in terms of a wide range of other criteria, and results in a specific response, which in turn is interpreted by other actors through the lens of their own prevailing threat perception. In this context, perception becomes reality because it results in tangible outputs that elicit specific responses in a dynamic fashion.

The conclusion reached in light of the empirical evidence, is that the *first hypothesis* is valid if the entire analysis is biased in favour of first-order resource scarcity alone. Seen in this manner, a linear relationship exists between water scarcity and threats to the security of the state, primarily of an economic nature. When second-order resource availability is factored into the equation, the *first hypothesis* is also valid, but becomes far more nuanced than this simplistic linear relationship suggests. Seen in this light, disparities in political power between the respective riparian states translate into different capacities to mobilize technical ingenuity, with a kind of hydropolitical “arms race” ensuing in which dams and IBTs become the “weapon” of choice. This leads ultimately

to the cascading of insecurity to all other riparian states, triggering a political crisis that makes a new type of demand on second-order resources in the form of social ingenuity, seen in crude terms as the capacity to broker an agreement between otherwise hostile actors. The independent variable is consequently the capacity to mobilize second-order resources, in the appropriate quantities and of the appropriate type, at the appropriate moment in historic time; and to apply these to the effective solution of the problem. When this is not done, or when a given riparian state is simply unable to do this, then basin closure gives rise to increasing levels of insecurity in the given international river basin. It can therefore be concluded that basin closure does result in increasing levels of insecurity, which can become a fundamental national security concern for non-hegemonic states, only if they are adaptively insecure.

6.2.2 The Second Sub-problem and Hypothesis

(a) *Second sub-problem:* What are the possible consequences of increasing levels of insecurity within a closed (or closing) international river basin?

(b) *Second hypothesis:* If increasing levels of insecurity arise from basin closure in an international river basin, then one of the possible outcomes is a process of securitization, whereby a hydropolitical security complex emerges. The process of securitization is generally based on a zero-sum principle, so consequently this sparks off an escalation in the levels of insecurity for downstream users of the water, thereby exacerbating the conflict potential that already exists between the riparian states. Broader threat perceptions therefore play a role in either attenuating, or accelerating this process, because they are formed through historic experience and influence decision-making into the future.

The empirical data from the South African case study has shown that increasing levels of securitization are indeed an outcome of a complex process in which water scarcity is only one of the factors involved. The primary driver of the process of securitization is outside the hydropolitical sphere, being derived directly from the high politics of the anti-colonial and anti-apartheid struggle. This struggle, which saw apartheid as being a special form of colonialism, added an ideological dimension to the political equation that became all pervasive in the international river basins under review. Significantly, the process of securitization was driven primarily by a specific structure within the hegemonic power. This structure - the State Security Council - translated the threat perception into what it

called the "total onslaught" against every sector. Consequently the *Total National Strategy* was developed as an official policy response, with a two-pronged approach embracing an incentive to cooperate in the form of development projects (known technically as a policy contingency), and a disincentive to possible non-cooperation in the form of military retaliation. It was this two-pronged approach that became a fundamental driver of securitization in the water sector, as the water / economic development / national security nexus became more clearly defined.

The empirical data shows that the final outcome of this complex process has two possible permutations. A zero-sum outcome occurred when two specific conditions were met:

- When the non-hegemonic state within a given international river basin chose not to accept the terms of the regime offered by South Africa.

- When the actors defined their situation in terms of an ideological dimension such as the anti-colonial or anti-capitalist struggle.

A plus-sum outcome occurred when two specific conditions were met:

- When the non-hegemonic state within a given international river basin chose to accept the terms of the regime offered by South Africa.

- When the actors defined their situation in terms of national self-interest and sought to maximize their material gains from the cooperative endeavor.

As a result basin closure became an indirect consequence of the intensive application of technical ingenuity solutions by the hegemonic power. This in turn acted as an impetus for regime creation, but only after national security fears were invoked from the broader political arena. Regime creation was thus a direct result of securitization, but once established and functioning, the regime became a source of certainty in an otherwise uncertain world, and consequently an instrument of desecuritization. For the hegemonic state, this certainty was derived from the limited range of options that were left open to the other party, whereas for the non-hegemonic state, this certainty was derived from the material benefit that cooperation had resulted in. The transaction cost of national security for South Africa, thus became the investment needed to offer sufficient inducement to the other riparian state not to challenge the policy contingency and defect from the

cooperative arrangement. This was defined by the policy contingency threshold in all cases. It was the regime that facilitated negotiation, which ultimately allowed for a narrowing of the range of alternatives that each actor could realistically consider, which in turn became the fundamental driver of desecuritization.

There is no evidence of the emergence of a hydropolitical security complex because hydropolitical considerations have never been both a necessary and sufficient condition for securitization. There is substantial evidence to suggest that a "hydropolitical complex" is emerging however, which can be regarded as being a specific component of the regional security complex. The conclusion reached in light of the empirical evidence is that the second hypothesis is correct, but with a downgrading of the concept of a hydropolitical security complex to a "hydropolitical complex" instead (i.e. removing the word "security" and thereby making it a component of the larger regional security complex).

6.2.3 The Third Sub-problem and Hypothesis

(a) *Third sub-problem:* What are the alternatives to the securitization of water resource management that exist in an international river basin facing closure?

(b) *Third hypothesis:* If regimes are based on a plus-sum principle, then regime creation can become an effective mechanism for increasing the security of supply, while actually desecuritizing the management of water resources in an international river basin that is facing closure.

The empirical data from the South African case study has shown that this hypothesis is entirely valid. While regime creation was not originally the result of basin closure, once created it provided an area of certainty between the respective riparian states. Regime formation was originally driven by national security considerations, but once created became an instrument of desecuritization. The plus-sum outcome derives from the fact that the hegemonic power has to create sufficient incentive in the form of policy contingency for the other actor not to defect - a condition that is more likely to occur when the other actor defines the situation in terms of national-self interest rather than in terms of an ideological consideration. Furthermore, once created regimes are extremely robust and resilient, and can consequently become increasingly effective over time.

6.2.4 The Fourth Sub-problem and Hypothesis

(a) *Fourth sub-problem:* What are the critical elements of regime creation that can be considered as a management model in the various South African international river basins?

(b) *Fourth hypothesis:* If the conflict potential is institutionalized, and a confidence building mechanism is established between potentially hostile riparian states by means of a regime, then three critical elements are needed in order for this to be effective. These are: (i) a common set of rules and procedures that are mutually acceptable to all of the affected role-players, because this fosters the plus-sum principle by reducing uncertainty, and creates the normative foundation for future cooperation; (ii) uncontested hydrological data because this builds confidence and creates the capacity to manage problems effectively; (iii) a conflict management mechanism needs to be developed in order to address the naturally existing conflict potential that is inherent in basin closure, because it prevents the conflict from escalating into an issue of possible national security concern.

The empirical data from the South African case study has shown that this hypothesis is valid. Regimes are nothing more than a codification of agreed upon rules and procedures, some of which are recorded as part of the initial agreement, and some of which exist as a normative code of expected behavior. As they become more effective, any given regime develops its own unique set of procedural norms. These rules initially involve strictly non-technical procedural matters, but as the regime evolves over time, it starts to embrace the more technical issues arising from the methodologies for the collection, processing, interpretation and dissemination of hydrological data. It can be concluded that one of the empirically verifiable indicators of regime growth after initial creation is the way that rules are incorporated in the management of basin-wide hydrological data. The acceptance of rules and procedures for the collection and processing of basin-wide hydrological data, yields a threshold effect in its own right, and consequently becomes a significant event in the potential evolution of a regime into an institution.

The empirical evidence shows that hydrological data is a critical component of any effective regime. A strong correlation exists between the existence of intense political rivalry at the inter-state level and the contestation of hydrological data, with the converse also holding true. In all cases the process whereby basin-wide hydrological data is collected, evaluated and eventually institutionalized, is always accompanied by a period

of vacillation, but once accepted such data acts as a strong unifying factor. In this regard there seem to be three specific steps in this process, each representing a challenge in its own right.

- The actual collection of data requires a physical infrastructure of roads, hydrometric stations, telemetry hardware and the existence of trained personnel. All riparian states are not equally well endowed with these elements.

- Once collected, the data needs to be processed and stored. This requires that there must be sufficient institutional capacity in various forms in order to manage the process of transforming the raw data into meaningful results. While this is second-order resource dominant, the overall configuration of the specific resource needed can be generically called technical ingenuity, because it primarily involves technical processes that are essentially the domain of the natural sciences.

- Once collected and processed, the data needs to be legitimized in order to make it acceptable to all riparian states. It is this process of legitimization that institutionalizes data and converts it into knowledge. This requires that there must be an agreed methodology for the processing and interpretation of the raw data if it is to be uncontested. While this is second-order resource dominant containing elements of technical ingenuity, the overall configuration of the specific resource needed can be generically called social ingenuity, because it primarily involves the political processes of negotiation, compromise and consensus building.

The empirical evidence shows that a regime becomes a conflict management mechanism in its own right. Furthermore, all effective regimes have a formal dispute resolution mechanism but this has never been used in any of the international river basins under review. In fact in the case of the TPTC, the existence of a major conflict between two of the riparian states simply meant that the regime became dysfunctional without the cause of the dispute ever being subjected to any form of dispute resolution process. A formal dispute resolution process becomes extremely important in an institution when defined in the narrow sense of that concept, because all riparian states are sovereign entities and are never likely to agree to be subjected to enforcement arrangements without such a mechanism. Consequently, it can be anticipated that the actual use of a conflict management mechanism can be regarded as being empirical evidence of the

transformation of a regime into an institution - a theoretical possibility - but with nothing to suggest that this is necessarily the outcome of regime creation over time.

6.2.5 The Fifth Sub-problem and Hypothesis

(a) *Fifth sub-problem:* What is the necessary condition for the establishment of a regime in a closed (or closing) international river basin?

(b) *Fifth hypothesis:* If sufficient second-order resources can be mobilized by the various riparian states, then a viable regime can be created within the respective water resource management structures in a closing international river basin.

The empirical data from the South African case study has shown that second-order resources are a necessary pre-condition for the maintenance of a regime over time, rather than the initial establishment of the regime. In this regard, second-order resources play a critical role in 6 specific aspects of regime creation.

Firstly, the initial definition of the situation by an actor when offered a regime by the hegemonic power becomes a threshold event. Empirical evidence has shown that when an actor has chosen to define the situation in terms of ideological considerations, a zero-sum outcome has been the final result, whereas a plus-sum outcome has occurred when the actor has chosen to define the situation in terms of national self-interest. The decision by the negotiators at the time is influenced by the configuration of the second-order resource availability.

Secondly, the collection and processing of hydrological data is second-order resource intensive. Riparian states with a second-order resource scarcity, which is manifest as adaptive insecurity, are simply unable to collect and process sufficient data in both spatial and temporal terms to enable them to make an impact on the final negotiations.

Thirdly, once collected and processed, the hydrological data needs to be legitimized. This is a particularly important threshold event in regime evolution. Riparian states with a specific form of second-order scarcity - social ingenuity or the capacity to broker agreements - simply become irrelevant in the evolution of the regime, and even run the risk of being totally marginalized as has occurred with both Zimbabwe and Mozambique.

Fourthly, the process of legitimization dealt with in the previous paragraph results in the conversion of hydrological data into institutionalized knowledge. In the face of persistent second-order resource scarcity (or adaptive insecurity), this conversion is improbable, and if facilitated by a third party, will merely result in a new configuration of dependency emerging. Second-order resources therefore bring a degree of independence in determining the nature and extent of the institutionalization of knowledge, with obvious long-term benefits arising from this for the riparian state concerned.

Fifthly, all regimes that are effective have shown the tendency to be refined over time as they are confronted by increasing levels of complexity. In this regard regimes go through a process of evolution in response to the crises that they attempt to resolve. The way in which this crisis is perceived and dealt with by any riparian state is second-order resource intensive, so actors that are debilitated by second-order resource scarcity (or are adaptively insecure) are less likely to be in a position to influence this evolution in their favour.

Finally, for any regime to remain effective in the face of basin closure, a redefinition of the core problem being managed needs to be made from time to time. This results in the classic transition from a predominantly supply-sided management approach to a more demand-sided management approach over time. This transition is dependent on the extent to which data has been institutionalized and becomes knowledge in the narrow sense of that concept. This knowledge in turn builds consensus among the decision-making elites within the regime, bridging possible ideological divides that may exist, thereby allowing for the incremental adjustments in policy to be made as needed.

6.3 Conclusion

The availability of, and accessibility to water is an essential prerequisite for sustained economic growth and development. When water availability becomes tenuous, the management of water resources becomes a strategic matter, and once decisions are made about who gets what, when, where and how, the process enters the political domain. Hydropolitics is nothing more than the authoritative allocation of values in society with respect to water. When water crosses international borders, then sovereignty becomes a factor. Consequently the allocation of water in one international river basin as a result of the exercising of the sovereign rights by one riparian state impacts on, and can be interpreted as being a challenge to, the sovereign aspirations of another riparian state.

The management of water resources in closed international river basins is consequently more about politics and less about water. Regime creation is therefore an extremely important aspect of IWRM in international rivers. The South African case study has shown that regimes are valuable instruments for the desecuritization of water resource management, and are vital if the unintended consequences of the "hydrological arms race" that are inherent to resource capture are to be averted. In this regard the major challenge for any regime is the harmonization of national development strategies between all riparian states, which cuts to the very heart of sovereignty as a key defining factor in the international political system. The emergence of a "hydropolitical complex" as a component of the Southern African regional security complex is a development that reflects both the importance of water to the future economic prosperity of the SADC region, and the complexity that arises from what initially seems to be a seductively simple act of water resource management.

In conclusion then, institutional developments in the water sector, particularly as they pertain to the management of international river basins, are primarily driven by political aspects. In this regard sovereignty is a fundamental issue, so regimes are a valuable form of specialized institution that serve to desecuritize water resource management in international river basins, and thereby prevent the occurrence of a zero-sum outcome as the result of basin closure. Water scarcity need therefore not necessarily be a limiting factor to the economic growth potential of the state. Second-order resources are consequently the independent variable driving institutional development, as shown by the South African case study. It is the configuration of second-order resources in a given international river basin that converts the potential zero-sum outcome of basin closure into a plus-sum outcome, thereby becoming a fundamental aspect of institutional development in the water sector.

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SUMMARY

The political aspects of institutional developments in the water sector: South Africa and its international river basins

by

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Degree: Doctor Philosophiae (International Politics)

This research set out to develop a deeper theoretical component to the emerging discipline of hydropolitics by studying the political aspects of institutional developments in the water sector. The focal point was the four international river basins that are shared between South Africa and six of its neighbouring states. The study found that while there is a lot of evidence for the securitization of water resource management in South Africa's international river basins, there are also a number of examples of regimes. The creation of these regimes was driven primarily by threat perceptions relating to state security, mostly during the period of apartheid and the Cold War. These regimes were mostly robust and served as a valuable instrument for the de-escalation of conflict, which was primarily of a high politics nature. Examples of both plus-sum and zero-sum outcomes have been isolated. Plus-sum outcomes arose when the non-hegemonic state chose to view the offer of a regime in terms of national self-interest with four examples of this condition. In all four cases the non-hegemonic state benefited from cooperation with South Africa. Zero-sum outcomes arose when the non-hegemonic state chose to view the offer of a regime in terms of ideology with two examples of this condition. In both cases the non-hegemonic state did not benefit and was sidelined to the extent that they became marginalized and worse off than before. In all cases the hegemonic state benefited from the regime. The research consequently showed that a hydropolitical complex is emerging in Southern Africa, clustered around two international river basins, the Orange and Limpopo, which have been defined as pivotal basins. Both of these basins have reached the limit of their readily available water resources and future development is not possible on any great scale. Four of the most economically developed states in Southern Africa (Namibia,

Botswana, Zimbabwe and South Africa) are riparians on these two international river basins, and have been defined as pivotal states. Other less developed countries that share any international river basin with a pivotal state have been defined as an impacted state, because their own development aspirations have been capped through this association. Any international river basin that has at least one of the pivotal states in it has been defined an impacted basin. Finally, this research showed that regimes create a plus-sum outcome in closed international river basins because they reduce the levels of uncertainty and institutionalize the conflict potential. As such regimes are a useful instrument with which to regulate inter-state behavior, leading over time to the development of institutions consisting of rules and procedures.

Key terms: hydropolitics; hydropolitical complex; institution; international river basin; national security; regime; regional security complex; Southern African Development Community (SADC); state security.

SAMEVATTING

Die politieke aspekte van institusionele ontwikkelinge in the watersektor: Suid-Afrika en sy internasionale riveropvanggebiede

deur

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Graad: Doctor Philosophiae (Internasionale Politiek)

Die doel van die navorsing is om ‘n dieperliggende teoretiese komponent vir die opkomende studievak van waterpolitiek te ontwikkel, deur die bestudering van politieke aspekte rakende institusionele ontwikkelinge in die watersektor. Die fokus was die vier internasionale rivieropvangebiede wat gedeel word deur Suid-Afrika en sy buurstate. Die studie bewys dat, terwyl empiriese getuienis dui op die verveiliging van die waterhulpbronbestuur van Suid-Afrika se internasionale riviere, daar wel ‘n aantal voorbeelde van regimes is. Die totstandkoming van hierdie regimes was hoofsaaklik aangemoedig deur bedreigingspersepsies wat verband hou met staatsveiligheid, veral gedurende die apartheidsera en die Koue Oorlog. Hierdie regimes was oor die algemeen sterk en het as ‘n waardevolle instrument vir die deëskalering van konflik, wat primêr van ‘n hoë politieke aard was, gedien. Voorbeelde van beide plussom en nulsom resultate is geïsoleer. Plussom resultate het te voorskyn gekom toe die nie-hegemoniese staat besluit het om die aanbod van ‘n regime in terme van nasionale selfbelang, met vier voorbeelde van hierdie voorwaarde, te hersien. In al vier gevalle het die nie-hegemoniese staat voordeel getrek uit samewerking met Suid-Afrika. Nulsom resultate het te voorskyn gekom toe die nie-hegemoniese staat besluit het om die aanbod van ‘n regime in terme van ideologie met twee voorbeelde van hierdie voorwaarde te hersien. In beide gevalle het die nie-hegemoniese staat geen voordeel getrek nie. Dit was tersyde geskuif tot op die vlak waar dit gemarginaliseer was en slegter daaraan toe was as tevore. In alle gevalle het die hegemoniese staat voordeel getrek uit die regime. Die navorsing het

gevolglik bewys dat ‘n waterpolitieke kompleks in Suidelike-Afrika besig is om sy verskyning te maak. Hierdie kompleks bestaan uit twee internasionale rivieropvanggebiede, die Oranje en Limpopo, wat geïdentifiseer is as vername opvanggebiede. Beide opvanggebiede het die beperking van hul geredelik beskikbare waterhulpbronne bereik en toekomstige ontwikkeling is nie op grootskaal moontlik nie. Vier van die mees ekonomies ontwikkelde state in Suidelike-Afrika (Namibië, Botswana, Zimbabwe en Suid-Afrika) is deelstate van die twee internasionale rivieropvanggebiede, en is as vername state gedefinieer. Ander minder ontwikkelde state, wat enige internasionale rivieropvanggebied met ‘n vername staat deel, is gedefinieer as ‘n geaffekteerde staat. Die rede hiervoor is dat hulle ontwikkelingsaspirasies deur hierdie vennootskap beperk word. Enige internasionale rivieropvanggebied wat deur ten minste een van die vername state gedeel word is gedefinieer as ‘n geaffekteerde opvangebied. Laastens bewys die navorsing dat regimes ‘n plussom uitkoms in geïsoleerde internasionale rivieropvanggebiede skep. Dit is omdat hulle die vlakke van onsekerheid verminder en die konflikpotensiaal institusionaliseer. Hierdie regimes is nuttige instrumente waarmee interstaatlike optrede beheer word en lei met verloop van tyd tot die ontwikkeling van instellings wat bestaan uit reëls en regulasies.

Sleutelkonsepte: waterpolitiek; waterpolitieke kompleks; instelling; internasionale rivieropvanggebied; nasionale veiligheid; regime; regionale veiligheidskompleks; Suider-Afrikaanse Ontwikkelingsgemeenskap (SADC); staatsveiligheid.