International conflict over fresh water resources: the formulation of preventive and interventive guidelines

by

Nola Redelinghuys

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Promoter: Prof. AJ. Pelser
(Department of Sociology)

Declaration

I declare that the thesis hereby submitted by me for the degree Philosophiae Doctor (Sociology) at the University of the Free State is my own independent work and has not previously been submitted by me at another university. All sources referred to in this study have been duly acknowledged. I furthermore cede copyright of the thesis in favour of the University of the Free State

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Nola Redelinghuys

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Table of contents

LIST OF TABLES **VII**

LIST OF FIGURES **VIII**

LIST OF MAPS **IX**

LIST OF ABBREVIATIONS AND ACRONYMS **X**

ABSTRACT **XII**

OPSOMMING **XIV**

CHAPTER 1 PROBLEM STATEMENT AND METHODOLOGY **1**

1. Introduction **1**

2. Statement of the problem **2**

2.1 The environmental context of water 3

2.1.1 Groundwater and aquifers 3

2.1.2 Lakes and reservoirs 4

2.1.3 Rivers and streams 5

2.2 Water scarcity and the development context 8

2.3 Sub-Saharan Africa as an epicentre of future water scarcity and water conflicts 11

2.4 Water as source of conflict 13

2.5 The Southern African hydrological context 15

2.6 The lack of policy agendas and intervention strategies as mechanisms to address tension and conflict over water resources 17

3. Research aim and objectives **18**

4. Research design and methodology **19**

4.1 The literature review 21

4.2 The field study 22
4.2.1 Target population and sampling 22
4.2.2 Operationalisation of data collection 24
- The literature review 24
- Demographic and hydrological data 25
- Key-informant interviews 25

5. Limitations of the study 26

6. Ethical issues 27

7. Value of the study 27

8. Thematic overview of the study 28

CHAPTER 2 THE SOCIOLOGY OF ENVIRONMENTAL SCARCITY: ENVIRONMENTAL SCARCITY AND THE SOCIAL ENVIRONMENT 31

1. Introduction 31

2. Sociology and the study of conflict over environmental issues 32

3. Theoretical assumptions regarding resource scarcity 35
3.1 Distinguishing between environmental scarcity and resource scarcity 36
3.2 Environmental scarcity and the social environment 38
3.2.1 Population pressure (size of the population and consumption patterns) 39
3.2.2 Affluence 41
3.2.3 Level of technology (including human activities) 42
3.2.4 Supply-induced scarcity 42
3.2.5 Demand-induced scarcity 43
3.3 Environmental scarcity and the political economy of resource distribution 44
3.3.1 Environmental scarcity as influenced by the economic system 45
3.3.2 Power relationships 46
3.3.3 Structural scarcity 48

4. The main assumptions underlying environmentally based action in the face of the current environmental crisis 51
4.1 The technocratic world view 51

4.1.1 The role of industrialisation and economic development 52
4.1.2 Competition and market forces in the management of resource scarcity 53
4.2 The ecocentric worldview 54
4.2.1 Humankind as interdependent with nature 55
4.2.2 The role of appropriate technology 56
4.2.3 Small scale and simple social organisation 56
4.2.4 Preventing and alleviating environment scarcity 57
4.3 Policy considerations of the opposing views 59
4.4 Sustainability and sustainable development: the middle ground 60
4.4.1 Socio-economic development and sustainability 61
4.4.2 Sustainable development in practice 63
4.4.3 The strengths of a sustainable development approach 64

5. The case of fresh water 64

6. Conclusion 66

CHAPTER 3 THE INCORPORATION OF ENVIRONMENTAL SECURITY INTO THE CURRENT POLITICAL ARENA 67

1. Introduction 67

2. A social-historical perspective of security 69

3. The political security perspective 70
3.1 Classical liberalism and neo-liberalism 71
3.2 Realism and neo-realism 72
3.3 Constructivism 74

4. A socio-political construction of security 75

5. The need for an expansion of the current perspective on security 77
5.1 The concept of security: vagueness, ambiguity and poor demarcation 79
5.2 Marrying traditional responses with a new conceptualisation of security 80
5.3 Rethinking the mechanisms for attaining security within the bounds of a new definition of security 83

6. Conceptualising environmental security 84

7. The environment, society and political security in the 21st century 88
7.1 The population/ environment linkage 88
7.2 The political security/ socio-economic security linkage 90
7.3 Environmental linkages and political security 92

8. Conclusion 94

CHAPTER 4 THE RELATIONSHIP BETWEEN POPULATION DYNAMICS, SOCIO-ECONOMIC DEVELOPMENT AND WATER SCARCITY 96

1. Introduction 96

2. Conceptualising the relationship between population and the natural environment 97

3. The relationship between population and water 100

4. Population growth and water scarcity 103
4.1 Continued growth of the world population 104
4.2 The Southern African context 109

5. Population structure 111
5.1 Developed nations: ageing and higher life expectancy 111
5.2 Developing nations: the youth bulge 112

6. Population migration and urbanisation 113

7. Water scarcity, population pressure and socio-economic development 116
7.1 Linking demographic realities in Southern Africa to socio-economic development 118
7.2 Linking demographic realities, water scarcity and political conflict 123

8. Conclusion 126

CHAPTER 5 THE POLICY AND LEGISLATIVE LANDSCAPE FOR REGULATING INTERNATIONAL WATER RELATIONSHIPS AND DISPUTES 128

1. Introduction 128

2. Water policy development in the historical context: shifting emphasis 129

3. The international conference dynamic and the impact on water resource management 133

3.1 1970 – 1980: linking human actions with environmental consequences 134

3.2 1980 – 1990: focus on sustainable development 134

3.3 1990 – 2000: the decade dominated by the Earth Summit 135

3.4 2000 and beyond: the integration of population, development and environmental factors into policy frameworks 136

4. International policy developments pertaining specifically to water 138

4.1 1970 – 1990: water is placed on the international policy agenda 139

4.2 The Dublin Declaration and its impact 140

4.3 The World Water Forums 141

4.4 Contributions outside the World Water Forum process 146

5. The development of an international legislative framework 149

5.1 International customary water law: doctrines of water use 150

5.2 The 1997 United Nations Convention on the Law of Non-Navigational Uses of International Watercourses 154

6. Regional policy and legislative developments 157

6.1 Linking regional policy developments in the water sector with a wider social context 158

6.1.1 The impact of natural environmental realities on policy developments in the region 159

6.1.2 The SADC and policy developments pertaining to water 161

6.2 The SADC Protocol on the Non-navigational Uses of Shared Watercourses 163

7. Conclusion 167

CHAPTER 6 POLICY DILEMMAS AND ISSUES 170

1. Introduction 170

2. Governance issues: sovereignty, trust and the strategic nature of water 171

2.1 The importance of sovereignty 172
2.2 Strategic nature of water and issues of trust 178
2.3 Institutional implications and challenges 185

3. The dilemma of equitable distribution in the face of competing demands 186
3.1 Water as a tradable economic asset 187
3.1.1 Water as an economic good in international policy 188
3.1.2 Water as a common good *vs* water as an economic good 189
3.2 Water as a socio-economic good 192
3.2.1 Socio-economic good in the international policy framework 192
3.2.2 Ecosystem protection *vs* socio-economic development 194
3.2.3 Policy and institutional interfaces 196
- Interstate tension 196
- Group-state interface 198
- Regional and international policy responses 201

4. Conclusion 208

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS 211

1. Introduction 211

2. Main conclusions of the study 212

3. Recommendations 225

4. Summary 230

5. Directions of future research 231

LIST OF REFERENCES 233

ANNEXURE A 251

List of tables

Table 1: River basins in Southern Africa **7**
Table 2: Access to water supply and sanitation services: 1990-2000 **10**
Table 3: Per capita water availability in Southern Africa (2003 – 2050) **17**
Table 4: Objectives and research questions **18**
Table 5: Outline of interviews **24**
Table 6: The depletion of natural resources **37**
Table 7: Comparing the technocentric and ecocentric perspectives **58**
Table 8: Proportion of environmental impacts attributed to population growth **98**
Table 9: Population projections for Southern Africa – 2005, 2025, 2050 **109**
Table 10: Sectoral water withdrawals (%) in Southern Africa **115**
Table 11: Percentage of the population urbanised - 2005, 2015, 2030 **116**
Table 12: The Millennium Development Goals **118**
Table 13: Outline of the major conferences on population, environment and development - 1972 – 2002 **138**
Table 14: Contributions to water policy development (Second World Water Forum) **144**
Table 15: Overview of main water policy development milestones (1977 – 2005) **148**

List of figures

Figure 1: **Determinants of supply-induced environmental scarcity** **43**

Figure 2: **Resource capture** **1**

Figure 3: **Ecological marginalisation** **1**

Figure 4: **Population-Water Links** **101**

Figure 5: Trends in Population Growth Worldwide **105**

Figure 6: **World Population and freshwater use** **106**

Figure 7: **Population growth in more and less developed regions (1950 -2050)** **1**

List of maps

Map 1: River Basins of the world 6

Map 2: The hydrological divide 1

Map 3: Global projections of water stress (1995 & 2025) 1

List of abbreviations and acronyms

BICC	Bonn International Center for Conversion
CDC	Commonwealth Development Cooperation
CGIAR	Consultative Group on International Agricultural Research
CMA	Catchment Management Agencies
CSIR	Council for Scientific and Industrial Research
DWAF	South African Department of Water Affairs and Forestry
FLS	Front-Line States
DWP	Dominant Western Paradigm
GATT	General Agreement of Trade and Tariffs
GNP	Gross National Product
GWP-SA	Global Water Partnership, Southern Africa
HDI	Human Development Index
ICPD	International Conference on Population and Development
IDWSSD	International Drinking Water Supply and Sanitation Decade
ILA	International Law Association
ILC	International Law Commission
IMF	International Monetary Fund
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resources Management
LHDA	Lesotho Highlands Development Agency
LHWC	Lesotho Highlands Water Commission
LHWP	Lesotho Highlands Water Project
MDGs	Millennium Development Goals
NEP	New Ecological Paradigm
ORESACOM	Orange River Basin Commission
PRB	Population Reference Bureau
SADC	Southern African Development Community
SADCC	Southern African Development Co-ordination Conference
TCTA	Trans-Caledon Tunnel Authority
UN	United Nations

UNCED	United Nations Conference on Environment and Development
UNCIW	United Nations Convention on the Law of Non-Navigational Uses of International Watercourses
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFPA	United Nations Population Fund
UNHCE	United Nations Conference on the Human Environment
UNICEF	United Nations Children's Fund
WCD	World Commission on Dams
WCED	World Commission on Environment and Development
WSSD	World Summit on Sustainable Development
WTO	World Trade Organisation
WUA	Water User Association
WWC	World Water Council
ZACPLAN	Zambezi River Basin System Action Plan
ZAMCOM	Zambezi River Basin Commission

Abstract

The pressures of human society on available water resources lead to the grave and ever-worsening scarcity of this resource, which locally and internationally, strains policy and institutional capacity to deal with the issue cooperatively. While conflict over fresh water, to the extent even of war, is not generally characteristic of relations over water, tension is nevertheless felt between countries over various issues surrounding access to water. It is thus imperative to determine the nature and extent of issues that may give rise to future tension and conflict over freshwater resources.

Given the above situation, this study aimed to meet the following objectives:

- To gain in-depth understanding of the social, economic and political dynamics that underlie current relations over water, globally and more specifically in the Southern African region.
- To assess current ways in which water issues are being addressed at the international and the regional level, by focusing on the existing global and regional policy frameworks for dealing with water scarcity.
- To assess the institutional frameworks within which water issues are currently being dealt with at the international and the regional levels.
- To develop a set of policy guidelines that can be used to facilitate cooperation over water issues in Southern Africa.

The research design of this study was qualitative and interpretative, and four sources of information were utilised in data collection, namely primary and secondary literature sources; secondary demographic and environmental data; policy and legislative documents; and, information obtained from personal key-informant interviews.

The following conclusions were drawn from the study

- The dominant social paradigm underlying decision making with regard to natural resources does not support closer cooperation over fresh water.
- The emphasis on political sovereignty in policy is inconsistent with the international commitment to cooperation over freshwater resources.

- The policy obligation of equitable distribution of water between sectors and states is hampered by unresolved tensions in policy and institutional frameworks.
- As a result of the vagueness with which contentious issues are addressed in international policy, current policy options may neither be adequately able to intervene in nor to prevent conflicts over fresh water.
- A lack of both ratification and enforcement of the existing international policy framework renders these instruments powerless to prevent or intervene in future conflicts over fresh water.
- Effective cooperation between water-resource institutions is hampered by significant shortcomings in vertical and horizontal communication linkages between such institutions.

Recommendations made based on the study are:

- A transition needs to be made *from* a technocentric approach focused on managing the issues arising from water scarcity, *to* an ecocentric approach focused on radical changes in policy formulation.
- Current vague statements and terms in the international policy framework need to be conceptualised more clearly.
- Policy makers at the regional and national levels should specifically work toward diffusing subtle tensions in current policy and institutional arrangements through closer integration of sectoral policies.
- A regional perspective on the issues of water scarcity, conflict and cooperation over fresh water needs to be strengthened.
- In line with the IWRM strategy's emphasis on decentralisation, appropriate mechanisms need to be found to link institutions horizontally.
- The capacity and functioning of multistakeholder platforms in the water sector need to be strengthened.

Opsomming

Die druk van die menslike samelewing op beskikbare waterbronne lei tot die ernstige en toenemende skaarste van hierdie hulpbron. Om hierdie kwessie deur middel van samewerking op te los, strem beleids- en institusionele kapasiteit op sowel die internasionale as die plaaslike vlak. Terwyl konflik oor vars water, tot selfs op die vlak waar dit tot oorlog lei, nie oor die algemeen kenmerkend is van verhoudings oor water nie, word spanning nogtans tussen lande aangevoel oor verskeie kwessies rondom toegang tot water. Daarom is dit noodsaaklik om die aard en omvang te ondersoek waartoe dié kwessies in die toekoms tot stygende spanning en konflik oor varswater mag aanleiding gee.

In die lig van voorgenoemde het hierdie studie ten doel om:

- die verkryging van 'n in-diepte begrip van die sosiale, ekonomiese en politieke dinamika wat huidige verhoudings oor water globaal en meer spesifiek in Suider-Afrika onderlê.
- die assessering van wyses waarop waterkwessies op internasionale en streeksvlak aangespreek word deur te fokus op die huidige globale en streeksbeleidsraamwerke wat waterkwessies aanspreek.
- die assessering van die huidige institusionele raamwerke waarbinne waterkwessies hanteer word op sowel internasionale as streeksvlak.
- die daarstelling van 'n stel beleidsriglyne vir die fasilitering van samewerking oor waterkwessies in Suider-Afrika.

Die navorsingsontwerp van hierdie studie is kwalitatief en interpretatief van aard en vier bronne van inligting is gebruik om data in te samel, naamlik primêre en sekondêre literatuurbronne, sekondêre demografiese en omgewingsdata, beleids- en wetlike dokumente, en inligting verkry deur persoonlike sleutelinformantonderhoude.

Uit die bevindinge van die studie is die volgende gevolgtrekkings gemaak:

- Die heersende sosiale wêreldsiening ondersteun nie nouer samewerking oor vars water nie.

- Die klem in beleid op politieke soewereiniteit is teenstrydig met die internasionale verbintenis tot samewerking oor varswaterbronne.
- Die beleidsverpligting ten opsigte van regverdige verdeling van water tussen sektore en state word gestrem deur onopgeloste spanning in beleids- en institusionele raamwerke
- As gevolg van die vaagheid waarmee aanvegbare kwessies in internasionale beleid hanteer word, mag huidige beleidsopsies nie voldoende wees om doeltreffend in te gryp in, of om toekomstige konflikte oor vars water te voorkom nie.
- 'n Gebrek aan bekragtiging en afdwingbaarheid van huidige internasionale beleidsraamwerke laat hierdie instrumente kragteloos om toekomstige konflikte oor water te voorkom of daarin in te gryp.
- Doeltreffende samewerking tussen waterinstansies word gestrem deur beduidende tekortkominge in vertikale en horisontale kommunikasiekanale tussen hierdie instansies.

Die volgende aanbevelings word op grond van die studie gemaak:

- 'n Transisie van 'n tegnosentriese benadering, gefokus op die bestuur van kwessies voortvloeiend uit waterskaarste, na 'n ekosentriese benadering gefokus op radikale veranderinge wat in beleidsformulering gemaak moet word.
- Huidige vae stellings en terme in internasionale beleidsraamwerke moet duideliker gekonseptualiseer word.
- Beleidmakers op streeks- en nasionale vlak moet pertinent daaraan werk om subtiele spanning in huidige beleids- en institusionele opsette op te los.
- 'n Streeksperspektief op die kwessies van waterskaarste, konflik en samewerking oor varswaterbronne moet versterk word.
- Toepaslike meganismes moet gevind word om instansies horisontaal te verbind in ooreenstemming met die klem op desentralisasie, soos deur die Geïntegreerde Waterbronbestuurstrategie (IWRM) aanbeveel.
- Die kapasiteit en funksionering van multi-rolspelerplatforms in die watersektor moet versterk word.

Chapter 1
Problem statement and methodology

1. Introduction

It is now widely accepted that environmental problems will greatly influence the future of humankind and that of entire societies (Cohen 1995; Harper 2004; Myers 1998). The environmental problems set to shape humankind's future are diverse, ranging from rising sea levels resulting from global warming and ozone depletion to the loss of bio-diversity and resource depletion. Natural resources under threat include both non-renewable resources, such as fossil fuels and renewable resources, such as water. Water is already considered scarce in many parts of the world, and will become even more so in future. Climate change, increased resource consumption rates by growing populations, the growing demands of humankind in terms of household needs, and the growing needs of the agricultural sector and industry all contribute to existing and growing water scarcities across the globe.

Furthermore, many of the socio-economic issues plaguing societies currently are rooted in environmental problems. An issue such as human population pressure and its impact on poverty receives added significance when viewed within the context of a growing scarcity of natural resources and the unequal distribution of and access to available resources. Environmental issues, such as a growing scarcity of life sustaining natural resources, also have immense potential for inciting or worsening conflicts across the globe. Kaplan (1994: 8) emphasises that environmental problems such as population growth, water depletion and rising sea levels, among others, will result in environmental disputes fuelled by existing ethnic and historical antagonism. Resource scarcity thus has the potential for inducing or worsening existing conflicts between groups on a national, regional and global level, and scarcity of water is no different. Scarcity of water is even more worrisome in this regard than that of other natural resources since there is no substitute for water.

This study explored the issue of scarcity over fresh water from a sociological perspective. Chapter 1 outlines the rationale behind studying water scarcity and conflict[1]. Furthermore,

[1] From the outset it must be emphasised that conflict in this study does not only refer to armed conflict, but includes a range of conflict from underlying tension over water issues between states to outright war.

the methodological premise of this research is outlined and an overview of the research process as it unfolded is given. First, the problem of water scarcity and conflict is explored to provide a rationale for studying this issue.

2. Statement of the problem

Water use increased rapidly during the past century, particularly since World War II, as social and economic processes placed more demands on existing freshwater resources. Among these processes, rapid population growth, urbanisation, industrialisation, and agricultural expansion all add to the growing demand for fresh water (Pelser 2004: 189; Steyn 2001: 3). Population increase and development pressures demand that more ground and surface water be allocated for domestic, agricultural and industrial use, and also exacerbate the pollution of freshwater resources across the globe. As a result of this combined pressure from population increase and socio-economic development, water is a natural resource that is in jeopardy of becoming extremely scarce, specifically in the semi-arid and arid parts of the world (UNWater 2006: 1).

According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the world currently has less than half the amount of water available per capita than was available 50 years ago. In 1950, no country in the world faced serious water supply shortages, while today approximately 35% of the world population are facing water shortages. The global demand for water is still growing and it is estimated that if nothing is done to curb the growing demand, two thirds of the world population could experience moderate to severe water shortages by the year 2025 (Sadeq 1999: 18). Engelman (1997: 164) points out that while water scarcity was previously mostly a local and temporary problem, it is *"now becoming pervasive and persistent in some regions of the world"*. Similarly, in Southern Africa the combined impacts of population pressure, socio-economic development pressures, economic development and agricultural expansion and intensification have severely overburdened the existing water resources in the region. Social change therefore has a severe impact on the various sources of fresh water across the globe. To understand the issue of societal impact on freshwater resources, it is necessary to briefly categorise these impacts according to the different sources of fresh water.

2.1 The environmental context of water

Fresh water is found above and below the earth's surface. Below surface, fresh water is found in the form of underground springs, rivers and lakes, while above ground, freshwater sources include lakes, streams and rivers. The way humankind interacts with, and uses water impact on all these sources of water, causing them to become depleted, as will now be discussed.

2.1.1 Groundwater and aquifers

Groundwater has been a source of water since the earliest civilisations. Currently, groundwater sources are heavily exploited at a rate of approximately 600-700km³/year. It is the bedrock of the agricultural revolution in Asia, supports rural livelihoods in large parts of sub-Saharan Africa and provides 70% of the piped water supplied in the European Union (UNESCO 2003: 78). More efficient and powerful pumps have led to increased consumption of groundwater, particularly for irrigation.

As a result of increased aquifer pumping, water tables are falling particularly in areas where large scale agriculture takes place, notably in China, India and the United States. Since these three countries produce half of the world's food, the depletion of aquifers could seriously affect their ability to continue current levels of food production. In India, for example, aquifer pumping is estimated to be double the rate of recharge from rainfall. As a result, the International Water Management Institute estimates that India's grain harvest could be reduced by up to a quarter (Brown & Halweil 1999: 1).

Historical evidence reveals that groundwater has since ancient times been a source of contention. More recent occurrences of disputes between users of groundwater show that these sources of water should deserve attention as potential sources of conflict. Some notable instances include the dispute between pastoralists and farmers over the waters of the Nubian aquifer (Obi 1998: 44). Many of the large aquifers in the world are transboundary, but because of the fact that they are largely hidden beneath the surface, these aquifers have not, until very recently begin to figure in the debates about freshwater conflict to the same extent as transboundary surface water. In Europe alone over 100 aquifers transcend national boundaries and in northern Africa at least seven aquifers are transboundary, to cite but two examples (UNESCO 2003: 316-317).

2.1.2 Lakes and reservoirs

Lakes are naturally occurring large surface areas of water created by various geological processes. Most of the major 145 lakes across the globe are situated in the northern hemisphere, containing 168 000km³ of water. Of this total, approximately 91 000km³ is fresh water (UNESCO 2003: 82).

Dams and reservoirs are man-made receptacles of fresh water and according to the World Commission on Dams (WCD) there are currently 47 655 large dams and a further 800 000 smaller ones[2]. Some dams have been constructed to increase the capacity of existing lakes (Owen Falls Dam for example), while dams are also built across river valleys to create reservoirs (UNESCO 2003: 83). Dams have been constructed since ancient times, but since the 1950s there was an increase in the commissioning of large dams. Some 35 000 large dams have been built since 1950, with an increased construction rate during the past 15 years (Petrella 2001: 76).

On an international level, dams are often used to control water resources. Nations in upstream countries are in a strategic position to, through, among others dam-building, control the amount of water that a state downstream receives. When upstream nations adhere to the political principle of absolute sovereignty, they are in a position to claim exclusive rights to the resources within their territory and use it solely for their purposes[3]. However, downstream nations rightly object to this, since they also assert their right to benefit from the undiminished and uninterrupted flow of water originating in other countries (Petrella 2001: 46).

When nations are faced with this situation, conflict between states becomes a very real threat. The threatening situation regarding water in the Nile basin attests to this. Egypt, the last country through which the Nile flows is especially vulnerable to water scarcity, since it

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[2] According to the International Commission on Large Dams (ICOLD), a large dam is a dam with a height of more than 15 metres, or with a dam wall of above 5 metres and a holding a capacity of 3 million cubic meters of water (UNESCO 2003: 83).

[3] Three principles protect downstream nations from the principle of absolute territorial sovereignty. The principle of limited and integrated territorial sovereignty states that states have the right to use water in its territory under condition that it does not harm the interests of other states. The principle of community interests - no state may use waters on its territory without consultation and cooperation with other states to achieve integrated management. The principle of fair and reasonable use states that each state has the right to use the waters of a particular basin through ownership and control of a fair and reasonable share of the basin's resources (Petrella 2001: 46-47). These principles receive more detailed attention in Chapter 5, paragraph 5.

does not control much of the water of its primary source, the Nile. While Egypt has a longstanding agreement regarding the waters of the Nile with upstream neighbour Sudan, this is not the case with another neighbour, Ethiopia. Ethiopia has, as a result of population pressure and changes in agricultural practices, proposed the construction of a number of small dams on the headwaters of the Blue Nile leading into Egypt. Egypt, however, is also facing challenges relating to population growth and food security that influence the amount of water needed in this country and therefore cannot afford to receive less water from upstream countries. This has led the Egyptian government to declare on a number of occasions that water could be an issue that could take Egypt to war again (Gleick 2000: 6; Myers & Kent 1995: 98).

2.1.3 Rivers and streams

Currently there are 263 listed transboundary river basins (See Map 1 for an illustration of the major river basins in the world) and 145 nations that include territory within these basins. Of these 145 nations, 21 lie entirely within transboundary basins and a further twelve have more than 95% of their territory within one or more transboundary basins. Furthermore, the number of river basins shared between countries has increased over time due to a process of internationalisation, making it essential that social institutions adapt to the political changes brought about by these processes.

When looking further at the riparian status of countries it transpires that one third of transboundary basins are shared by more than two countries and nineteen are shared by five or more nation states. The Danube has eighteen riparian states, while the Congo, Niger, Nile, Rhine and Zambezi have between nine and eleven riparian states each. The remaining thirteen basins, among others the Amazon, Ganges - Brahmaputra - Meghna, Mekong and the Tigris-Euphrates, have between five and eight riparian states As a result, individual countries have to compete with each other over the quantity and quality of existing water supplies (Anderson 1988: 2; Engelman & LeRoy 1993: 8; Stanley Foundation 1992: 19; Wolf 1998: 251-252; UNESCO 2003: 203).

Map 1: River Basins of the world

Source: UNEP 2008.

River basins therefore constitute a significant conflict potential and not surprisingly, Homer-Dixon (1999: 67) emphasises that experts *"…suggest that international disputes over river water, in particular could become more frequent in coming decades"*. Postel (2002: 5) furthermore, emphasises with regard to preventing future conflicts over water in river basins that preventive diplomacy must be initiated in river basins at risk of tension over water. With regard to tension in Southern African river basins, Turton *et al.* (2003) state that this region is globally unique, since it is one of only a few developing regions in which so many international river basins are as strategically important to the respective riparians as in Southern Africa. In the

South African Development Community (SADC) region[4], 15 river basins are shared between two or more states. The river basins of particular strategic importance to South Africa and her neighbours are depicted in Table 1.

Table 1: River basins in Southern Africa

Basin	Total area of basin	Countries	Area of country in basin (km³)	Area of country in basin (%)
Buzi	27 700	Mozambique	24 500	88.35
		Zimbabwe	3 200	11.65
Cuvelai/Etosha	167 400	Namibia	114 100	68.15
		Angola	53 300	31.85
Incomati	46 700	South Africa	29 200	62.47
		Mozambique	14 600	31.20
		Swaziland	3000	6.33
Kunene	110 000	Angola	95 300	86.68
		Namibia	14 700	13.32
Limpopo	414 800	South Africa	183 500	44.25
		Mozambique	87 200	21.02
		Botswana	81 500	19.65
		Zimbabwe	62 600	15.08
Maputo	30 700	South Africa	18 500	60.31
		Swaziland	10 600	34.71
		Mozambique	1 500	4.98
Okavango	706 900	Botswana	358 000	50.65
		Namibia	176 200	24.93
		Angola	150 100	21.23
		Zimbabwe	22 600	3.19
Orange	945 500	South Africa	563 900	59.65
		Namibia	240 200	25.40
		Botswana	121 400	12.85
		Lesotho	19 900	2.10
Sabi	115 700	Zimbabwe	85 400	73.85
		Mozambique	30 300	26.15
Umbeluzi	10 900	Mozambique	7 200	65.87
		Swaziland	3 500	32.44
		South Africa	30	0.27
Zambezi	1 385 300	Zambia	576 900	41.64
		Angola	254 600	18.38
		Zimbabwe	215 500	15.55
		Mozambique	163 500	11.81
		Malawi	110 400	7.97
		Tanzania	27 200	1.97
		Botswana	18 900	1.37
		Namibia	17 200	1.24
		DRC	1 100	0.08

Source: UNESCO 2003.

[4] The SADC comprises 14 member states namely Angola, Botswana, the Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, the United Republic of Tanzania, Zambia and Zimbabwe (Dzimba 2001: 24).

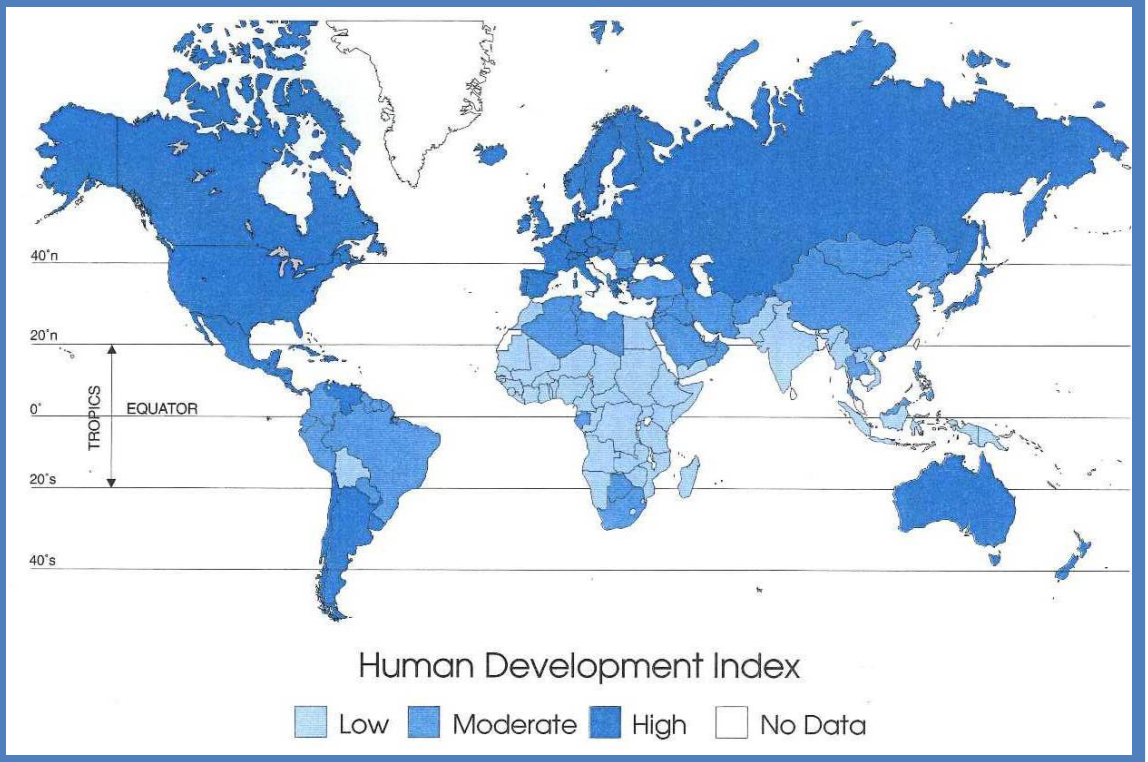
The issue of water scarcity and conflict becomes even more relevant when seen in relation to distribution of fresh water across regions and between different nations.

2.2 Water scarcity and the development context

Large parts of the earth are semi-arid, arid or desert regions where water is scarce and supplies are uncertain from one season to the next. These semi-arid, arid and desert regions mostly fall within the boundaries of economically impoverished developing countries that are ill equipped to deal with water scarcities (Map 2). These nations find themselves in semi-arid, arid and desert regions where extreme climate conditions and smaller water supplies lead to a distressing state of affairs where water security is concerned (Steyn 2001: 116). Since developing nations, unfortunately, are mostly situated in these more arid regions of the world in which water is already scarce, in places them at a socio-economically disadvantage position compared to developed nations where availability of fresh water is concerned – effectively dividing the globe into water *haves* and *have nots* (Miller 1996: 455).

This disadvantage in terms of access to water is intensified by the lack of economic capacity of developing countries to employ technology and develop reservoirs and dams to capture freshwater run-off (UNFPA 2001: 11). Harrison (1993: 53) emphasises that water will set the development ceiling for many nations in Africa since water shortages will constrain improvements in agriculture, industry and domestic use. Engelman (1997: 29) states that shortages of renewable fresh water is already placing serious constraints on development in 88 developing countries, hosting 40% of the world's population. By the end of the previous century, approximately 460 million people living in developing countries were already experiencing water shortages. This number comprises 8% of the total world population (Sadeq 1999: 18).

Map 2: The hydrological divide



Source: Falkenmark & Widstrand 1992.

These inequalities are also reflected in the ability of nations to supply access to basic water provision and sanitation (Table 2). In spite of countless technological breakthroughs, an explosion of information and the increased expansion of world markets, the living conditions of the largest part of the human population have not improved significantly, if at all. Gleick (2002: 1) argues that despite the massive investments of the 20th century, some 2.4 billion people still lack sanitation equal to the standard available to most citizens in ancient Rome. Currently, more than 3 billion people, mostly children, die of diseases associated with poor sanitation, while 1.1 billion people lack adequate supply of water (UNESCO 2003: 109). As a result of water shortages, public health is put under pressure due to the fact that a large disease burden is associated with a lack of clean water for domestic use. It is estimated that 90% of diseases in developing countries are associated with lack of clean water, with children suffering the most (Myers 1998: 21).

Table 2: Access to water supply and sanitation services: 1990-2000

		Water supply		Sanitation	
		Access to improved water supply facilities (%)	**Not served (%)**	**Access to improved sanitation facilities (%)**	Not served (%)
Africa	**1990**	59	41	59	41
	2000	64	36	60	40
Asia	**1990**	73	27	29	71
	2000	81	19	47	53
Latin America & Caribbean	**1990**	82	18	72	28
	2000	87	13	78	22
Total	**1990**	72	28	16	62
	2000	79	21	20	48

Source: UNESCO 2003.

A further factor of significance is that water scarcity often results from the distribution of water resources between the needs of industry, agriculture and domestic use. Increased consumption results in an increased demand for water from the agricultural and industrial sectors and if one sector appropriates an increased share, the other sectors will almost certainly experience shortages. At present, agriculture dominates the demand placed on fresh water and it is estimated that as the world population grows and as food consumption increases, more fresh water will need to be channelled to agriculture. In the south-western United States the increased demand for fresh water in growing cities there has led to a decrease in irrigated agriculture, resulting in large areas of productive farmlands returning to desert (Brown 1998: 261). This impacts firstly on food security, and secondly increases the risk of conflict between different sectors. Already tension is heating up between domestic users in swelling cities such as San Diego and Los Angeles and farmers who use 83% of California's water, but only produces 3% of the state's economic wealth (Harper 1996: 78).

Different levels of development spur different environmental problems due to the fact that the social driving forces behind environmental degradation in a developing context are not the same as those in a developed context. In fact, environmental problems are often the manifestation of deep-rooted social, political and economic problems prevalent in a certain geographic area (Redelinghuys 2000: 42). Poverty, combined with population pressure and lack of adequate access to the natural resources base, often leads to the destruction of the natural environment in developing regions. These social, political and economic factors, however, work within a specific bio-physical environment to induce resource scarcity in these regions. Environmental problems in the developed world are, on the other hand, in

most cases the result of economic progress, technological development and uncontrolled consumption patterns. In terms of fresh water, developing regions commonly experience social, political and economic challenges that result in a distinctive profile of water scarcity and influence access to water resources. The context in which water scarcity develops in the developing world is not, however, only determined by socio-political and socio-economic factors. Geography and climate conditions determine the physical distribution of water across the globe, placing some nations in areas with larger available water supplies, temperate climates and, ultimately, relatively high levels of water security as was discussed in paragraph 2.2.

When analysing environmental scarcity and its conflict potential, the wide array of social, economic and political factors involved need to be considered, since these act as socially and humanly induced driving forces of resource scarcity. On the other hand, the external factor of the physical environment that acts independently of the society living in this environment should not be left out of the picture when constructing a profile of scarcity and conflict. In analysing these factors, a profile of the driving forces of environmental issues, in this regard water scarcity, can be compiled. This profile can then be used to construct a picture of scarcity induced conflict in a specific socio-economic and socio-political context. Homer-Dixon (1999: 17) points out that it is important to consider the numerous contextual factors unique to a specific situation in determining the degree to which environmental scarcity influences conflicts. However, *"analysts should [also] avoid swinging to the …extreme, in which the causal role of environmental scarcity is entirely subordinated to that of contextual factors"* (Homer-Dixon 1999: 17). With this in mind, the significance of water scarcity in the socio-economic context of Sub-Saharan Africa needs to be expounded.

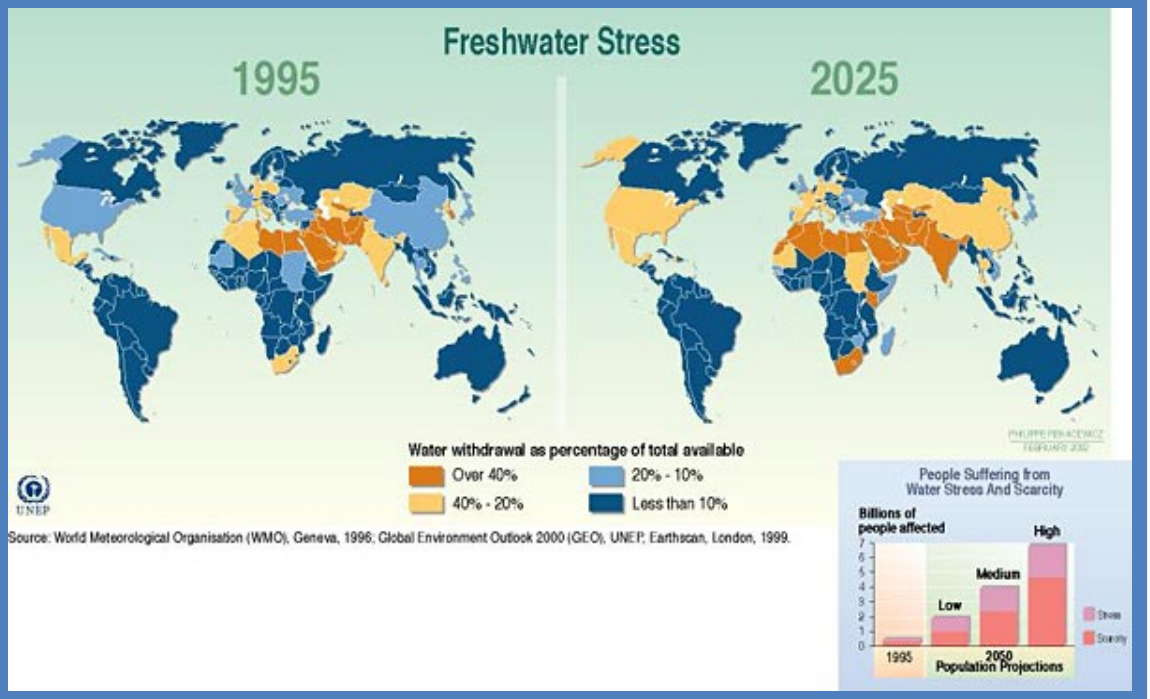
2.3 Sub-Saharan Africa as an epicentre of future water scarcity and water conflicts

Almost the entire Africa, which forms a significant part of the developing world, is particularly at risk of growing water shortages. Many African countries are already experiencing water shortages on a frequent basis as a result of the combined effects of climate change and population growth. Benson & Clay (2000: 288) indicate that Sub-Saharan Africa is the driest continent-sized region in the developing world. Droughts occur so

frequently that at least 60% of the region is said to be vulnerable to drought, while 30% is regarded as highly vulnerable.

Map 3 gives an indication of the growing worldwide problem of water scarcity in the next 25 years, and highlights South Africa as one of the countries that will have to address the problem of increasing water shortages. Some projections suggest that by 2025, 48 countries and 3 billion people could face chronic water shortages (Van Eeden 2001: 17). Another facet of this problem is the fact that existing supplies of fresh water are threatened by rising pollution levels, severely compromising the quality of already scarce water supplies.

Map 3: Global projections of water stress (1995 & 2025)



Source: UNEP 2008.

To put the issue of water scarcity into perspective it is useful to note that during the past 50 years, the number of Sub-Saharan African countries classified as water scarce have grown from one (Djibouti) in 1955, to seven (Djibouti, Cape Verde, Kenya, Burundi, Rwanda, Malawi and Somalia) in 1990 (Dinar & Keck 2000). It is estimated that this figure could rise to 21 in 2025. All countries in southern Africa could experience either water stress or absolute water scarcity in the next two decades[5].

2.4 Water as source of conflict

The ever increasing prevalence of water scarcity, the effects of population change, socio-economic development pressures and changes in political arrangements may tax the institutional capacity of nations to effectively deal with future water issues and may change the way in which water is perceived and dealt with. Although conflict to the extent of war has not generally characterised relations over water, tension is certainly felt where a number of issues of shared water resources between riparian countries are concerned. However, historical analyses have convincingly proven that conflict over water is dealt with through cooperation more regularly than through conflict. In fact, at an international level, Wolf *et al.* (2005: 1) emphasise that instances of cooperation between riparian nations outnumber conflicts by more than two to one between 1945 and 1999. For nations to cooperate over the various issues surrounding water distribution and allocation, an institutional framework within which cooperation and negotiation can take place is necessary. However, in spite of these optimistic forecasts, the realities of growing water scarcity and increasing levels of human insecurity, combined with inadequate legislative, policy and institutional guidelines and mechanisms, may seriously hamper future cooperative relationships between countries sharing water resources.

Deteriorating per capita availability resulting from increasing demand and decreasing quality is an important factor in diminishing levels of human security. Ashton (2000: 98) emphasises that as demands for water approach limits of available supply, tension over water will occur first in areas where water is in shortest supply, from where conflict will then spread further as scarcer water resources are used or transferred to meet rising demands. Thus, tension over

[5] The term 'water stressed' indicates countries with between 1000 and 1700m³ of fresh water available per capita, while 'water scarce' denotes countries with less than 1000m³ of water per capita.

fresh water at the local and the regional level could in all likelihood spill over into the international arena as more and more people are affected by water scarcity (Wolf 2001: 1). On a regional and national level, water is leading to, and aggravating several conflict situations between different nations across the globe.

Water does not respect local ethnic boundaries, or national political boundaries, and this exacerbates the problem of conflict and competition between users. Tension over water can range from localized clashes between, for instance, rural and urban users, to conflicts between nation-states. The brewing tension between Californian farmers and city dwellers over scarce water sources there and clashes between pastoralists and agriculturalists in the Sahel in North Eastern Africa illustrate the conflict potential of water on a local and ethnic level in different parts of the world (Harper 1996: 78; Obi 1998: 44). The United Nations estimated in the early 1990s that there was a real threat of war over water in at least 10 areas in the world (Cylke 1993: 58).

For the last four decades water has been a source of conflict in the Middle East. Israel has since 1967 controlled most of the Jordan River's headwater and basin, leaving downstream countries with insufficient water supplies. While Israel is literally *'making the desert bloom'* with irrigated agriculture of various crops, many Palestinians lack running water and have to buy their water from trucks or capture the little rain that falls in cisterns. While Palestine is situated on top of the West Bank aquifer (supplying 25% of Israel's water), Israel forbids them from accessing the water in this aquifer (Robbins 1998: 3). As the Israeli population is set to grow from 7.3 million in 1997 to 9.3 million in 2025 (WPDS 2007), they could place an even greater demand on scarce water sources in the region. This could exacerbate existing inequalities over water, leading to heightened tension over water resources. Water disputes also exist between Israel, Jordan and Syria over the water of the Jordan River (Gleick 2000). No wonder the Middle East is referred to as a hot spot for conflict over water (Robbins 1998: 3).

Another region that illustrates the conflict potential that water holds is North East Africa. Egypt is almost entirely dependent on the Nile for its water supply, but this river flows through eight other countries before entering Egypt. All but 3% of Egypt's water comes from the Nile and the country is already using almost all its available water supplies (Harrison 1993: 52). While Egypt will need more water in future to meet its growing water

demands, the growing demands of upstream countries are seriously threatening Egypt's water supplies. Egypt is especially concerned over Ethiopia and Sudan's plans to build major dams upstream which will affect Egypt's water supply severely. In the face of these developments tension between the different users of the Nile water is rising rapidly. Many more situations of tension and conflict exist across the globe. Among others deserving mention are the conflict between Syria, Iraq and Turkey over the Euphrates river, the tension between India and Bangladesh over the Ganges, India and Pakistan over the Kashmir and the growing tension between Germany and the Czech Republic over the Danube. It therefore comes as no surprise that some analysts have suggested that water could replace oil as a major cause of war in the near future.

Southern Africa as a semi-arid and arid region is subject to similar potential conflict situations over scarce water resources in the area and in the context of this study, it is necessary to outline the hydropolitical context of Southern Africa briefly.

2.5 The Southern African hydrological context

Annual renewable freshwater resources in the whole Southern African region total 325 km^3 (Own calculation, see Table 3). However, several countries such as Namibia and Botswana mainly have unpredictable and episodic non-perennial or ephemeral rivers within their borders. Therefore, these countries rely strongly on rivers rising outside their borders. In terms of evaporation, Southern Africa has a moisture evaporation rate of above 1500 mm per year. The largest part of Southern Africa has a mean precipitation rate of between 50 mm and 250 mm per year, although precipitation is highly seasonal, leaving large sectors of the population in conditions of water scarcity for extended periods of time. Botswana, for example, is characterised by an arid and semi-arid climate with low rainfall and high rates of evaporation. An average of 416 mm rainfall per year falls mainly in localised showers and thunderstorms, resulting in extended dry periods. Furthermore, the average rainfall in South Africa is 495 mm per year, but only 35% of the country has a precipitation of 500 mm or more, while 21% has a precipitation of less than 200 mm. Similar climate conditions prevail in other countries in the region (FAO 2006; Falkenmark & Widstrand 1992: 8; UNESCO 2003: 76, 77).

Currently, three countries in Southern Africa are water-stressed, namely Lesotho, South Africa and Zimbabwe based on the commonly accepted categorisation of water-stressed as

having less than 1700m³ of available water per capita (Table 3). Based on UN medium population projections, only Lesotho will move into a better position with regard to per capita water availability in the coming half century, while the rest of Southern Africa will all have less water available per capita over time.

Recently, tension between Botswana and Namibia arose over Namibia's plans to divert water from the Okavango River to relieve drought conditions (Robbins 1998:3). The Namibian plan was one of the contributing factors in Botswana's decision to increase their military arsenal in 1996. Increased military arms build-up by Botswana may have deterred Namibia from following through with their plans. In 1997 the Namibian government announced that it would not continue with the project without Botswana's approval and until the outcome of a feasibility study for the whole Okavango river basin is known (Le Roux 1997:117-129). Conflict could also erupt between Zimbabwe and Mozambique over Zimbabwe's plans to build another dam in the Zambezi River. If current projections of water scarcity in this region are correct, conflict over scarce water resources might become a very real threat to regional political stability in the near future.

South Africa's water demands will increase by more than 50% by the year 2030, while this country is, furthermore, expected to experience a situation of more or less permanent drought between 2002 and 2040 (Balance & King 1999:20; Yeld 1997:46). By 2050, South Africa will already approach the 1000 m³ benchmark for water scarcity. More than half (54%) of the region's population reside in South Africa. By 2050 this country will still be home to the largest share of the region's population (44%). Water scarcity, combined with population pressure, may increase vulnerability to conflict if South Africa is in need of more of the total pool of resources to cater for the water needs of its population. Currently, South Africa's relations over water with its neighbours indicate that South Africa is acutely aware of the importance of securing a large share of available water resources for its population and development needs. South Africa is in agreement with Lesotho to export water to South Africa through the Lesotho Highlands Water Project (LHWP) to secure a steady water supply for the Gauteng region – a growth point for the country, both economically and demographically. This agreement points towards the importance of securing water for economic and social development in South Africa that will continuously feel the pressure of population increase and development demands on scarce water resources in the country.

Other agreements include intergovernmental discussions for the sharing of the Orange (among Namibia and South Africa) and the Limpopo (among Botswana, Zimbabwe and Mozambique) rivers are also underway (FAO 2006: 5).

Table 3: Per capita water availability in Southern Africa (2003 – 2050)

	Total available water Km³ p/y	Total water available (km³)	Water resources Total renewable per capita (m³ p/y)		
			2003	**2025**	**2050**
Botswana	14.4	1.6	9 345	8701	8685
Lesotho	3.02	5.2	1 485	1787	1886
Mozambique	216.11	117	11 841	7843	5747
Namibia	17.94	2.7	10 211	7122	5863
South Africa	50	52.8	1 154	1035	1028
Swaziland	4.51	2.8	4 876	4626	4396
Zimbabwe	20	15.5	1 584	1386	1265

Sources: Own calculations based on UNDP 2004 & UNESCO 2003 data.

The above only represents a limited picture of the conflicts over water that is currently brewing, but serves to illustrate the importance of placing water on the policy agenda of individual nations and at a global level.

2.6 The lack of policy agendas and intervention strategies as mechanisms to address tension and conflict over water resources

Currently, the study of water scarcity has, to an extent, progressed past acknowledging the possibility of conflict over fresh water and has matured so that attention is now focused on understanding the multi-dimensional range of factors that may converge to spur conflicts over fresh water, and actively working towards strategies that would mitigate or prevent future conflicts. Among the best contributions in this regard are made by, Gleick (1993), Turton (2000) and Wolf (1998).

While water is a source of conflict, many nations are willing to cooperate with neighbours in formulating shared water agreements. Such agreements are in place between Israel and Jordan and India and Bangladesh. However, although countries appear to willingly enter into agreements over water, implementation of these agreements does not always follow, or implementation is often not sufficient to prevent tension and conflict. This represents a serious flaw in the way in which water issues are being addressed, nationally and internationally. Furthermore, as a result of tension between irreconcilable views, paradigms and expectations imbedded within the policy and institutional framework, tension arises

between states, groups and between states and international institutions with respect to interpretation and application of policy.

On another level, most countries in the developing world do not have any action plans in place to cope with water scarcity in general. Without adequate policies, strategies and measures in place to cope with water scarcity in the long run, many nations run the risk of having to use more than their fair share of shared water sources to alleviate water scarcities in their countries. Often these measures, taken in the face of imminent disaster, will negatively affect other nations relying on these water sources, as was the case with the water dispute between Namibia and Botswana.

Rosegrant (1995: 4) emphasises with regard to cooperation over water that long-term solutions for water scarcity will require international cooperation between countries and that future directions in policy must transcend national boundaries. Water issues cannot, therefore, be addressed by countries at a national level without taking the water needs of their neighbours into account, especially where water sources are shared between countries.

To conclude, growing water scarcities, ineffective water-sharing agreements, low institutional capacity and the low level of preparedness for future scarcities could seriously affect the socio-political stability in many parts of the world as different water users compete with each other over diminishing water resources.

3. Research aim and objectives

In the light of the above problem of water scarcity and potential conflict over water sources, the main aim of this study was the development of a strategy in the form of policy guidelines for preventing scarcity induced water conflicts and dealing with conflicts over water at a regional level, and in Southern Africa in particular.

Stemming from this aim, the following objectives were set:

Table 4: Objectives and research questions

Objective	Research questions
4.1 To gain in-depth understanding of the social, economic and political dynamics that underlie current relations over water, globally and more specifically in the Southern African region.	• What are the current political framework/ context that underlie decisions over environmental issues? • How does this framework influence political relations over fresh water? • How are environmental issues perceived by those in decision-making structures? • Which social paradigms underlie society's perceptions of environmental issues? • What is the nature of the current socio-economic context in which issues over water develop? • What is the relationship between population dynamics, socio-economic development and water scarcity? • What are the main challenges with regard to relations over water in the 21st century?
4.2 To assess current ways in which water issues are being addressed at the international and the regional level, by focusing on the existing global and regional policy frameworks for dealing with water scarcity.	• What policy and legal frameworks exist for dealing with water issues? • What are the major themes that influence relations over water, either towards conflict or cooperation? • How are the challenges over water and cooperation taken up into the current policy framework? • What are the main considerations that influence policy decisions over water? • How are these issues incorporated into the current policy framework?
4.3 To assess the institutional frameworks within which water issues are currently being dealt with at the international and the regional levels.	• What institutions play a role in dealing with water issues? • What is the capacity of these institutions to play a role in cooperation and prevention of conflict? • What sources of conflict are there in the current institutional framework?
4.4 To develop a set of policy guidelines that can be used to facilitate cooperation over water issues in Southern Africa.	• What issues are currently not being addressed by the existing policy framework? • How can these issues be addressed better by a policy and institutional framework over water?

4. Research design and methodology

This study falls within the study terrain of sociology and more specifically within the bounds of the environmental sociology. As a discipline, sociology aims toward understanding human society and concerns itself with all social aspects of human existence such as social structures and processes, social institutions and social phenomena. As a sub-discipline, environmental sociology studies the relationship between the natural and social environments and thus is interested in issues arising from this relationship (Harper 2008: 28). Therefore, this study deals with socio-political issues arising from an environmental issue – water scarcity – and is imbedded in the sub-discipline of environmental sociology. The study is therefore primarily

a sociological analysis of the issue and although reference is made to political and economic theories, the study by no means aims to offer an in-depth economic or political perspective on the issue.

This study had a qualitative and interpretative research design. Babbie (2007: 378) describes qualitative research as *"a nonnumerical examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationships"*. The researcher aimed with this research design to gather systemised information and interpret it through analysing different sources of literature, and through in-depth interviews in order to identify recurrent themes with regard to water conflict prevention and intervention.

To achieve the aim and objectives of this study, four main sources of information were used, namely primary and secondary literature sources, secondary demographic and environmental data, policy and legislative documents, as well as information obtained from personal key-informant interviews. The literature review informed objectives 4.1 – 4.4 (See

Table 4), while the key-informant interviews were paramount in achieving objectives 4.3 – 4.4. These key informants were based in selected countries in Southern Africa. The data obtained through these sources were triangulated to achieve interpretation, validity, verification, objectivity and reliability of data.

4.1 The literature review

A very extensive and intensive literature review was conducted in order to explore the various dimensions of the issue under investigation. Emphasis was placed on reviewing case studies of water conflicts, as well as concentrating on policy documents dealing with water issues around the world. Although the global arena was set as the general point of departure, the situation in Southern Africa more specifically provided the analytical framework and served as reference point for the development of the guidelines referred to in

Table 4 (objective 4.4)

The aim of the literature review was to:

- explore the social and political ideologies underlying current perceptions with regard to environmental scarcity in general and water scarcity in particular;
- provide a detailed picture of the social context in which water scarcity and conflict over fresh water may be more likely. In this regard, the socio-economic and socio-political factors that contribute to water scarcity and that may trigger water conflicts were investigated;
- outline the existing policy and institutional framework with regard to water.

4.2 The field study

An intensive field study also formed part of the study. The field study consisted of personal in-depth interviews with strategic key informants in key institutions working in the water sector at national, regional and international levels and who were knowledgeable on the subjects of water scarcity, water conflict and policy formulation on water issues. The aim of the field study was to:

- obtain first-hand knowledge of the specific situation of water scarcity and water-induced conflicts in Southern Africa;
- explore core areas in the formulation of intervention strategies and policy guidelines;
- substantiate and verify sentiments and arguments put forward in the literature.

4.2.1 Target population and sampling

For the purpose of achieving the aim and objectives of the study, it was necessary to include the ideas, opinions and suggestions concerning the subject of various people knowledgeable on the issue. The level of analysis was the international and the regional levels, while the unit of analysis in this case was organisations, since the views expressed by government and non-governmental organisations were of particular significance for the study.

A number of different regional institutions and government agencies in Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland as well as international institutions such as UNWater and regional institutions such as The Global Water Partnership – Southern Africa, were approached for interviews, although in some cases it was not possible to obtain

interviews with identified key informants because of, among others, time and budget constraints[6]. Subsequently, a non-probability sampling technique that Babbie & Mouton (2001: 288) refer to as *multi-person continuous interviewing* was employed. In this form of data gathering the researcher gained as much information from each key informant as possible until sufficient data was collected. As a result, interviews were between one and three hours in duration. Each informant was then asked to refer the researcher to other knowledgeable informants in their professional network – a strategy referred to as snowball sampling. The researcher thus relied strongly on references from one informant to the next in order to locate and network the most appropriate informants. The following institutions and government departments were included as part of the target population:

- The Department of Water Affairs and Forestry, South Africa;
- The CSIR;
- The Ministry for Environmental Affairs, Lesotho;
- The Komati Basin Water Authority, Swaziland and South Africa;
- The Trans-Caledon Tunnel Authority (TCTA);
- The IUCN (International Union for the Conservation of Nature);
- The SADC Water Sector;
- The Global Water Partnership – Southern Africa (GWP-SA);
- Independent consultants.

A total of 11 interviews were conducted between December 2006 and November 2007, although networking with various key informants was already initiated during the course of 2006.

[6] This limitation is discussed in more detail in paragraph 5 of this Chapter.

Table 5: Outline of interviews

Affiliation	Key informant	Date and place of inteview
KOBWA (Komati Basin Water Authority)	Mr. Chris Keevy, CEO	11 December 2006 Piggs Peak, Swaziland
KOBWA	Mr. Ian van Zuydam, Environment and resettlement manager	11 December 2006 Piggs Peak, Swaziland
KOBWA	Mr. Enoch Dlamini, Manager responsible for Water Management	12 December 2006 Piggs Peak, Swaziland
Ministry of Environmental Resources, Lesotho	Mr. Imannuel Lesoma, Ministry of Environmental Resources, Lesotho	21 December 2006 Maseru, Lesotho
Council for Scientific and Industrial Research (CSIR)	Dr. Anthony Turton, Strategic Leadership Water Resource Competence Area	9 July 2007 Pretoria, South Africa
Global Water Partnership (GWP)	Ms. Ruth Beukman, Regional Secretary	30 July 2007 Pretoria, South Africa
Global Water Partnership (GWP)	Mr. Andrew Takawira	30 July 2007 Pretoria, South Africa
International Union for the Conservation of Nature (IUCN)	Ms. Tabeth Chiuta, Regional Programme Coordinator	30 July 2007 Pretoria, South Africa
BNC Project, Al Bader International Development Company. Formerly Ministry of land and agriculture, Lesotho	Dr. Ahmed Adam, Vice President	2 September 2007 Via e-mail from Khartoum, Sudan
Lesotho Highlands Water Commission (LHWC), RSA Delegation	Mr. Leon Tromp, Alternate Delegate	19 October 2007 Maseru, Lesotho
Consultant, Lesotho Highlands Development Project	Mr. George van der Merwe, Independent Consultant	19 October 2007 Ladybrand, South Africa

4.2.2 Operationalisation of data collection

Data was collected by critically reading literature on the subject, by obtaining demographic and hydrological data from secondary sources, by analysing appropriate policy and legislative documents and through unstructured key-informant interviews.

- **The literature review**

A wide range of sources on water scarcity, water conflict and policy responses were consulted in order to compile the literature review. These sources included books, articles from scientific journals, and articles from websites. Initially, a number of keyword searches were done on various databases such as the Social Sciences Citation and Academic Search

Premier. A keyword search was also done using internet search engines. The literature found through these searches was then studied and from there other sources were identified. These sources were identified through references made in literature sources and through identifying other key words that could yield further sources of literature. It must be emphasised that the literature review was not regarded as completed until the end of the study, since key informants also referred the researcher to sources of literature. Key informants also provided the researcher with sources of literature and where applicable these sources were integrated into the existing literature review. Through the literature review, the researcher could identify specific core issue that needed further elaboration and substantiation through key-informant interviews.

- **Demographic and hydrological data**

It was essential for the purpose of this study that information regarding the demographic, socio-economic and hydrological contexts be obtained. This was necessary to firstly determine the current status of water availability in relation to different demographic and socio-economic features for the world in general, and for Southern Africa specifically. Secondly, this data could then be used to make projections of future availability of fresh water in relation to future demographic and socio-economic development trends. Therefore, in addition to the above literature review the researcher also used demographic, socio-economic and hydrological data to determine the current situation with regard to water scarcity and the socio-economic context.

Demographic data was obtained mainly from three sources, namely, UNFPA State of the World Reports for various years, Population Reference Bureau (PRB) Data Sheets for various years until 2007 and data obtained from the UNDP website. Socio-economic data was also obtained from the UNDP website, specifically the World Development Reports and the Millennium Development Reports.

- **Key-informant interviews**

In addition to personal references by key informants, the appropriate persons with whom to conduct interviews were mainly determined by visiting websites of identified institutions and organisations and through telephone conversations. These informants were then contacted by telephone or e-mail in order to arrange interviews. Interviews were conducted by the

researcher personally and each interview was recorded on a digital voice recorder. An interview schedule (Annexure A) was compiled during the course of compiling the literature review and these questions formed the basis for conducting the interviews. However, since each institution and government agency could provide new insight into the issue of freshwater scarcity and the intricate linkages within the policy and institutional framework, the researcher adopted a more flexible approach to allow an in-depth discussion on pertinent issues in the area of expertise of the respondent, rather than to be bound strictly to the interview schedule.

Interviews focused on the overall objective of the study, which is to formulate comprehensive policy guidelines for preventing and dealing with scarcity induced water conflict. Issues identified during the initial literature review were discussed during key informant interviews. As other issues were identified during each subsequent interview, these issues were then explored again in the subsequent interview. In this way each interview built on previous interviews. Information gathered through the in-depth interviews were then used to enrich and substantiate the findings of the literature review, as well as to identify specific issues of importance in developing a policy guideline to prevent and intervene in conflicts over fresh water.

Each interview was transcribed and analysed qualitatively by the researcher. In this analysis attention was paid to identifying recurrent themes of issues that could hamper cooperation over freshwater resources and lead to conflict.

5. Limitations of the study

One important limitation of the study was the lack of cooperation from some key institutions. After several attempts at securing interviews with key informants in the South African Department of Water Affairs and Forestry (DWAF) by telephone and e-mail, and by attempting contact with several different identified key persons, there was still a lack of cooperation and, no interviews with key informants in this institution at national level could be secured. However, the researcher did succeed in interviewing one of the LHWCs South African Delegates that could provide information on DWAF and on the linkages between DWAF and parallel departments in neighbouring states.

Due to the dominant institutional positions of some key informants it was not possible to secure interviews, since their time-schedules and their positions did not allow for interviews on studies of this nature. The researcher did attempt to communicate with these informants via telephone and e-mail, but these methods of communication did not allow for more in-depth discussions on relevant issues.

Some identified key-informants were situated in countries inaccessible to the researcher due to budget and time constraints. For example, two identified informants were respectively stationed in Khartoum and Addis Ababa. Although the researcher did manage to conduct interviews via e-mail, the nature of electronic communication does not lend itself to in-depth probing on certain key issues.

6. Ethical issues

Before travelling to interview each key informant, the researcher communicated with the informant on the purpose and objectives of the interview. This was either done through e-mail in which a brief outline of the study was given and the purpose and objectives of the interview were communicated, or by telephone conversation. Before commencing with the interview, verbal consent to record the interview for the purposes of this study was obtained from the particular key informant. The researcher also indicated that once the study was completed, a summarised report of the findings will be provided to each institution that contributed to the study.

One ethical issue that must be pointed out is that there is a degree of political mistrust between different countries surrounding water issues that in some cases made it difficult to collect more pertinent information with regard to conflict and cooperation. In one interview in particular, the interviewee refused that the interview be recorded since he was afraid of what information the researcher would then be able to convey to the South African government. Where informants indicated that a specific comment should not be used in the study, the researcher respected the request of the informant.

7. Value of the study

The study proves valuable in several respects:

Firstly, it provides policy makers, as well as agencies and organisations active in the field of environmental scarcity, with a set of comprehensive guidelines for dealing with the issue of water scarcity and scarcity-induced water conflict, particularly in Southern Africa. Such a set of guidelines might prove a valuable reference in future, as Sub-Saharan Africa is set to turn into a focal point of water conflicts in the next two to three decades.

Secondly, the study contributes to the existing literature base of environmental scarcity and environmental conflict on a general level, and particularly as far as water-related conflicts in developing nations are concerned.

Thirdly, the study explored and identified key dilemmas that are hampering future cooperation over fresh water. Insight into these dilemmas by those in decision-making positions is valuable in preventing future tension and conflict over shared water resources.

Fourthly, this study assisted in raising awareness of a pressing global issue and its complexities and challenges at regional and local level

8. Thematic overview of the study

Chapter 1: Problem Statement and Methodology

This chapter provided the rationale behind this study and also outlined the methodology and operationalisation of the study.

Chapter 2: The Sociology of Environmental Scarcity: Environmental Scarcity and the Social Environment

This chapter focuses on providing a social theoretical basis for the study by firstly outlining the role of sociology in studying environmental issues. The significance and value of water cannot be understood or appreciated if it is not viewed in relation to the existing worldviews and dimensions of human society. Secondly, this chapter discusses the main social paradigms that underlie policy and action with regard to environmental issues. This is important since the way in which environmental issues are viewed by those in decision-making positions guide strategies and policy to deal with these issues and the social consequences (i.e. conflict) thereof.

Chapter 3: The incorporation of environmental security into the current political arena

Chapter 3 gives a broad overview of how the environment is perceived from the perspective of important political worldviews in the light of the fact that states are politically and environmentally interdependent. It further shows that since environmental concerns, such as resource scarcity, significantly affect the quality of human and social life and ultimately impact on political security, environmental issues are crucial in political decision making. This given, this chapter seeks to outline the significance of the environment as a political security concern and therefore, firstly undertakes a comprehensive conceptualisation of security. Secondly, the political paradigms that underlying political relations theory are discussed, since these paradigms determine the importance of the environment, and other non-political concerns, in political relations.

Chapter 4: The relationship between population dynamics, socio-economic development and water scarcity

This chapter contextualises the relationship between population and environment by linking the demographic and environmental realities that are surfacing as a powerful determinant that is decreasing human security worldwide, and more specifically in Southern Africa. This has a resultant negative impact on future political stability and interstate cooperation. A critical analysis of the demographic realities and related socio-economic issues facing the world and the Southern African region is therefore undertaken to highlight the demographic challenges that render this region vulnerable to scarcity of and conflict over freshwater resources.

Chapter 5: The institutional and legislative landscape for regulating international water relationships and disputes

This chapter evaluates the capacity of the existing policy and the institutional framework to deal with water-related issues of the kind that are addressed in the study. The international conference dynamic that shaped international environmental policy and institutions in general, and water policy and institutions specifically, is outlined and analysed with regard to its impact on water policy development. The development of an international legislative framework to deal with water issues is also discussed. More importantly, this chapter discusses and evaluates the development of a regional policy and institutional framework regarding water in the Southern African region in terms of its efficacy to prevent and intervene in conflicts over freshwater resources in the region. This chapter also includes

references to data gathered by means of in-depth interviews with key informants and thus also comprises an empirical component.

Chapter 6: Exploring the key issues that is hampering effective prevention and intervention in future conflicts over fresh water

In this chapter it is argued that, while there are more indications of cooperation over water than conflict, some pertinent underlying dilemmas may be detrimental to future cooperation over fresh water. These dilemmas form critical undercurrents that are stagnating and even hampering progress in international and regional policy and institutional developments aimed at fostering cooperation and preventing conflicts over this scarce resource. It is further argued that these dilemmas prevent a new direction in policy from being taken. This chapter further identifies core dilemmas and issues that need to be addressed in the international policy framework if water scarcity and potential conflict over fresh water are to be adequately addressed.

Chapter 7: Conclusions and recommendations

In this chapter the main conclusions with regard to the study will be discussed and recommendations and guidelines with the view to future policy developments are given.

Chapter 2
The sociology of environmental scarcity: environmental scarcity and the social environment

1. Introduction

In the context of scarcity, humankind is continuously confronted with the reality of dwindling natural resources. Declining levels of resources, such as water, fossil fuels, minerals and soil are problematic due to the various negative impacts that this may have on human society[7]. Resource scarcities, in turn, are fuelled by social factors such as population pressure, overconsumption and industrial development. Therefore, the relationship between society and the decline in the quality and quantity of resources is influenced by social factors, while resource scarcities again influence human society. Environmental scarcity is just one of the many facets of the current state of the natural environment that leads to concern.

Resource scarcities are inherently created and understood within the socio-political and socio-economic context in which they develop. Not everyone active in the environmental field are equally convinced about the nature, or extent, of the environmental crisis that humankind is facing, or agree upon appropriate strategies to deal with the environmental problems challenging humankind. Therefore, like so many other resources in the natural environment, the significance and value of water cannot be fully appreciated by humankind if it is not seen in relation to different facets and worldviews of human society. It is therefore

[7] To illustrate the extent of dwindling natural resources consider the following: between 1950 and 1996, the average amount of grain land per capita has decreased by almost 50% - from 0.23 hectares to 0.12 hectares. By 2030, the available grain land per capita could decrease to 0.08 hectares; per capita forest area has fallen by 50% from 1.2 hectares per person to 0.6 hectares in the last forty years leading to severe loss of biodiversity and the extinction of species (UNFPA 2001: 15,23). Fisheries across the globe are collapsing due to the fact that the global demand for seafood is overrunning the sustainability of the oceans (Brown 1998: 258). Lastly, water demands have increased to the extent that aquifers in many regions of the globe are running dry and the natural system cannot keep up with the demands placed on it by growing human needs. Already the water tables in some cities in China, South America and South Asia are declining by over a metre a year (Myers 1998: 21; UNFPA 2001: 13).

necessary to focus on the theoretical frameworks that attempt to explain the relationship between society and resource scarcity.

Furthermore, how environmental scarcity is perceived by those in decision-making positions will strongly guide the interventive and preventive strategies employed to deal with scarcity and environmentally induced conflict. In this manner, assumptions about scarcity will influence the nature of environmental and political policy regarding these issues determinedly. Therefore, attention is devoted to the main thought patterns underlying awareness, intervention and prevention of environmental problems and the implications of each of these in terms of policy decisions.

To understand these social processes and paradigms that underlie action towards environmental issues, one needs to have a firm social scientific basis from where to explore this dynamic interplay between factors. So far, social theory has progressed significantly in terms of its understanding of the complex relationship between human society and the natural environment. Whereas, social theory in the past considered the social as separate and irreconcilable with the natural[8], it is now more appreciative of the complex and dynamic interrelationship between the human and natural environments. This viewpoint is aptly described by Barry (1999:10) as *"… the relation between society and environment denotes a series of relationships, physical, social, economic, political, moral, cultural, epistemological and philosophical covering a multi-faceted, multi-layered, complex and dynamic interaction between society and environment"*.

As a first point of reference then, the importance of the social sciences in general, and sociology in particular, in understanding environmental problems and resource scarcity must be determined.

2. Sociology and the study of conflict over environmental issues

Sociologists have only in the past three to four decades become aware of the particularly valuable contribution that the discipline can make to the study of environmental issues. The study terrain of sociology was, after all, demarcated as the *social* environment by the founding

[8] Sociology have traditionally tended to exclude factors such as the biological and the environmental from their analysis in a well-grounded attempt to demarcate the social aspects shaping human life as their unique field of study (Benton 1994: 30). Since the 1970s have sociologists begun to recognise the importance of including the environment as a sphere of life that is of significance to social life.

fathers or classical theorists, notably Durkheim, Comte and Weber. Furthermore, sociological theories were an *"attempt to organise the apparently random nature of social life into coherent social knowledge and, at the same time, raise new questions for social research on the relations between different parts of society, such as how they are constituted and survive as permanent structures, and how they affect individual actions"* (Swingewood 1999:51). On the one hand, the attempt of early sociologists to demarcate the subject matter of sociology was not without merit, since it did succeed in focusing attention on the social aspects that influence human life, thereby largely reserving the social environment as the field of study of sociologists (Benton 1994: 30). On the other hand, it inhibited sociologists to consider the natural environment as a force that could influence human action at the micro-level and social structure at the macro-level.

It is important to bear in mind that during the early development of sociological theory, the environment was not considered in the same light as it is today. During the 19th century, and for the largest part of the 20th century, the natural environment was seen according to an anthropocentric world-view that placed humans in a superior position to an infinite natural resource base. Catton & Dunlap described this view as the Dominant Western Paradigm (DWP) or the Human Exemptionalist Paradigm (Dunlap *et al.* 2002: 20; Harper 1996: 55).

The focus of sociology today, although still primarily on the social environment, has widened since the latter part of the 20th century (particularly from the 1970s) to include the environment as part of its analysis. Today, sociologists working in the field of environmental sociology recognise that the social environment cannot be detached from the natural environment and that humankind is not only influenced by social and cultural factors, but also by its interaction with nature. Humans are furthermore dependent on a finite bio-physical environment that limits human affairs both physically and biologically, and that although humans might think that their inventiveness can extend the carrying capacity of the earth, they cannot repeal the ecological laws of nature (Barry 1999: 209). This view is described as the New Ecological Paradigm (NEP) by Catton & Dunlap (Dunlap *et al.* 2002: 21) The shift in thinking from the DWP to the NEP has occurred in large part as a result of the increased social awareness of the negative impact of humans on the natural environment. It is increasingly being recognised by social scientists that environmental degradation and destruction contributes to some specific social phenomena and problems. Thus, *"social sciences have a more significant role to play in understanding and responding to environmental crisis than has*

been widely assumed in the past" (Benton & Redclift 1994: 2). The increasing pressure on water resources, for example, is instigating and contributing to competition and conflict that has widespread repercussions – from the global social structure through to relations between smaller groups and communities.

With the theoretical heritage of sociology being seemingly not well suited to incorporate the environment into its analysis, some thought must be given to the particular insight and value that sociologists can add to the understanding and study of environmental issues. Firstly, sociology is bringing a distinct and significant social dimension to the study of environmental issues. Sociology's well developed methodology and approach to the study of social issues bring to the study of the environment an ability to incorporate multiple units of analysis simultaneously and systematically into an analysis (Laska 1993: 5). Furthermore, applying a social methodology and asking theoretical questions about environmental issues emphasises the relationship between the social and environmental. In this way, sociology can contribute much to the understanding of environmental issues.

While the focus of environmental sociology is mainly on the interrelationship between social/ human dimensions and the natural environment, this field of study is not only aimed at understanding the cause and effect relationship between social factors and environmental issues. The focus of environmental sociology is much more complex than this. Environmental attitudes and values, and environmental policies, among others, also form part of the study terrain of environmental sociology. Sociology also looks closely at the relationship between social processes and the environment, the political and economic nature of environmental problems and the forces that generate concern about these issues (Cylke 1993: 11). In studying the interrelationship between human society and the natural environment, sociology brings a multi-faceted dimension to the study of the environment that is crucial in understanding both the environment and the social dimensions of environmental issues better.

Even a seemingly environmental concern such as scarcity of fresh water necessarily develops within a social context, which necessitates that a broader sociological approach be followed in studying this particular environmental concern.

3. Theoretical assumptions regarding resource scarcity

The idea of conflict and competition over scarce resources generally assumes that environmental scarcity is the main catalyst of these conflicts, but the influence of environmental scarcity on conflict cannot be fully understood if environmental scarcity itself is not clearly outlined and conceptualised. Demarcating environmental scarcity can prove a daunting task due to the nature of the particular scarcity being subject to the socio-economic and socio-political context in which it is experienced. Therefore, the different sources of environmental scarcity need to be understood, as well as the social, economic and political value that a specific resource holds for the society in which these scarcities develop.

At its core, the concept of scarcity implies lack – it supposes that there is a resource of one or other kind that is in limited supply. Consequently, competition and even conflict to obtain this resource by individuals or groups could result. Scarcity does not, however, necessarily have to be a lack of something that is physical and tangible such as an environmental resource (water) or economic resources (money), but can also be intangible, such as social status or political power. Likewise, competition and conflict over scarce resources can also be either direct – *i.e.* over limited supplies of food, water, space etc., or indirect – *i.e.* over social rank or status, which, in turn, will influence access to resources (Southwick 1996: 298).

Environmental scarcity, firstly, can never only be seen in purely environmental, ecological or resource terms, although the purely environmental aspect of depletion and degradation of natural resources do result in the natural ecological base of the planet being diminished. Resource scarcity is therefore intertwined with social, political and economic forces within the society where this scarcity is present. In this regard, Homer-Dixon (1994: 9) points out that scarcity is not an objective fact, rather it is *"determined not just by absolute physical limits, but also by preferences, beliefs, and norms"*.

What is also problematic is the fact that various individuals and groups attach different meanings to scarcity and therefore, are not in agreement as to the extent of an environmental issue such as resource scarcity, nor are they likeminded on the nature of these problems. As Harper (1996: 62) points out with reference to different groups working towards understanding human-environmental problems:

> *"Natural scientists… tend to see [the] problem in terms of the long-term implications of* ***growth in scale in a finite world****. Economists, on the other hand, tend to frame the causes of human-environment problems in terms of more* ***proximate market failures and resource-allocation problems****… Other social scientists, including some economists, sociologists and political scientists, tend to frame human-environment problems as* ***broad social distribution problems....****"* (emphasis added).

From an ecological point of view, the natural world is, according to many scientists, being subjected to the threat of whole ecosystems collapsing and countless natural resources being depleted at an ever-increasing rate, while from a social, or societal perspective, humankind has had a large part in bringing about the current state of the environment. As a result of various factors, among others population pressure, industrialisation and economic growth, some natural resources might already be pushed beyond a point of ever recovering (Table 6). To come to terms with the impact of humankind on environmental scarcity, some theories have emerged that focus explicitly on attempting to gauge the extent to which different factors of human population are influencing the natural environment and vice versa.

3.1 Distinguishing between environmental scarcity and resource scarcity

In the field of environmental studies, various concepts are employed to indicate the different degrees of scarcity. Among these concepts, environmental scarcity and resource scarcity are often used interchangeably[9]. While both these concepts can be used to point towards the scarcity of environmental resources, some distinction has to be made in order to employ these concepts successfully in the subsequent discussion. To a certain extent, environmental scarcity is used to indicate the general decline of environmental *resources*, but this concept also encompasses the general deterioration of the natural environment. Thus, when environmental scarcity is used, it refers to the extensive and encompassing deterioration of the natural resource base. Environmental scarcity is used to refer to resource decline, but also to the degradation of other environmental components that are not generally regarded as resources *per se*[10].

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[9] See for example Homer-Dixon (1999).

[10] Environmental scarcity is largely the result of humanly-induced factors such as population pressure, the level of socio-economic development, consumption patterns and the use of technology. The impact of humankind on the environment as a result of these factors will receive detailed attention in paragraph 3.2.

On the other hand, resource scarcity refers to the limited availability of natural resources. Among these resources, renewable and non-renewable resources are identified. There has been much concern over the depletion of the so-called non-renewable resources, such as fossil fuels and minerals, but renewable resources such as water, fisheries and soil were for all practical purposes not treated with the same concern. It was generally assumed that these renewable resources could be replenished through natural ecological cycles. Currently, it is continually being realised that the emphasis must not fall so much on the depletion of non-renewable resources, but that the resources being regarded as renewable are in fact more finite than was initially thought. Non-renewable resources are being protected by their finite nature and are essentially subjected to the simple law of supply and demand. As scarcity of these resources increase, their value increases as well, making the resource more expensive. These forces demand that substitutes and alternative technologies be pursued. With renewable resources, users generally assume that the resources are able to replenish and thus continue to exploit these resources to a point where the natural ecological cycle collapses and the resources are depleted beyond a sustainable level. Mathews (1990:4) concludes that *"[t]here are, thus, threshold effects for renewable resources that belie the name given them, with unfortunate consequences for policy"*.

Table 6: The depletion of natural resources

Resource	Rate of depletion
Cropland	Approximately 70 000 km² of farmland are abandoned every year because of top soil loss and during the 1980s the amount of per capita arable land declined by 19% due to soil loss.
Forests	Deforestation, mostly occurring in the developing world. resulted in a loss of some 180 million hectares of forest between 1980 and 1995, an average of 12 million hectares per year.
Fishing grounds	60% of marine species are at, or beyond, their maximum level of sustainable yield therefore their generative capacity is severely affected.
Water	Currently 54% of annual available fresh water is being used With current trends remaining steady 70% could be used by 2025 and if per capita consumption everywhere reaches the level of developed countries 90% of available water could be used by 2025.
Biodiversity	Some 17 500 species are lost yearly.

Sources: Enviropaedia 2006: 67, 183; Southwick 1996: 100; UNFPA 2001: 11.

Scarcity also explicitly incorporates a human dimension. Resources derive their value from the fact that humans and society attach instrumental and aesthetic value to a particular resource. This, in turn, implies competition among groups and between various parts of the system relying on these resources to obtain control over this resource.

3.2 Environmental scarcity and the social environment

Environmental change generally refers to the process through which the environment and ecological processes are altered, either through natural ecological cycles or through anthropocentric causes. Both natural processes and anthropocentric factors can alter particular characteristics of the environment dramatically, thereby contributing to environmental change. Examples of a natural process would be the erosion of sandstone, the alteration of river flow through time, earthquakes and volcanic eruptions. Many of these environmental processes have occurred for millennia without being noticed, or gravely without affecting human lives. Due to the advent and expansion of human civilisation, however, many of these naturally occurring processes have become more visible and threatening to humankind. Some of these processes have only begun to develop significance to humankind due to the impact that these forces have on their lives. If a river changes course due to flooding, for example, it might induce a scarcity of water for the people that have settled near the river. People have generally learned to adapt to these changes created in their environment and for the most part these processes have effected change without resulting in a major crisis for the society involved.

With many anthropocentric factors, however, the process of environmental change is greatly accelerated and the changes are largely negative – resource depletion, loss of bio-diversity and pollution being among the most significant. Humankind's impact on environmental change is largely dependent on the nature of the society that lives in and utilises the environmental resources. Various equations exist that attempt to explain how the impact can be determined.

According to Southwick (1996: 92), three factors determine the human impact on the environment: the size of the population, the activities that they pursue and the duration of these activities. In other words I = NAD. The most well-known and widely used equation is offered by Erlich and Holdren who see environmental impact as being a compounding effect of population, affluence and the level of technology of the population, or I = PAT (Harrison & Pearce 2000: 7)[11].

[11] These equations were not developed to explain resource scarcity *per se*, but are rather used as an indication of how interrelated humanly induced factors impact on the environment. However, since resource scarcity is also an environmental impact, these equations, as the theoretical assumptions that will be used.

Many of the current environmental issues being experienced is the result of a combination of humanly induced factors, but as is noted by Southwick (1996: 93) it is erroneous to assume that the relationship between humankind and nature is firstly only negative, or that it is a simple relationship. In referring to the usefulness of the I=PAT equation, Conca (1994: 28) states: *"[t]his representation is useful because it stresses the role of multiple factors and leads us away from simplistic, single cause interpretations"*. However, the same author also stresses that the equation negates the role of prevailing laws, beliefs, customs, power relations and other aspects of social structure on the elements of the equation and *"… thus flirts with a fundamentally technocratic worldview, in which independent levers such as population, technology, or …affluence can be pulled in ways that keep society within the bounds of carrying capacity"*[12]. For example, both overconsumption and overpopulation play a part in impacting on the environment and neither of these factors is clear-cut and simple. Furthermore, the impact of any of these factors on the environment also depends on the sensitivity of the environment in which it occurs. For example, the impact of population on a subsistence farming community is much greater if their farming activities take place in ecologically sensitive marginal lands. It is worth considering each of the above human impacts on environmental change in general, and on resource depletion in particular.

3.2.1 Population pressure (size of the population and consumption patterns)

Erlich & Holdren's attempt with their equation specifically was to prove that population is the single factor that exerts the most pressure on the environment, but as Harrison & Pearce (2000: 7) emphasise, different factors have been dominant at different periods in history. During the industrial revolution, for example, technological advancement exerted the greatest pressure of all factors in leading to environmental damage, with affluence and population exerting less pressure on the environment. It is, however, hard to ignore the fact that more people will exert greater pressure on the environment than fewer people will. More people will naturally demand more resources for use.

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further on, serve to illustrate the relationship between various social factors and an environmental issue such as resource scarcity.

[12] For a more in-depth discussion on the technocratic world view see paragraph 4.1.

According to a systems, or functionalist, approach, humankind live in a closed, interconnected system where the parts of the system work to maintain equilibrium and where there are limits to the number of organisms that can be supported successfully by the system (Harper 1996: 12, 18). When a species, such as humans, require more from the natural environment in terms of resources, the system will become strained and could eventually collapse under the pressure. An essential element of this approach is the emphasis placed on balance and the harmonious functioning of the system as a whole. It is reasoned that if one part of the system is out of balance, the system will attempt to restore balance and achieve balance by implementing necessary changes in the system.

This is essentially the approach followed by Malthusian and neo-Malthusian theorists in their analysis of the relationship between population growth and resource scarcities (particularly food scarcities). In the view of this group of thinkers, population growth is out of line with the rate of food production and nature would restore equilibrium through balancing factors, or positive checks, if humankind does not bring their population growth in line with the natural resources that exist. These positive checks include famine and war. If too many people rely on scarce natural resources, famine would result and conflict would ensue over the control of these scarce resources. Mortality would increase, bringing population growth in line with resource availability (Ziehl 2002: 46). Currently, neo-Malthusian thinkers point out that environmental degradation is the result of large populations and rapid population growth. Population pressure destroys the natural resources that are needed for survival, particularly in poor nations. However, population pressure is influenced by various other socio-cultural and socio-economic factors, among others poverty, fertility preferences and the position of women in society.

Population size, therefore, does determine the pressure placed on natural resources to a large extent, since people rely on the natural environment for supplying basic needs such as water, shelter, food and living space. The impact of a population on the environment is further determined by the level of consumption and life style of the population. A large population pursuing a consumer driven lifestyle will place more pressure on resources than a smaller population engaged in a lifestyle of affluence.

3.2.2 Affluence

It is not only population pressure in terms of the size and growth that plays a part, but also the amount of resources consumed that determines the impact on the environment. Many populations exert great pressure on the natural resource base due to their consumption patterns, rather than their size. In nations with a large industrial sector, or large commercial agricultural sector, more pressure is placed on water resources than is the case for nations that are mainly engaged in subsistence farming due to large industrial processes and commercial agriculture. On the other hand, poorer nations may exert more direct pressure on the environment due to their reliance on environmental resources that fulfil basic needs, but they may actually have a far lesser impact per person on resources than people living in a consumer driven affluent society.

People in developed, affluent nations generally consume more resources due to their level of affluence than people in developing nations do[13]. In this regard, Myers (1998: 29) estimates that the average British family with two children exerts pressure equal to a family of ten children when their affluent life-style is compared to the global average. An average American may also place at least a twenty times greater demand on natural resources than the average person in Bangladesh (Nebel & Wright 1996: 146). Furthermore, developed nations contribute more to global environmental problems such as ozone depletion and global warming due to their consumption patterns.

The above arguments indicate that the solution to the current environmental issues that the world faces cannot be addressed simply through decreasing population size, but that the other side of the problem, namely consumerism and affluence, also needs to be dealt with. This overconsumption *vs.* overpopulation debate has effectively divided the Northern affluent nations and the less affluent Southern nations in terms of what they consider the main cause of resource scarcity is, and on how the issue is to be handled at a global level. While the affluent developed nations generally believe that the resource issues of the world

[13] Another concept that explains the relationship between people, resource use and the impact thereof on the environment is the 'ecological footprint'. This concept describes the ecological impact of a group on the earth. Therefore, a bigger footprint points to a larger impact on the environment (Enviropaedia 2006: 77). This concept therefore looks at the equation from another perspective – that of the amount of resources needed to sustain a particular population, instead of focusing on the impact of people and their consumption patterns on the environment.

can be addressed effectively through curbing population growth in the developing world, developing nations advocate a lowering of consumption levels in affluent nations.

3.2.3 Level of technology (including human activities)

Technology as is used in the equation by Ehrlich & Holdren refers to the waste created through the production of consumption units. The technological unit of the equation was later elaborated upon by other researchers to also include the technology of resource use with the waste created through production of consumption units (Harrison & Pearce 2000: 8; Harper 1996: 248). In sociological terms, technology encompasses a material and a non-material dimension. Material technology includes all the tools and materials that are used in transforming and controlling the natural environment, and that enable humankind to utilise natural resources. On the other hand, non-material technology is all the practical knowledge (formulas and recipes) that tell humans how to do things. It is also through technology that economic production is created and maintained. While technology can to a certain extent and under certain circumstances lessen environmental impact, "*technology is a major force that makes the environmental impacts of populations unequal*" (Harper 1996: 33). This is because technology enables humankind to utilise the earth's resources more intensively and produce more waste than would have been the case otherwise.

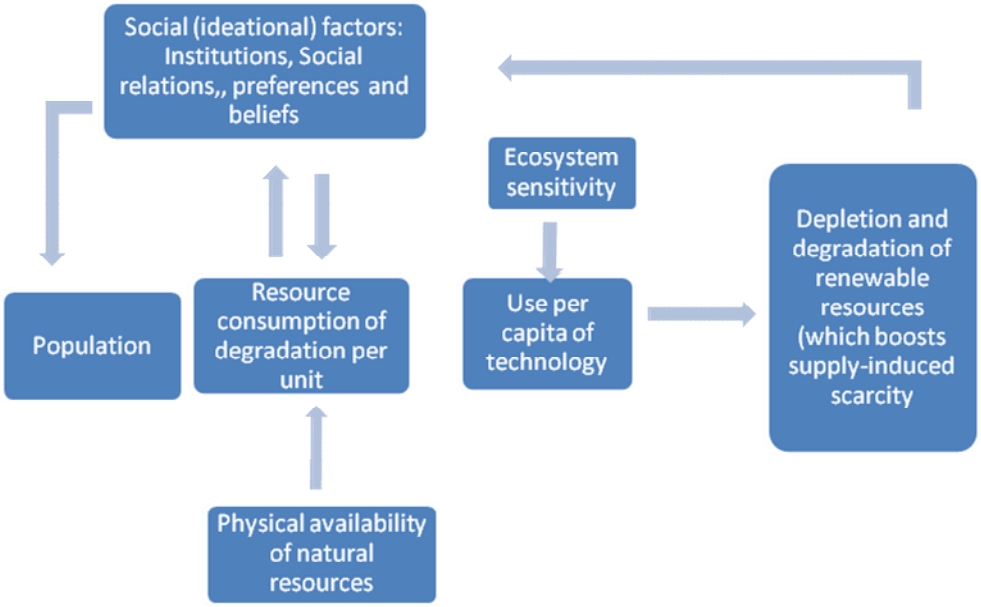
The interplay between the above societal factors leads to what is referred to by Homer-Dixon (1999: 49) as supply -induced and demand-induced scarcity.

3.2.4 Supply-induced scarcity

Supply induced-scarcity is an environmental impact that occurs as the result of the multiplier effect between population, resource consumption and technology available to the population. This type of scarcity occurs when the *'static resource pie'* has to be divided into smaller pieces for the growing number of individuals, or if individuals become more skilled through the use of technology to consume the existing pool of resources, leading to a deterioration and depletion of existing resources. For supply-induced scarcity to occur, a number of natural and social factors must be present. This type of resource scarcity firstly depends on the availability of natural resources and the sensitivity of the ecosystem to handle the influence of human factors. Depletion and degradation of resources secondly is dependent on the size of the population, the technology used and the extent and nature of

resource consumption. These social factors are again determined by the social institutions, relations, preferences and beliefs of the particular human society (Homer-Dixon 1999: 49).

Figure 1: Determinants of supply-induced environmental scarcity



Source: Homer-Dixon 1999: 50.

3.2.5 Demand-induced scarcity

Demand-induced scarcity occurs when population size or consumption increases, leading to scarcity of a particular resource or resources. This type of scarcity can be put as a function of the population size multiplied by the per capita demand for a particular resource (Homer-Dixon 1999: 51). Population size is influenced by various socio-cultural factors, economic considerations, demographics and social relations, while demand for resources is influenced by economic preferences.

In the view of Homer-Dixon (1999: 49) demand-induced scarcities will only arise with resources that are *rivalrous*. A resource which availability is reduced for other users when this resource is utilised by one actor or group is considered *rivalrous*. These are therefore the resources over which competition and conflict take place, such as water, fisheries, croplands and forests.

The factors of population size and increased per capita consumption not only directly contribute to environmental scarcity by increasing a demand for a particular resource. It can also indirectly affect the demand through the impact of these two factors on the supply of the resource. Supply of resources are diminished if increased depletion and degradation of the resource takes place due to population pressure and increased demand for the resource (Homer-Dixon 1999: 52).

Supply- and demand-induced scarcity interact with each other, with depletion and degradation producing a decrease in the supply of resources (shrinking the resource pie) and population growth and consumption increasing the demand for resources. Homer-Dixon (1999:15) puts it that *"[i]n many countries, resource availability is being squeezed by both these supply and demand pressures"*.

Environmental scarcity is further influenced by the distribution of and control over resources. Therefore, scarcity cannot be fully understood if it is not also seen in relation to political factors.

3.3 Environmental scarcity and the political economy of resource distribution

Often the issue at hand is not supply or demand of resources, but access to and control of resources. This is very visible where water resources are concerned. Mention is often made of the fact that there are more than enough fresh water available to supply the needs of the human population, but that these freshwater resources are not equally distributed across the planet, leading to competition and struggle to access and control these resources. Those social groups who control either the political power, the economic means, the social superiority, or all, are in a position to access and control the scarce resources more successfully than those that do not possess any of the above. Therefore, there will always be a struggle between interest groups to gain access to resources.

In a political sense scarcity has much to do with the fact that a resource is regarded as significant enough to induce competition and struggle over this resource. Therefore, society as a whole or interest groups within society must attach a certain value to a particular resource in order to motivate them to control this resource. The issue of power and control over environmental resources is best explored by a number of social theorists working

within the conflict paradigm. The conflict paradigm is, just as functionalism, a theoretical perspective within which sociological theory can be categorised. Theoretical traditions such as Marxism and critical theory all take their main assumptions from the conflict perspective.

3.3.1 Environmental scarcity as influenced by the economic system

The scarcity or abundance of resources are often created and maintained by processes in the economic system. Many resources derive their value from the economic value attached to a particular resource. From a purely economic standpoint, certain economic resources are commodities that can be bought and sold on financial markets and are subject to the governing market forces of the day. In this sense, *"…the economic significance of scarcity has been assumed, in general, to be adequately grasped through concepts such as the economic cost of acquisition"* (Benton & Redclift 1994: 3). Thus, many natural resources are only considered scarce because they are determined scarce with regard to their high market value, while many other natural resources are simply taken for granted and do not figure as quantifiable economic units. It is, therefore, often not truly environmental scarcity, but rather artificially created economic scarcity that determines the financial value of resources.

In many cases, economic forces work to worsen existing resource scarcities due to the fact that the economic law of supply and demand determines resource value. In this regard, it is specifically the theoretical assumptions that underlie the economic system that influences perceptions of scarcity, and also induces resource scarcities.

The developed world functions primarily according to the capitalist principles of supply and demand, profit and distribution of resources based on the financial means to obtain these resources. Industrial market economies continuously seek to expand their markets and corporations operating within this system must therefore continue to grow their operations and increase their profitability (Harper 1996: 59). Within the framework of a capitalist system, profit must, therefore, always be maximised. This is done in various ways.

Marx pointed out that profit is maximised primarily through the exploitation of labour and control over the means of production. Means of production includes all the means necessary for creating profit and would include natural resources (Redclift & Woodgate 1994: 53). Profit is also increased through growth in the consumer market since capitalist corporations

will continue to seek out new, unexplored markets and find new ways to maximise consumption of current markets (Harper 1996: 60).

Schnaiberg referred to the capitalist system as the treadmill of production. The system's inherent need for profit leads producers to market products through the media in order to keep the profit-making system going, even if this leads to severe environmental damage. In the capitalist system environmental problems, such as resource scarcities, are rather counteracted by opening new areas for exploitation than advocating reduced consumption (Hannigan 1995: 20).

Apart from the economic aspects, another dimension that conflict theory has a particular interest in is power relationships, since who has the power determines also who makes the decisions in the economic system.

3.3.2 Power relationships

In a sense, critical theory has laid down an important foundation for studying the power relationships that govern humankind's dealings with nature. Firstly, theorists working from a critical framework *"bemoan the dark side of scientism, industrialism and modernity, and critical theorists … seek the emancipation not just of human beings but of nature as a whole"* (Dobson 1993: 190). The emphasis of environmentalist critical theory is on the fact that man has an instrumental relationship with nature in which nature is to be dominated and controlled. Secondly, in an attempt to subjugate and control nature, man is not only controlling nature, but also himself. Critical theorists argue that man is misled into believing that he is liberated by his control of nature, while the means through which he controls nature is in fact instrumental in enslaving him and taking away much of what is rightfully his (Helliwell & Hindess 2000: 86).

Humans gain control over nature using various ways such as technology, scientific knowledge, labour capacity and production means, but often these mechanisms for control eventually control humans as well. Through technology, for example, Marcuse (1989: 120) argues that humankind loses its connection with nature and with its purpose for living because *"[w]hile the new scientific method destroyed the idea that the universe was ordered in relation to a goal, to a teleological structure, it also invalidated a hierarchical social system in which occupations and individual aspirations were predetermined by final causes"*. The natural world is therefore replaced by a technical world and man becomes a one-dimensional being that can only function in a

dimension of reality that is governed by technical and practical knowledge of how to use nature.

This technical world becomes a powerful agent that leads man into believing that he is free and has mastery over nature. Liberty in essence becomes a force that dominates man and prevents him from considering the principles on which society operates in a rational independent mode of thinking. The danger in continuing to function under this false consciousness is the maintenance of existing power structures that work against the needs and interests of members of society (Helliwell & Hindess 2000:86). Through this technical knowledge nature is controlled and natural resources exploited for the satisfaction of man's needs, but through this process man also represses his fellow man. In this regard Marcuse (1989:125) writes: *"The human therefore becomes an instrument of labor; he is productive. But this productivity is always accompanied by suffering and by destruction, which are the marks of the violence done to humans in their biological constitution"* and *"all progress, all growth of productivity, is accompanied by a progressive repression and a productive destruction."*

Marxist-critical theory argues further that the existing power structures in the world are based on the capitalist system in which profit-making, and not human needs, determine the distribution of resources. Access to resources is controlled by capitalists who would rather destroy resources such as food to protect their profit margins than to distribute these resources to where it is needed. Therefore, the problem of resource scarcity is not scarcity as such, but maldistribution of resources between groups and nations (Ziehl 2002: 50).

Social ecology was built on the premise that the roots for the ecological crisis is to be found in hierarchical power structures associated with the modern bureaucratic state and corporate capitalism (Barry 2001: 242). Bookchin believes that the establishment of these power structures, the development of capitalism and the formation of nation states has led to the domination of nature and humanity (Benton 1994: 39). He maintains that it would be futile to attempt to balance the ecological system on the basis that humankind is one of many species that forms part of the bigger ecosystem without addressing the social forces and elements that are responsible for the imbalance in the first place.

Social ecology incorporates a strong symbolic interactionist element through its emphasis on the way in which social forces develop, and relationships between the natural and social environments are essentially products of a subjective interpretation. As Hartman (1998: 339)

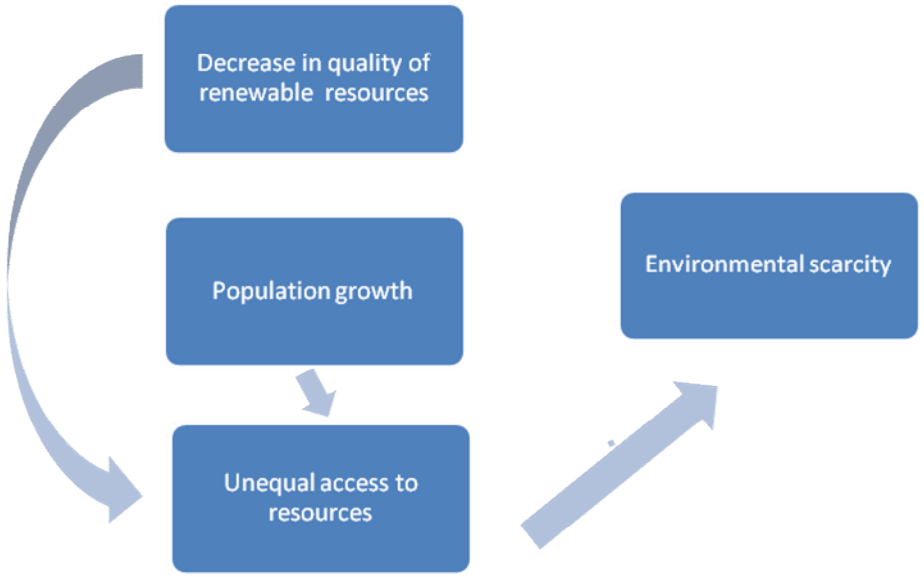
emphasises: *"…our interpretation of ecological forces is always through the lens of particular social forces"*. Therefore, social forces such as political relationships and class structures will be influential in our understanding of the natural environment and will guide and limit our actions in this regard.

3.3.3 Structural scarcity

This type of scarcity is a third type of scarcity identified by Homer-Dixon (1999: 52) and relates to the distribution of resources, hence its importance here. Structural scarcity *"concentrates a resource in the hands of some groups and subject the rest to greater than average scarcity"* (Homer-Dixon 1994: 9). An unequal distribution of resources often arises when powerful groups take control over resources which quality and quantity are threatened by increased demand and decreased supply, thereby placing poorer and weaker groups in an even poorer position with regard to access over a scarce resource. Structural scarcity can only occur where resources can be physically controlled and possessed as in the case of renewable resources such as land, forests, water and fish.

Structural scarcity when interacting with supply and demand induced scarcity leads to two patterns of interaction, namely resource capture and ecological marginalisation. Resource capture takes place when powerful groups seize control over diminishing and deteriorating resources. This pattern of interaction is most likely what caused so-called war veterans to initiate a land grasp in Zimbabwe. Most of Zimbabwe's rural populations make a living of subsistence agriculture in ecologically fragile areas that are wholly unsuited for agriculture. The degradation of the environment due to ineffective agricultural practices and worsened by population growth and poverty has led people to take control over land that is perceived to be of better quality – land owned by a small minority of commercial farmers. The situation in Zimbabwe can therefore be traced back to scarcity over resources and the conflict resulting from this scarcity has thrown an entire nation into political turmoil

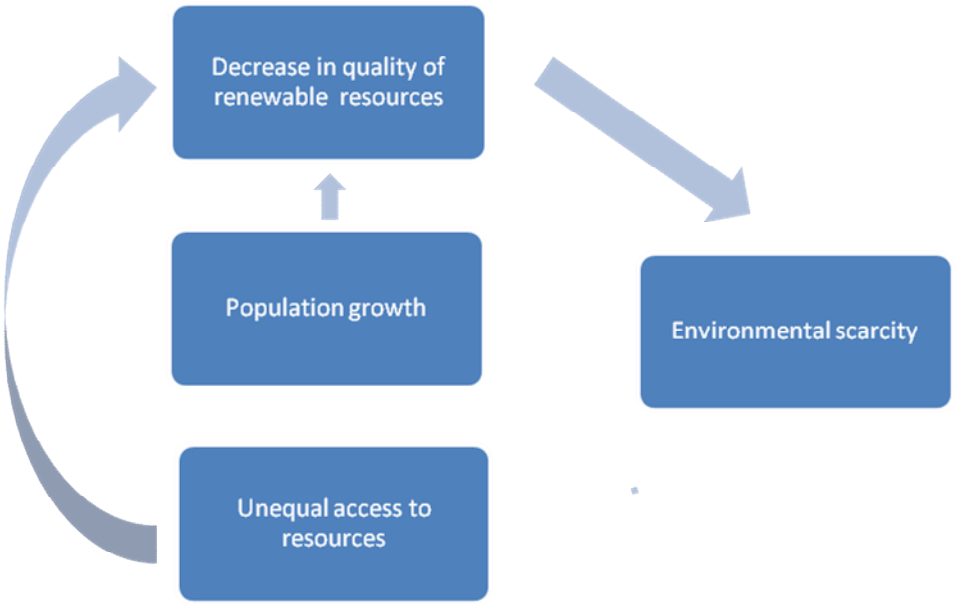
Figure 2: Resource capture



Source: Homer-Dixon 1999:74.

The second pattern of interaction resulting from environmental scarcity is ecological marginalisation. This process is set in motion when resource scarcity results from an unequal distribution of resources as is the case in South Africa. The degradation and depletion of particular natural resources then force those subjected to these conditions to further deplete and degrade the already scarce resources.

Figure 3: **Ecological marginalisation**



Source: Homer-Dixon 1999:74.

In South Africa, the influence of unequal resource distribution on the quantity and quality of resources is clearly witnessed. With the former homeland policy, many minority groups were resettled in homelands or self-governing areas. Through a combination of population pressure, poverty and lack of adequate infrastructure, environmental degradation in the form of soil erosion, water shortages, deforestation and pollution resulted (Klugman 1991: 72). In this sense, the initial unequal distribution of resources, particularly in terms of the quantity and quality of land, decreased the supply and quality of resources in these areas and led to severe environmental scarcity.

In the preceding pages a theoretical foundation was laid from where resource scarcity as a social, political and economic concept could be understood. In the following paragraph the main assumptions underlying environmentally based action in the face of current environmental issues, among others resource scarcity, are being explored.

4. The main assumptions underlying environmentally based action in the face of the current environmental crisis

For centuries, philosophers, economists, religious thinkers and social theorists have debated and speculated about the probable future outcomes of humankind in relation to the environment. Among these thinkers Plato, Bacon, Machiavelli and Franklin come to mind. The views of these thinkers have diverged between those who foresee a Utopian world where man and nature would be in harmony and those who predicted an outcome where humankind would perish as a result of the destructive nature of their relationship with the environment (Southwick 1996: 83).

Sociological thought on environmental issues and the implications of the latter for human social life can essentially be divided into four categories – Cornucopian/ technocentric, Malthusian/ ecocentric, radical/ post-modern[14] and sustainable development (Haas 2002:2). Each perspective provides insight into the extent to which the environment is recognised as a threat to political and human security, into the premises guiding policy formulation and political decision making in the face of these concerns, and contribute to the understanding of these issues. In more recent years (since the late 1940's and early 1950s), social scientists' views on the current and future state of the environment were more definitely divided into two opposing views – the technocentric and the ecocentric views.

4.1 The technocratic world view

During the 19th and 20th centuries a technocratic worldview gradually emerged. Within this perspective various strains of thought exist, but the main premise of all remains that humans must, and are able to, master nature through scientific knowledge and that technological innovation is the medium through which this mastery occurs. It thus believes in humankind's ability to solve all problems, including those pertaining to resource scarcity, through technological advances.

[14] Essentially, many of the arguments proposed by the radical/ post-modern perspective are also taken up by the other perspectives – mainly the technocratic and ecocentric paradigms. Furthermore, the discourse on the importance of environmental scarcity is based mainly on the ideas of the ecocentric, technocentric and sustainable development perspectives.

The Agricultural Revolution, elevated as the solution to world hunger, is but one example of developments within this worldview. Another was the increase in dam-building initiatives since the 1950s to provide water security for the agricultural sector and for growing urban developments. According to the International Commission on Large Dams (ICOLD), more than 40 000 dams now obstruct the world's rivers, with only 5 000 having been built before 1950 (McCully 1998: 3). This view generally "*advocates … business as usual: continued economic growth, continued pursuit of managerial control of the environment, continued and increasing centralisation of that control*" (Milton 1996: 205). Proponents of this view take an optimistic view of the future and envision both an end to poverty and the entire human population living in relative affluence while maintaining a permanently sustainable environment through appropriate technology (Harper 2004: 290; Southwick 1996: 84). Resource scarcity and environmental degradation are viewed as the side-effects of humankind's efforts towards achieving a society where relative global affluence exists and where these scarcities will be overcome by ingenuity and technological progress. This approach proposes that *"…we should become increasingly able to protect ourselves from formerly catastrophic threats from nature: storms, floods, droughts, diseases, predators and so on"* (Benton 1994: 32).

Although there are many variants on this perspective, the most prominent and well-known is the Cornucopian world view as was propagated particularly strongly by Herman Kahn and Julian Simon (Southwick 1996: 86). The Cornucopians believe in a world without limits imposed on humankind by the environment as well as in the advantages that industrialisation and growing economic efficiency will hold for the future.

4.1.1 The role of industrialisation and economic development

The Cornucopian word view sees the world as progressing from an agricultural society, through an industrialisation phase towards an ideal post-industrial society. Cornucopians argue that the world is currently in a transitional phase that commenced with industrialisation in the 1700s and will end with the birth of the truly post-industrial society. This transitional phase can, in turn, be divided into three phases: the industrialisation period from the Industrial Revolution and the industrial societies of the early 20th century; the super-industrial society with an emerging global economy, high technology, service industries and multi-national corporations; and the future transition to a post-industrial society (Harper

1996: 255). During the current transitional phase some environmental, technological, economic and social problems might arise, but after the year 2175 these problems will be phased out and the world will truly be on the way to living in an energy efficient, technologically advanced, affluent and environmentally sustainable system.

4.1.2 Competition and market forces in the management of resource scarcity

The Cornucopian thinkers have also argued that natural resources cannot by any economic accounts be seen as finite, since scarcity of resources sets the economic principle of supply and demand in motion. Scarcity leads to a rise in value and therefore the price of the resource increases, which in turn leads to innovation and stimulates the development of more efficient processing methods and alternatives. Therefore, natural resources must be consumed if the efficiency with which they are produced is to be increased. In fact, the consumption of scarce resources will over time make the resources accessible to more people due to the fact that more efficient production and alternatives will decrease the market value of the resource (Seitz 1995: 212). Furthermore, competition in the capitalist system that is driven by consumer demands will lead to the full utilisation of scientific knowledge and technological innovations thereby satisfying all human needs and desires for consumer goods (Benton 1994: 32). When humans can satisfy their desire and needs it will actually lead to a slowing down of economic growth, increased affluence through innovation and better utilisation of resources and a population occupied with non-economic activities which will have the positive spin-off of a more sustainable natural environment, among others (Harper 1996: 257)

The neo-classical school of economic theory underlines the above assumptions regarding environmental problems. Resource scarcities in a well-functioning market system will lead to more efficient allocation of the resource and the protection of the resource through increased price and market value (Harper 1996: 167). Neo-classical economists are of the opinion that nature must be valued in financial terms if overuse and exploitation is to be halted. Some resources are exploited and overused because they are considered free and if they are commodified by using the supply and demand principle it will be possible to protect these resources more efficiently (Jacobs 1994: 71). Environmental scarcity will therefore be alleviated through economic growth, rather than by scaling down economic processes. Hunt

(2004: 41) reasons with regard to fresh water that since people began to view water as a scarce resource, it has been translated into economic terms and projections of increased demand relative to supply serves to drive up the cost of water where water is priced. Water has become a commodity that is transported globally in bottles, bags tankers and even glacial ice. This commoditisation causes increased pressure to expand markets by stimulating demand and expanding supplies.

For proponents of the Cornucopian view, not even the rapid increase in population is cause for concern, since this only increases the pool of human capital and human knowledge that is needed to solve the current problems that humankind face (Seitz 1995: 214).

This approach in essence *"[has] faith in technology and assume that humankind is in control. They may wish to make industrial society more environmentally benign through changes in policy and practice, but they do not question the goals of industrial development, nor the values which drive it…"* (Milton 1996: 75) (emphasis added). Technocentrism is at the core of much of the mainstream thinking i.e. in policy circles with many environmental solutions proposed containing ideas and auspice values inherent to the technocratic perspective. In this regard, Southwick (1996: 329) points out that even the seemingly eco-centered Brundtland Report (1987)[15] attempted to marry the contradicting ideals of ongoing economic grow with the quest for a sustainable environment.

4.2 The ecocentric worldview

Where the technocratic proponents have an optimistic outlook on the outcomes of the current environmental problems, the advocates of the ecocentric perspective see the human race as being on a collision course with nature. The ecocentric worldview rejects the idea that humans are able to, and entitled to, control the natural environment. Furthermore, the earth provides a limited ecological base that will collapse in the not-so-distant future because of the pressure placed on it through added population growth, resource consumption and pollution (Benton 1994: 39; Harper 2004: 294; Milton 1996: 75). In the light of this, the ecocentrist paradigm does not consider that any progress towards a sustainable society can be made without a radical rethinking of current social and cultural values and, therefore, human society must significantly and radically change the social organisation on which today's society is built. Ecocentrists emphasise that if changes are not made to current socio-

[15] This report is also discussed in Chapter 5, paragraph 3.2.

cultural, economic and political processes, the environmental crisis will only worsen and will inevitably result in an outbreak-crash scenario characterised by high levels of human insecurity and increased political conflict. The evidence of this scenario becoming a reality has been surfacing with disquieting regularity in recent years and with increasing environmental insecurity. The likelihood for increased human insecurity and political conflict also grows.

Recent extreme weather phenomena, such as the devastating hurricanes that bombarded the United States in 2005 and the prolonged and widespread drought in large parts of Southern Africa during the summer of 2004/2005, attributed to the effects of global warming and climate change, drive the point home that environmental decline is, and will become even more so, a source of extreme human insecurity. In Kenya the deepening drought conditions of 2005 led the World Food Programme to more than double its estimate of people needing food aid to around 2.5 million and about 560 000 people in seven districts were expected to be in need of emergency water supplies by the beginning of 2006. By the end of December 2005, The United Nations Children's Fund (UNICEF) reissued an emergency appeal for US$ 4 million in order to deal with the impacts of the drought and water scarcity on the people of Northern Kenya. A concern that is explicitly stated in this appeal is the risk of conflict over access to water, pasture and livestock. Past conflicts over scarce water and food resources have resulted in 'brutal massacres' (UNICEF 2005: 1).

The ecocentrists suggest that if current trends in population growth, industrial development and technological advancement are not halted, human survival could be jeopardised. Ecocentric thinkers also are not wholly united in their beliefs about the outcomes of the current environmental situation, or on how to divert the impending crisis posed to human civilisation by the destruction of the environment. However, some common assumptions are shared by the proponents of this view.

4.2.1 Humankind as interdependent with nature

Firstly, the ecocentric perspective rejects the idea that humans are able to and are therefore entitled to control the natural environment, rather seeing humans as being one species existing interdependently with other species and being dependent on the same natural environment. Humans are also subject to nature and not in control of nature, as is proposed by technocrats (Benton 1994: 39; Milton 1996: 75). Furthermore, the ecocentrists argue that

the earth provides a limited ecological base that will collapse in the not so distant future as a result of the pressure placed on it through added population growth, resource consumption and pollution. This outbreak-crash scenario was most vividly brought to the fore by the Club of Rome's World Systems Dynamic (WSD) model in the 1970s. The WSD was a computer simulation that projected the impact of resource consumption, population growth, pollution and economic growth on the future viability of the natural environment to sustain human life. Despite repeating the simulations of the system to account for changes in variables, the outcome always remained the same – the cumulative effect of factors will result in the natural environmental system collapsing in the course of the future (Harper 1996: 259). Various authors have, however, since the 1960s written accounts of what the outcome of current patterns of population growth and consumption could lead to if it goes unchecked. Among the widest publicised and popular were Ehrlich's *The Population Bomb* and Carson's *Silent Spring* (Seitz 1995: 209)

4.2.2 The role of appropriate technology

This perspective argues that sophisticated technology does not offer any definite or long-term solutions to the problem of a deteriorating natural resources base, but only delays the inevitable collapse of the system. Instead of relying on these high-tech solutions to the resource problems and environmental deterioration experienced as a result of increased population growth, overconsumption and large-scale economic growth, the ecocentrists emphasises the adoption of environmentally benign technologies. These technologies would be simple in the sense that it could be understood and repaired by the people who use it and less likely to fail, while also causing less environmental damage than complex technologies (Harper 1996: 261)

4.2.3 Small scale and simple social organisation

The ecocentrist paradigm does not believe that any progress towards a sustainable society can be made without a radical rethinking of current social and cultural values and therefore, human society must significantly and radically change the social organisation on which today's society is built. In the words of Milton (1995:75): *"The practical implications of this view… could not be achieved to any significant degree without a radical overhaul of the foundations of industrial society."* Current socio-cultural and economic values, and political systems are not conducive

to the future survival of the planet or humankind and therefore, these values need to be addressed while there is still time to halt the degradation of the environment.

Ecocentrists firstly consider the current socio-political system that is built on competition, conflict and the centralisation of power to be irreconcilable with the goals of ecological sustainability. They advocate instead that emphasis must be placed on the decentralisation of power and the scaling down of economic processes. This entails that people must adopt a culture of frugality and reduce the consumption of resources dramatically. Ecocentrists believe that if people are freed from the chains of the consumerist culture, they would be able to pursue more worthy things such as spirituality, music, conversation, family and thus the scaling down of current social processes are central to the ecocentrist approach (Harper 1996: 261). Some proponents of this view would like to see society return to the values of a golden age when man lived in harmony with nature, while others propose that human society should progress to a stage where there would be *"a dialectical resolution of the ecological and social contradictions of our past"* (Benton 1994: 40).

4.2.4 Preventing and alleviating environment scarcity

In contrast to the growth centred approach of the technocentrists, the ecocentrists view scaling down and limiting growth in all facets of human society as the solution to the environmental crisis that humankind is facing. More importantly, whereas the technocentrists do not acknowledge that environmental scarcity poses any threat to the survival of humankind, ecocentrists emphasise that growth and overconsumption will only increase existing scarcities and add to the environmental problems of the world. This approach is not, however, without any hope for the future, but believes that there is still time to prevent the impending crash of human civilisation by adopting an alternative life style pattern to the one currently held up as ideal. If changes are not made to current socio-cultural, economic and political processes the environmental crisis will only worsen.

Social ecologists, such as Bookchin point out that many deep ecologists advocate a return to decentralised, self-sufficient human communities that would benefit humankind and be ecologically less harmful to the environment, without considering that this form is not necessarily ecologically better, more democratic or emancipating. Feudal societies, for example were also built on a social form of small scale, decentralised, self-sufficient

communities, but oppression and domination of the peasants by the elite were the order of the day in these communities (Harper 1996: 307).

The technocentric and ecocentric approaches have, naturally, very different views as to how the current environmental situation should be addressed. Table 7 gives an overview of the main differences of these two approaches to dealing with environmental issues.

Table 7: Comparing the technocentric and ecocentric perspectives

	Technocentrism	Ecocentrism
Basic premise	The future and the solution to the environmental crisis lies in tapping human ingenuity and continuing on the path of economic development	Humankind is on a collision course with nature and the only means to prevent an outbreak crash scenario is to limit current economic and population growth trends
Views on environmental scarcity	Current scarcities is a temporary negative spin-off from economic growth but will be intercepted by creative technological solutions in future Scarcity paves the way for the development of alternatives In many respects there is no real scarcity	Resource scarcities are very serious and if the environment is not protected against degradation, human society will collapse due to certain life sustaining resources being degraded past a point of no return
Population growth and resource consumption	The population must be allowed to grow and no efforts must be made to curb either population growth or resource consumption	Limiting population growth and resource consumption is absolutely essential if the collapse of human society is to be prevented
Economic growth	The solution to poverty and achieving relative prosperity for all mankind can only be achieved by continuous economic growth	The solution to poverty and achieving well-being for mankind lies in limiting economic growth, downscaling economic processes
Policy implications	Technological advancement Managerialist Globalist	Decentralisation and self sufficiency Appropriate technology Localised

Source: Own Construction.

It is necessary to consider the approaches to intervening and preventing the wide array of environmental issues that the world is confronted with, since the basic assumptions that underlie these two divergent approaches will be reflected in policy on environmental issues. The question that must receive pertinent attention, especially where water is dealt with as an environmental resource and a scarce one at that, is: Can an environmental problem that transcends social and political boundaries, such as scarcity over freshwater resources, benefit from proposed strategies inherent in these approaches?

4.3 Policy considerations of the opposing views

From a technocentric point of view, resource scarcities are merely the side-effects of humankind's efforts at achieving a society where relative global affluence exist and where these scarcities will be overcome by ingenuity and technological progress. Thus, scarcity of environmental resources is not addressed directly in this approach. Rather, the focus is on finding technological solutions to alleviate the impact that scarcity has on the functioning of humankind and human society. This approach does not advocate any changes to lifestyle, consumption or economic and population growth patterns to prevent further scarcity, but proposes instead that *"…we should become increasingly able to protect ourselves from formerly catastrophic threats from nature: storms, floods, droughts, diseases, predators and so on"* (Benton 1994: 32).

Ecocentrists, on the other hand, are deeply troubled by the growing resource scarcities confronting humankind and do not share the optimistic view of human ingenuity overcoming the obstacles presented by the worsening environmental crisis. Proponents of ecocentrism envision radical, comprehensive change as the outcomes of any policies and strategies, thus making their approach both revolutionary and millenarian, while technocentrists can be labelled as being reformist in their views. The ecocentrist approach also favours a more holistic solution to an impending environmental crisis compared with that of the technocentrists who advocate piece-meal and less comprehensive changes (Milton 1996: 75).

Very few endeavours to bring about significant, holistic and comprehensive changes to those human social processes driving environmental decline are undertaken and very few proposed solutions and strategies of this nature are ever successfully employed. Rather, while many of these endeavours have an ecocentric flavour, most opt for strategies that would not radically affect the status quo of human society. This approach is severely criticised by Thompson (2002: 233):

> *"… management – a key component of the discourse [between relativist and constructivist views] – predominates. Academics, researchers and policy-makers are obsessed with management. Management of the environment carries within it as a germinal seed the idea that all environmental problems can be dealt with by rational debate and scientific and/or technical solutions".*

The above criticism reflects the general view of ecocentrists with regard to applying technocentric strategies to achieve ecocentric ideals. This way of doing is embodied in the much-publicised sustainable development approach that actually attempts to achieve a middle ground between the technocentric and ecocentric approaches.

Currently, there is more support for an ecocentrist approach to the environment, with technocentrism being viewed as unrealistic and untenable in the face of both growing environmental decline and increased environmental insecurity and also with no groundbreaking technological solutions to these problems being forthcoming (Hunt 2004; Shiva 2002). However, in spite of an ideological shift towards ecocentric ideals, the strategies and solutions to environmental problems still have a predominantly technocentric flavour insistent on human ingenuity and progress to bring about a better future. While many of these endeavours have ecocentric outcomes in mind, most opt for strategies that would not too radically affect the status quo of human society. Interestingly, the adoption of comprehensive and revolutionary practices to decrease environmental insecurity may constitute a security risk in itself, since it may upset the status quo and thus induce social and political upheaval.

4.4 Sustainability and sustainable development: the middle ground

Sustainability and sustainable development are fairly recent concepts that have begun to gain prominence in the late 1980s after the much-publicised United Nations World Commission on Environment and Development's (WCED) *Our Common Future* report, more widely known as the Brundtland Report (1987) (Southwick 1996: 329). According to this report, sustainable development is conceptualised as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, while sustainability is defined simply as the ability of a system to endure.

When environmental decline and resource scarcity is considered in the post-Brundtland era, it is almost without exception considered from a sustainable development framework. Therefore, resource scarcity and environmental decline created by the current generation's need for growth, in population and economic terms, is acknowledged as having the potential to seriously affect the ability of future generations to meet their needs. To achieve

sustainable development, the Brundtland Report outlines 12 major priorities (Southwick 1996: 329):

- slowing population growth;
- reducing poverty, inequality and debt in the developing world;
- making agriculture sustainable;
- protecting forests, habitats and biodiversity;
- protect the ocean and coastal resources;
- protect freshwater quality and improving water use efficiency;
- increasing energy efficiency;
- developing renewable energy resources;
- limiting greenhouse gases and air pollution;
- protecting the stratospheric ozone layer;
- reducing waste;
- shifting military spending to sustainable development.

In the spirit of sustainable development, various authors have attempted to lay down similar requirements for a society that is sustainable. For example, Harper (1996: 269) outlines seven requirements for a sustainable society: dampen population growth and stabilise population size; conserving and restoring the system's ecological base; gradually minimise and phase out the use of fossil fuels; work towards economic efficiency; have social forms compatible with the natural, technical and economic characteristics of a sustainable society; adopting cultural beliefs, values and social paradigms that define and legitimise the characteristics of a sustainable society; and co-operating and negotiating sustainability with other societies.

Ideally, sustainable development should be different from the path of development that was followed by humankind since the onset of the industrial revolution where economic gain and expansion was pursued at the expense of the natural environment.

4.4.1 Socio-economic development and sustainability

Socio-economic development is seen as a mechanism for addressing social and economic problems such as poverty and unemployment and for contributing to the well-being of the human population (Humphrey *et al.* 2002: 221). Current levels of development have largely

been achieved through exploiting and degrading the planet's natural resource base; development has thus contributed much to the current state of the environment (Milton 1996: 184). Sustainable development proposes that development can still be pursued if certain requirements for sustainability are met. In practice, development can often not be achieved without at least contributing to environmental decline at a certain level. The sustainable development approach is, therefore, not unduly criticised by some for its pro-development, pro-technology, pro-growth approach to the future.

Sustainability is, in many respects, the achievement of a balance between the human need for progress and growth and the ecological goals of protection and creating a society where environmental and social goals can co-exist indefinitely[16]. In theory, sustainable development is possibly the best alternative for achieving a future society able to marry ecocentric ideals with a technocentric desire for continued human and social progress. As Humphrey *et al.* (2002: 222) point out: *"the mainstream sustainable development rhetoric assumes that [environmental protection and continued economic growth] are complementary and … focuses on how sustainable development can be achieved"*. Thus, while sustainability is, in essence, closer to the ecocentric approach in the values it espouse and the goals it want to achieve, its methods and strategies are more in line with that of the technocentric approach. This does not, nevertheless, imply that sustainability is effective in marrying the demands of development with the need for conserving the ecological base for the future.

Furthermore, sustainable development is considered by some to be a contradiction in terms, since development is inherently an unsustainable process that only increases the degradation of the natural resource base and the ecological system (Hartman 1998; 341; Southwick, 1996: 329). The crucial question that needs answering is therefore whether sustainability can be achieved through the strategies and methods proposed – ecocentric principles with technocentric solutions or are these wholly incompatible with each other?

This is precisely where sustainable development is potentially flawed. Sustainable development, as currently understood and practised, is strictly managerial and only sets forth slight modifications to modes of production, political structures and societal values, without

[16] It must be noted that sustainable development cannot be regarded as an approach or scenario to environmental issues, but rather a set of strategies and guidelines that need to be achieved in order to bring about a future where humankind is not threatened by the doomsday scenario proposed by the ecocentrists.

imposing radical, life-altering changes on members of society (Humphrey *et al.* 2002: 224). People are inclined to make small changes to their socio-economic existence towards achieving a sustainable future, but often the costs of making larger, more encompassing changes outweighs the long-term benefits of environmental sustainability.

4.4.2 Sustainable development in practice

In practice, the ideals of sustainable development are far from being realised. This is evident in the failure, at the international level specifically, to bring about the changes in human social practices necessary to secure a sustainable future. Cases in point are the United Nations Conference on Environment and Development (UNCED, 1992)[17] and the Kyoto Protocol (1997), in which stakeholders have laid down basic strategies to be implemented and goals to be achieved towards achieving a sustainable future, but that was not followed through by key players. Thus, while there is an intellectual commitment by the international community to strive towards sustainable development – as the endless stream of international conferences on the environment testify – there is generally far less of a commitment in the international arena in terms of changing current patterns of environmental degradation.

Recent years have also seen various instances where the principles of sustainable development have been severely tested. For, example, in 1992 the northern cod industry collapsed in Newfoundland due to overfishing, prompting the government to place a two-year moratorium on cod-fishing to give stocks a chance to replenish itself. This lead to 40 000 workers and hundreds of communities being affected (Humphrey *et al.* 2002:221). Instances such as these highlight the often-strained relationship between ecological and social processes, but do not necessarily mean that people will support sustainable development practices in future. For individuals, groups and communities it is often a case of weighing costs and benefits that determines whether ideals and practices are reconcilable with each other. In this regard, people have various reasons for using the natural resource base provided by the environment. If the costs of degradation and exploitation outweigh the benefits, then there might be enough of an incentive to protect the natural resources at stake (Dasgupta 2000: 1). However, if people perceive a greater benefit from exploiting the

[17] This conference and its policy implications are addressed in Chapter 5, paragraph 3.3

resource – possibly in the form of socio-economic security – then efforts to promote the long term sustainability of the resources will be difficult to achieve.

4.4.3 The strengths of a sustainable development approach

In spite of these criticisms, sustainable development does provide a strategy or an agenda for structuring future development at a global and local level, while also promoting long-term environmental security. A further strong point of the sustainable development approach lies in its multidimensional focus. The focus of sustainable development is neither solely environmental nor economic, but encompasses the achievement of sustainability through changes in the economic, social and ecological systems. At the 2002 Johannesburg World Summit on Sustainable Development (WSSD)[18], the multidimensionality of the sustainable development approach is enshrined in the core ideas of the WSSD Plan of Implementation[19]. This Plan of Implementation sets peace, security and stability as prerequisites for achieving sustainable development, thereby focusing its attention on amongst others, poverty eradication, protecting and managing the natural resource base of economic and social development, and on recognising that specifically in Africa, sustainable development is hampered by poverty and conflicts (Brynard & Stone. 2004: 31; UNFPA 2004:21). The multidimensional focus of sustainable development implies a more comprehensive treatment of the concept of security, since sustainability will affect all spheres of life in the same way that a slide towards unsustainability will increase environmental insecurity. Therefore, some consideration needs to be given to rethinking the current conceptualisation of security[20].

5. The case of fresh water

With regard to freshwater scarcity, there is a continuous stream of conferences, forums, declarations and protocols in which stakeholders lay down basic strategies to be implemented and goals to be achieved towards achieving a sustainable future. In spite of water being recognised as one of the most important environmental security issues on the international political agenda since the first major world conference on water (The Mar del

[18] The WSSD receives more attention in Chapter 5, paragraph 3.4.
[19] The Rio Summit of 1992, and particularly Agenda 21, is the foundation on which the WSSD builds. While Agenda 21 outlines the principles and guidelines for achieving a sustainable future for humankind, the WSSD focuses more pertinently on the practical implementation of sustainable development.
[20] This issue will be addressed pertinently in Chapter 3.

Plata Conference of 1977, organised by the United Nations), and in spite of several programmes, projects and declarations having been approved, applied and implemented, the water crisis appears to grow worse as time progresses (Petrella 2001: 26)[21].

Population growth, for example, will remain one of the main drivers of water resource management for at least the next half century. Over the past years future projections of world population growth have been revised downward due to significant declines in birth rates. Even if this decline continues, the world population may only stabilise at around 9.3 billion by 2050. Based on these estimates, up to 7 billion people in sixty countries will be affected by water scarcity by the middle of the century. Even under the best-case projections, around 2 billion people in forty-eight countries will be confronted with water scarcity by this time (UNESCO 2003: 13)[22]. Currently, groundwater sources are exploited at a rate of approximately 600-700km³/year (UNESCO 2003: 78). More efficient technology has led to increased consumption of groundwater, particularly for irrigation, notably in China, India and the United States, the three countries that produce half of the world's food. Brown & Halweil (1999: 1) report that under the North China Plain, this country's breadbasket, water tables fall by around 1.5 metres a year. In several Indian provinces, groundwater depletion has left previously self-sustaining communities water scarce and in some villages over 90% of wells have run dry in the past decade due to overpumping (Shiva 2002: 11). Rivers such as the Colorado in the USA are also increasingly running dry and it is estimated that the Lake Mead and Lake Powell reservoirs in this river have dropped to 58% and 42% respectively of their capacity since 1999 due to prolonged drought conditions and an increased demand for fresh water (Leavenworth 2004: 8).

The reality of growing water scarcity ultimately will place great demands on society in terms of developing appropriate policy and strategies to deal with this issue. Society deals with the issue of water scarcity by filtering it through the current social paradigm that underlies society. This paradigm currently has more in common with the technocentric view that subscribes to policy guidelines that promote the management of the problem, while ecocentric options are not really considered as viable.

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[21] The impact of Mar del Plata and other international developments will be discussed in Chapter 5, paragraph 4.

[22] The demographic changes associated with increased water scarcity and conflict are discussed in depth in Chapter 4.

6. Conclusion

In this chapter, a foundation was laid from where the issue of conflict over fresh water could be studied. Firstly, the value of a sociological outlook on environmental issues was established and it was pointed out that sociology as a discipline is, due to its scientific focus, in a position to analyse the interplay between human and environmental spheres of life. Furthermore, the issue of resource scarcity was explored from various theoretical points of view. These theoretical views came from different social scientific disciplines, such as sociology and economics, and emphasised the multi-dimensional nature of resource scarcity. Lastly, the main frames of reference with regard to the environment were addressed since this has bearing on how environmental issues are understood and ultimately what strategies for action are to be taken.

The above theoretical basis would, however be meaningless for the purposes of this study if it cannot be related to the issue of conflict over fresh water. As the above, however, points out, nothing related to this issue can be taken as a given. The entire problem is firstly subject to interpretation and secondly, it is multi-dimensional in nature, thus rendering it impossible to interpret the problem from a solely environmental, or social, or economic, or political frame of reference.

In order to explore the problem effectively, one has to contend with the fact that scarcity over freshwater resources can be brought about by the interplay between a vast array of social, economic and political factors. These factors, the dominant world view of those attempting to address the issue and the eventual response to the problem in terms of policy and strategy will work together to either create conditions in which conflict is averted, or where conflict becomes the only option available to those affected by the social and natural environment in which this takes place.

In the following chapter, more specific attention will be given to the environment as a new security concern of the 21st century. More specifically the conflict potential in environmental scarcity is addressed in depth.

Chapter 3
The incorporation of environmental security into the current political arena

1. Introduction

The 1990s ushered in a period in which environmental issues are increasingly included as national (political) security considerations. Since this time, a growing realisation developed that states are not only politically interdependent, but also environmentally (Steyn 2001: 8). Furthermore, a growing recognition is steadily emerging that environmental concerns, such as resource scarcities, will significantly affect the quality of human and social life and will ultimately have an adverse effect on political security. Kaplan (1994:8) emphasises the importance of dealing with the environment as a security concern: *"[I]t is time to understand 'the environment' for what it is: the national-security issue of the early twenty-first century."* Southwick (1996: 345), in turn, states that: *"[a] realistic appraisal of environmental and social trends shows … the qualities we value most – beauty, peace,* ***security****, diversity and freedom – are in grave jeopardy. …The problem is one of creeping deterioration in our physical, biotic and social environments. The results will be* ***insecurity****, violence and sickness"* (emphasis added).

In response to these issues, environmental issues have become crucial in political decision making, from the local to the international levels and have been placed on the political agenda at various levels. The environment[23] is thus becoming more and more significant in the political arena.

To outline the significance of the environment as a security concern properly, a first point of reference is exploring the various dimensions of security. Thus, a comprehensive conceptualisation of security needs to be undertaken. The political perspectives underlying a purely political understanding of security receive explicit attention. These perspectives

[23] The concept environment can refer to physical, biological and social environments. While the physical environment includes elements such as air, water, inorganic chemicals and physical structures, the biological environment includes all living organisms such as plants elements and micro-organisms. The social environment, on the other hand refers to cultural and human dimensions of an environment (Southwick 1996: 5). In this case the concept environment refers primarily to the bio-physical environment and therefore excludes references to the social dimensions of this term.

underlying political relations theory determines the importance that the environment, and other non-political concerns, is given in political relations, since these theoretical perspectives provide the backdrop against which actors in the political arena accord importance to various political and non-political security concerns.

Attention is also given more specifically to the issue of political security within the current dominant perspective of political relations. Realism remains the approach most favoured by political decision-makers and this approach governs existing views on security, as well as the strategies and mechanisms that is put in place to attain and maintain political security at the national and international level. This approach to international relations and security is becoming increasingly unsuitable due to its strong focus on the preservation of national self-interest in political security. As a result, there is a need for the expansion of the current perspective on security to include other concerns that do not fit as easily into the current realist security focus.

Once a clear idea of the concept of security is established and the need for an expanded approach to security is outlined, the focus shifts to environmental security. The concept environmental security is looked at in terms of its relevance as a security concern in its own right and as a security concern in relation to political security. Specific attention is therefore given to the relationship between environmental security and political security.

Concerning fresh water specifically, a growing body of literature is currently linking water scarcity to political security (Carius *et al.* 2000; Gleick 1993; Turton 1999). The linkages have largely centered on the implications of water scarcity for increasing conflict in respect of this scarce resource. However, water scarcity – within the broader conceptualisation of environmental and human security – calls for even more in-depth deliberation and demarcation. This is necessary since the underlying social worldview and socio-political paradigm on which global social relations are based provide the context in which water scarcity develops, is understood and is then dealt with. Furthermore, attention is given to the issue of expanding the current definition of security to include environmental and socio-economic concerns. First attention is drawn to conceptualising security in terms of its socio-economic and political dimensions.

2. A social-historical perspective of security

Security is an essential aspect of human social life, with people seeking to increase their security at different levels of existence. Broadly defined, security refers to a state or a feeling of being safe from fear and harm. In the quest for attaining this state, humankind employs mechanisms and strategies to reduce the threats posed to them from different fronts and aim to protect themselves from any perceived threat against them.

Throughout human history, people have always pursued security at various levels of their existence. For hunters and gatherers security was relatively simple to attain and rested mostly on the ability of the individual and the tribe to provide food, shelter and protection from the elements and predators. However, as society became more advanced, the levels at which security is sought have also increased in number and in complexity. In today's society, security is sought not only at the individual or group level, but security concerns also affect whole regions, nations and the international society and include elements of the political, economic, social and environmental.

Among the security concerns faced by human society today, political security remains foremost in the minds of people as the ultimate barometer of the level of security that is attained by society. At a societal level and at the international level, the idea of security is tied to the degree of political security that the particular society or nation has achieved in relation to other nations or societies. In this regard, Kegley & Wittkopf (2001: 366) point out: "*[s]ince the mid-1900s, because fear of nuclear holocaust has haunted much of the world, security has been conventionally equated with 'national [political] security'*". Therefore, much of the current understanding of security has been given a political flavour.

Economic, environmental and social issues have gained prominence as security concerns in large part because of the impact that these concerns have on maintaining political stability within society[24]. This trend is witnessed in the persistent conceptualisation of the above issues in political terms. For example, political economy and political ecology have become concepts used often to refer to the linkages between the economy and politics and the environment and politics. It stands to reason that the idea of security in environmental, political and social terms has become largely politicised and any security concern that is faced by the human population today must thus be seen in terms of its significance in the political realm.

3. The political security perspective

In order to understand the concept of political security better, it is necessary to focus on the various schools of thought that offer interpretations of security. This is further necessary because these schools of thought will influence the extent to which environmental security is recognised in the current political context. The extent to which socio-economic and environmental security feature in these approaches is, in turn, important in as far as political decisions and policy are formulated to deal with the threats of other security concerns, particularly in the context of this study environmental concerns, in the current political context.

Theoretical schools of thought in political theory attempt to explain how international relations, power and security are defined and work together. As is the case with most social scientific fields, also in the field of political theory certain theories tend to gain popularity in a specific socio-historical context and are then abandoned for theories that tend to better explain the current political context. At the beginning of the 20th century (also the age of the dawn of political theory), the *current history approach* was the theory most favoured by political theorists, since it adequately captured the optimistic views of this age in which peace and

[24] One must also contend with the fact that none of these spheres of social life exists wholly separate from the others. A wide array of factors – economic, political, social and cultural – are in complex interaction and it is this interplay that *"…sets the stage for deteriorating environmental conditions to develop into an environment that cannot sustain life any longer"* (Redelinghuys & Pelser 2002: 36). Economic insecurity, coupled with social, cultural and political factors therefore impacts on environmental security and vice versa. Poverty (economic insecurity) often 'forces' people to degrade their natural environments due to the fact that they cannot afford to put practices in place that would lead to a more sustainable and secure environment.

prosperity seemed to be persistent forces in society (Kegley & Wittkopf 2001: 27). However, these ideals were destroyed by the violence and turmoil of World War I, giving way to *liberalism* which dominated the study of world politics until the end of World War II. After this war, *realism*, or *realpolitik* emerged as the dominant theory. In recent years, neo-realism and neo-liberalism have gained popularity in academic circles, while some alternative theoretical approaches, such as *constructivism* and *chaos theory* have also emerged as perspectives on political relations.

3.1 Classical liberalism and neo-liberalism

According to the liberalist perspective, humans are essentially good, moral beings that can, and want to, collaborate with each other and are concerned with other people's well-being. Therefore, the forces used to shape interstate relations should be ethical principles and institutions, rather than the pursuit of power and capabilities of one state over another. The idealisation of the goodness of human nature and the ability of people to collaborate leads liberalists to believe that people would rationally aspire towards a peaceful, cooperative and orderly world. Thus, political relations should be seen as a struggle for consensus and not a struggle for power and prestige (Hobson 2000: 64; Kegley & Wittkopf 2001:28).

After World War II, liberalism was discredited as being utopian and realism became the more acceptable theoretical perspective to explain current trends in international relations. However, liberalism soon re-emerged due to the work of a new group of followers, most notably, Ernst Haas and Joseph Nye (Ruggie 1998: 5). This new strand of liberalism became known as neo-liberalism and focuses intently on the ideas of cooperation, political integration and the interrelationship between states in a globalising world. Their point of departure is not politics as such, but rather social, economic, environmental and institutional factors that promote cooperation between actors in the political arena. As Kegley & Wittkopf (2001: 39) point out, neo-liberalism *"… focuses on the ways in which influences such as democratic governance, public opinion, mass education, free trade, …arms control and disarmament, collective security … and ethically inspired statecraft can improve life on our planet"*.

Due to the emphasis that liberalism places on political structures meeting the needs of individuals in terms of social and economic concerns, it is not surprising that this theoretical perspective also has a broad view of what constitutes security. Much focus is placed on the impact of issues such as poverty, debt and environmental concerns on political security of

individuals and nations, and how these, in turn, affect relations among states. As Pettiford (1996: 294) points out: *"… security …should refer to …the whole range of dimensions of a state's existence"*.

While insecurity flows from wider social, economic and environmental sources, the political instability and insecurity that result from these factors must still be contend with. The preferable solution to prevent political insecurity, war and anarchy would be the strengthening of institutional arrangements that discourage these issues. Thus, global cooperation, international institutions, international law and disarmament become important in the fight against political insecurity, as does the promotion of democracy across the world (Kegley & Wittkopf 2001: 30). Liberalism constitutes a more suited approach to politics where the environment is to be incorporated within the political arena. However, currently politics are dominated by the realist approach.

3.2 Realism and neo-realism

Realism and neo-realism form the antithesis of liberal and neo-liberal thought. This perspective emerged strongly at around World War II when the idealism offered by liberalism was dealt a severe blow. Realism seemed to offer the best framework from where the current competitiveness in politics and the emphasis on military security could be understood (Kegley & Wittkopf 2000: 34). Proponents of this theoretical framework include George Kennan, Walter Lippmann; Hans Morgenthau and among the neo-realists Kenneth Waltz and Arnold Wolfers.

Whereas liberalism, particularly neo-liberalism, proposes global cooperation and the functionality of political entities to promote the socio-economic interests of individuals, realism is built on the premise that all individuals and states are essentially selfish and are continuously competing with each other to promote their own self interests. Furthermore, people inherently have a lust for power and want to dominate one another (Kegley & Wittkopf 2001: 32). Under this guiding premise, a number of issues emerge. Firstly, the state and state sovereignty forms a central aspect of realist thought; secondly, power and domination is key in establishing and maintaining international relations among states; and thirdly, security is built mainly on the idea that states seek to maximise their power and therefore, stability comes from a balance of power between states that continuously form and break alliances in the international political arena.

Currently, much of the way in which nation states understand and deal with security issues is founded on realist assumptions. Especially after World War II and during the Cold War, security came to be seen as being defined in terms of a struggle for power and dominance between the world's super powers and as a result war, military ability and a focus on external threats towards the nation state came to the fore as the most important security issues of the latter half of the 20th century. Security began to be viewed as a nation's ability to prevent and deter attacks against them, or to defeat any other power that might rise against it (Pettiford 1996: 292). In this regard, Kegley & Wittkopf (2001: 551) state that most states tend to reject the liberal and neo-liberal measures for increasing security that include reformation or integration of *"governmental procedures for democratically making national security decisions"* and the building of institutions for world law. Instead, states pursue the realist approach that promotes armament, the forming or severance of alliance with other states and the negotiation of arms control and disarmament agreements that reduces the threat of adversaries' weapons. Peace and security, therefore, rests on the premise that in order to obtain peace a nation should prepare for war.

This supposes that a nation must possess, or control the vital natural resources enabling it to exist with a certain degree of security. In many instances, realist-centred principles also govern access to and control over fresh water. In one of the major hot spots for future conflict over water, the Nile, the remark in 1974 by Boutros Boutros-Ghali, Egyptian former Secretary General of the United Nations, that the next war in Egypt would be fought over water is illustrative of realist-guided politics. Likewise, in Southern Africa, there are incidents in which realist-centred politics determined measures have been taken to avert potential scarcity of fresh water. The fact that Botswana increased its military capabilities in response to Namibia's plans to divert the water from the Okavango Delta during the late 1990s shows that where water threatens human security, the first line of defence is still to revert to realist politics to deal with a looming environmental scarcity crisis (Le Roux, 1997:117-129). In 1998 during the political crisis in Lesotho, the South African Defence Force intervened and troops were mobilized in two key locations, Maseru (the epicentre of the conflict) and at the Katse Dam. Protecting the Katse Dam was vital to South Africa due to its reliance on water

generated from the Lesotho Highland Water Project for industrial and urban development mainly in Gauteng Province[25] (Godschalk 2000: 120).

A contrasting approach to political relations is offered by constructivism.

3.3 Constructivism

Constructivism is an attempt to explore many of the aspects that the previous schools of thought take for granted in their approaches. The focus of constructivism falls on the social construction of ideas and entities in the political arena, the shared meanings between actors and how the social construction of meaning influences the relationship that these actors have with each other (Kegley & Wittkopf 2001: 45). The foundation of constructivism is the social construction of reality. In this sense, constructivism relies heavily on sociological insight and finds its roots in the work of the early sociologists, particularly Max Weber and Emile Durkheim, while also drawing from insights of the more recent sociological approaches of phenomenology and ethnomethodology. Many of the ideas inherent in the constructivist school of thought can be traced directly to the foundations of sociology. Concepts such as society, worldview, social construction of reality, values and norms are well-known and intensely studied aspects of the discipline of sociology.

Constructivism treats all aspects of political relations as firstly determined by the meanings attached to it by the actors involved. Therefore, security must also be viewed in this light. The meaning attached to security will firstly be influenced by the ideational factors shaping the views and actions of actors. An idea, such as security, has meaning for those involved on more than one level. Aside from the fact that it refers to social practices and institutions, it is also understood at a definitional and metaphorical level. At the first level, security will imply that certain practices are carried out in relation to existing power structures and institutions, while some interests and concerns will feature more strongly than others in deciding on, and carrying out these practices. These practices all take place within the context of the imbedded social meaning that is attached to the specific actors' conception of security (Conca 1994: 26).

[25] See Chapter 6, paragraph 2.1 for more elaboration on this case in practice with respect to sovereignty as a reflection of this underlying worldview.

The problems associated with incorporating environmental security into the current political context now receive attention. Calls for a conceptualisation of environmental security in its own right, or as part of a wider conceptualisation of political security, cannot be considered without first referring to the impact of the prevalent approach to politics on the current socio-economic context.

4. A socio-political construction of security

As was pointed out earlier, the realist/ neorealist perspective is by far the dominant paradigm on which political relations is forged within the prevalent socio-political climate. The political climate created by the Cold War was particularly suited to the ideas proposed by the realist perspective, since the primary aim of adversaries during this period was the protection of national interests from external threats. Throughout this period, security was increasingly being viewed in absolute terms – a nation was secure when it could deter, or defeat, an attack against it; and when it was able to protect its political independence and territorial integrity (Pettiford 1996: 292). In spite of radical changes in the nature of security threats that nations face today, this view still governs much of the current decision making in the political arena.

Relations between nation states and in the international political arena, from the Cold War until now, have developed in accord with the above view of security. The main aim of nation states is still, to a large extent, to demarcate their territory and protect it by all means necessary. As a result, nations have all, to a greater or lesser extent, invested in military means to deter potential adversaries and protect their interests if need be. In this sense, security is often viewed in terms of a nation's military ability and the force it is likely to exert in the face of political insecurity. Military capacity becomes the means through which states are able to protect their values, norms and institutions, or in other words, military capacity is the means through which security is attained (Makinda 1997: 327).

The world's global powers, notably the United States, Russia and China have all established a strong military force built on manpower and an increase in armament in order to show their power and deter any possible attacks against them. This has, especially in the case of the US and Russia and their respective allies, during the Cold War, resulted in a balance of power in which both these two superpowers set themselves up against the other in a *'no win'* situation.

The show of force in the presence of potential instability and insecurity has essentially led to a balance of power in which political security has actually increased as a result of the threat posed by each other. In the words of Little (2000: 48), during the Cold War *"…[i]t was often taken as axiomatic that it was neither possible nor desirable to move away from the nuclear balance that structured the international system"*.

The end of the Cold War has, in many respects, brought an end to this balance of power between the world's superpowers and many of the Cold War alliances have broken down since then. It was thought that the end of the Cold War signified the triumph of democracy over communism and was seen to be the start of a peaceful new world order in which states would be more politically secure than during the previous era. The 1990s saw an increase in new security threats that could not as easily be kept at bay through balance-of-power realist-centred politics[26]. During this decade, numerous ethnic and civil conflicts broke out as groups whose ideologies and interests were suppressed by the Cold War tension sought to assert themselves and gain position within the international system. Mann (2000: 145) lists the following threats to peace and security that emerged during this decade as being:

> *"…rising ethnic separatism, conflict between potentially nuclear states like India and Pakistan…, China's geopolitical role incommensurate with its real strength, the instability of Russia and some smaller well-armed powers, the prevalence of military regimes in the world, the likely proliferation of nuclear weapons and the largely uncontrolled current spread of chemical and biological weapons,…eco-tensions, resulting from water shortages, foreign dominated exploitation of country's habitats."*

New security threats, many of which were mentioned above, test the core beliefs on which realism is built. The security threats, in these instances, do not come from external sources, but from within the nation state itself. In this regard the United Nations Development Programme (UNDP) pointed out that only three major conflicts fought between 1989 and 1998 were between states; the remaining 58 were civil conflicts (UNDP 1999: 345). Therefore, other factors than the protection of national interests, power of one state over another and the sovereignty of the nation state will play a role in insecurity and conflict during the 21st century. Although national interests continue to be a major driving force behind the security policies of states, these new security concerns need to be realised. The

[26] Some argue that these threats have always been present, but were suppressed by the more pressing security concern of the Cold War. The end of the Cold War provided a void that could be filled with new security threats.

realist perspective, with its focus on independent states is wholly inadequate in addressing these emerging issues, which is why there is a need for an expansion of the current perspective on security in the international relations system that is not so reliant on the goals of realist politics.

5. The need for an expansion of the current perspective on security

The above perspective on security might have sufficed during the past political context dominated by the Cold War in which the threat of nuclear war was the most pressing security concern, at both national and international levels. The focus of the Cold War has inevitably influenced much of the theoretical and academic work on security until the beginning of the 1990s. However, the security issues that were deemed crucial during the period of the Cold War have become redundant. This also applies to the examining of security issues in the developing world, which often relied on examining their security concerns within the context of their relationship with the world superpowers (Pettiford 1996: 295). In the post Cold War era, socio-economic concerns, political and economic inequality and environmental concerns, particularly in the developing world, are fast surpassing the concern over large-scale political conflict fought over the protection of sovereignty and national political interests.

In recent years, there has been a growing interest in the issue of redefining the concept security to incorporate these security threats – particularly from a liberalist point of view – as well as a need for looking afresh at the mechanisms used to attain and maintain security. Until the end of the Cold War, all strategies and political mechanisms were geared towards the protection of national interests and sovereignty. In this context, it was necessary to amass great military strength as a deterring and threatening force. However, current security concerns cannot be addressed within this framework anymore.

While political security will, for the foreseeable future, still encompass an element of the protection of national interests, the majority of security threats that confront nations and the world today transcend the protection of national political interests. These problems are social, economic and environmental in scope and are not only complex, but have global significance in the sense that dealing with these issues would entail a break from the

protection of national interests to a place where cooperation within the international system becomes unavoidable on the one hand. On the other hand, the threats posed by these concerns often emanate from sources within national borders and can, therefore, not be dealt with within a realist frame of reference where the focus is on protection against external threats.

However, there still is a threat posed to national interests where socio-economic and environmental conditions in neighbouring states pose a security threat to bordering states. As Singh (1998:117) emphasises:

> *"[i]n contrast to the threats to regional security during the Cold War period, the security of neighboring states is not now threatened by powerful armies and military occupations. The threat is more often from unarmed, hungry, unemployed, and frequently ethnically divided people."*

Particularly in developing parts of the world, notably Africa, South America and South Asia, downward economic decline, ineffective government, and environmental deterioration have resulted in a resurgence of ethnic, religious and political conflicts. While the nature of security concerns has changed, the geographical placement of these concerns has also been altered. Where security concerns during the Cold War were mainly between the world's superpowers and centred in the Northern hemisphere, the current security threats and issues emerge mostly from instability in the Southern hemisphere. This is with the exception of the Eastern European countries that were inevitably usurped in the USSR's struggle for power and domination of Eastern Europe as part of its Cold War strategy.

When rethinking the concept of security to incorporate these new concerns, the focus falls more broadly on the total quality of life of individuals, or inhabitants of nations, than merely on protecting national political interests of the state. To provide for this new focus, some authors suggest that the use of concepts such as political security should rather make room for broader concepts such as human security, common security and comprehensive security (Kegley & Wittkopf 2000: 367; Makinda 1997: 327; Sutherland 2000: 186).

However, certain dilemmas arise when non-political concerns need to be incorporated into a historically political field of study. Firstly, in redefining security to incorporate wider concerns, there is a risk of the concept becoming vague, poorly demarcated and ambiguous, as is proven by current attempts at incorporating the environment into the mainstream security paradigm (Litfin 1999: 19). Secondly, a wider conceptualisation does not, on the one

hand, mean that political responses to security will change accordingly. On the other hand, a wider conceptualisation proposes considerable challenges to current mechanisms for attaining security that are often difficult, if not impossible, to achieve without a major paradigm shift by decision-makers (Sutherland 2000: 187).

5.1 The concept of security: vagueness, ambiguity and poor demarcation

The conceptualisation of security has, until recently, been mainly defined in realist terms of threat and the protection of interests against external sources. Under the influence of realism, the idea of security has been conceptualised as meaning freedom from fear. Freedom from fear encompasses that nations are able to offer their citizens protection against outside threats and be able to deter or meet any attack against the state with political and military means. In spite of questions posed in security definitions such as *'what is to be secured?'* and *'whose security needs need to be considered?'* most answers in the realist-focused Cold War era was relatively uncomplicated (Litfin 1999: 21). The focus was always on an external source as the threat to core values and the protection of the interests of the state, while the methods used to protect states were mainly military. Since the 1980s there have been attempts at re-examining security as a concept in political and international relations. As pointed out by Pettiford (1996: 294), *"…whether security as previously been understood is inadequate as a concept, or whether it has at least ceased to be adequate as a central organising concept of International Relations, has been increasingly questioned"*.

Regardless of this seemingly straightforward conceptualisation of political security by realists, actors were confronted with a serious dilemma – does the attainment of security through military means not lead to general insecurity as various nations strive towards increasing their ability to protect themselves from external threats? In fact, a whole body of literature exists that attempts to explain this *'security dilemma'*. The security dilemma refers to the fact that states, in increasing their own security position, decreases the security of others. This occurs because states react against other states' actions to increase their security by increasing their own military capacity. In this way, states again pose a security threat to others (Glaser 1997: 174).

The above focus on external threats and the protection of national interests through military capabilities becomes extremely problematic when one needs to incorporate other security

concerns than political ones into the current security debate. In most cases, current threats firstly do not emanate from outside sources, but from within the national boundaries of states, or in some cases from across the nation's borders in neighbouring states[27]. This forces a reconsideration of the focus on external sources, as well as a review of the emphasis on the protection of national interests. Furthermore, while security in the traditional sense was mostly geared towards intentional threats directed towards sovereignty and core values of states from outside sources, current security concerns, such as environmental insecurity, are not intentionally directed at a specific source (Sutherland 2000: 187).

In redefining security, emphasis is firstly placed on the fact that security needs to incorporate more dimensions than a singular focus on political aspects, since political insecurity often stem from insecurity in other areas of life. However, broadening the definition of security to include more dimensions leads to a number of dilemmas of which the practicality of a broadened view in international relations and national politics are amongst the most significant. There has, however, in recent years been growing recognition in international circles of the importance of socio-economic and environmental issues in destabilising political relationships and leading to conflict.

Any redefinition should take into consideration that broadening the current conceptualisation would necessarily entail that current responses to security threats may be redundant and would also need rethinking and redefining.

5.2 Marrying traditional responses with a new conceptualisation of security

In line with the focus and conceptualisation of security as freedom from external threats, appropriate mechanisms and strategies have developed to deal with security issues within this framework. States emphasised their sovereignty and territorial integrity in dealing with other states in the international relations system, therefore security became *"…conventionally equated with 'national security"* (Kegley & Wittkopf 2001: 366). The strategies that developed to

[27] In the developing world, the threat from neighbouring states poses a dilemma. As a result of the colonial divisions of states along artificial boundaries, many nation states have to consider the ethnic relations that exist among members of different states when these states are regarded as a threat. Also in the case of past conflicts, neighbouring states may have provided support to minority groups in attaining their political goals and these states, therefore, often have a moral obligation towards their neighbours. This is illustrated aptly by South Africa's seemingly unresponsiveness in dealing with international pressure to get involved in the current political situation in Zimbabwe.

deal with security issues reflected the central aim of nations. Therefore, the foreign policies of many nations were geared towards protecting national interests, while military capabilities were used to support nations in attaining and maintaining national interests. Equating security in general with national security provided states with a foundation on which political relations were formed and decisions were made regarding policies and political strategies.

As a result of the focus on national security, little attention was paid to develop appropriate strategies and mechanisms for dealing with security concerns outside of this frame of reference. As pointed out by Litfin (1999: 362) in reference to environmental dangers as a threat to security *"[b]ecause [these] dangers do not fit well into the military's traditional threat-defence mechanism, casting them [in terms of threats] may lead to serious misconceptions and misguided policy"*. In other words, concerns such as environmental scarcity, cannot be dealt with adequately by traditional policy responses to security threats.

In a truly realist paradigm, nations are required to increase their domestic security position as the only realistic means of preventing conflict in the international system. To increase a state's security, militarising was not the only strategy employed. Alliances with other like-minded states were actively pursued and this resulted in balances of power among states that were supposed to decrease the likelihood of conflict among nations greatly. Although it became clear during the first half of the 20th century that balances of power and militarisation could not maintain peace, states continued to pursue this course of action. In addition to the focus on balances of power and militarisation, collective security emerged strongly as a more liberal alternative to the above strategy.

Collective security is based on the premise that states could only be secure to the extent that it is also able to protect other states from their aggressors. International bodies, in particular the United Nations, were brought into being to put a system of collective security in place and to, in effect, co-ordinate security relations among members. In terms of the international system, member states were required not to use force against one another, and to come collectively to the aid of any state that is being attacked by external aggressors. Under this system it is assumed that peace is indivisible and that an attack against one state constitutes an attack against all (Evans 1994: 22; Ruggie 1998: 108).

Collective security, in principle, ought to have increased the security position of states involved in such a system. However, history has proven that this system has also not been

very effective in maintaining peace in the international political system. For example, Germany's early aggression against Hungary and Yugoslavia during the 1930s did not elicit a collective response from other nations to restore peace. When World War II did break out, nations reverted back to self-reliance and balance-of-power politics to maintain security (Kegley & Wittkopf 2001: 560). The primary reason for the failure of collective security in maintaining peace is that that the ideals of achieving a collective security regime are not reconcilable with the aims of balance-of-power politics. Likewise, the United Nations as the primary vehicle through which collective security is to be pursued is hampered in its effectiveness by the domination of the Security Council by Northern states[28]. Nations have, throughout the 20th century, in principle agreed to a collective security regime, but have also actively pursued alliances in order to increase their own position at the expense of other nations whom was regarded as threats. During the recent crisis in Iraq, balance of power politics prevailed over collective security as the United States disregarded the United Nations led diplomatic course, sought out like-minded allies and subsequently declared war on Iraq.

Collective security schemes have, therefore, not succeeded in dealing with the issues of political conflict in an effective manner. It is also questionable whether either collective security, or balance-of-power politics, can effectively deal with the threats posed by new security concerns. In response to these problems, new security approaches need to be explored. One such an approach is co-operative security. Co-operative security rests on three premises (Evans 1994: 22):

- Security needs to be approached in a preventive manner, as opposed to the current deterrent manner;
- Security has to be achieved with others and not against them;
- Security is multi-dimensional, incorporating not only political concerns.

Support for a co-operative security approach has slowly increased over the past decade, especially in the face of a growing concern over environmental concerns. This approach favours the promotion of stability and general well-being through economic and social

[28] The Security Council is the primary organ in the United Nations through which collective security decisions are made. The Council consists of five permanent members (China, France, the Soviet Union, United Kingdom and United States) and six other members elected from the general assembly. According to the UN Charter, the five permanent members have a right to veto any resolutions take by the Council, thereby effectively incapacitating the UN in dealing with international security issues (Roberts 1997: 313, 315).

cooperation within the international system. In achieving co-operative security, nations are required to reassess their focus on self-preservation in favour of a seeking diplomatic solutions, promoting dialogue between nations, developing peace-building preventive measures within the international regime and most importantly, adhering to the principle of cooperation between states (Sutherland 2000: 187).

5.3 Rethinking the mechanisms for attaining security within the bounds of a new definition of security

Redefining security to include non-political dimensions, such as water scarcity, has a far-reaching impact on current national and international strategies and mechanisms used in attaining security. As was pointed out previously, traditional responses to security cannot effectively deal with current security concerns. For example, threatened military action is irrelevant in persuading Brazil not to deplete its forests (Litfin 1999: 361). In fact, current strategies may even promote insecurity of social, economic and environmental facets of society in attempts to boost national political security. Furthermore, if these security concerns are not dealt with within a new framework, there is the risk that even these issues can be exploited by nation states for their own national security purposes.

Currently, unfortunately, mechanisms for attaining security are still geared towards the goal of protecting national interests. When considering social, economic and environmental concerns as security threats, nations firstly, may assume that social instability, economic underdevelopment or environmental decline in specific nations are breeding grounds for political upheaval that may threaten the security of other nations. As a response, nations threatened by these conditions in other states, may increase their national security through military means, instead of focusing on the roots of the political problems in affected countries. Conca (1994: 102), in referring to ecological (environmental) security, in this regard points out that ecological security has a twofold goal – firstly to attract governmental attention reserved for national security to environmental concerns, and secondly, to free up defence budgets for increased environmental protection. However, *"ecological security discourse seems more likely to militarize the environment than to green either the concept or the practice of security"* (Conca 1994: 102). Attempting to incorporate the environment into a current national security paradigm thus strengthens an *us-against-them* mentality in which developed nations

typically attempt to safeguard themselves through existing security mechanisms from perceived security threats posed by developing countries (Litfin 1999: 363).

Dealing with new concerns would in the opinion of Woods (2000: 388) require *"…a more sophisticated [international] order"*. The current domination of political institutions at the international level by powerful western states, however, prevents any real reforms from being instituted to effectively deal with these new issues. In recent years, there has been considerable progress in dealing with these concerns from an international standpoint, at least in theory. Organisations such as the United Nations and the World Bank have been instrumental in highlighting how various aspects of human social life determines the well-being of nations and the world. A wide array of international conferences dealing with world population issues, health and the environment have been held over the past three decades, of which the 1972 Stockholm Conference, the 1992 Earth Summit in Rio de Janeiro and the 1994 Cairo Conference on World Population and Development have been amongst the most influential[29] (Kegley & Wittkopf 2001: 368). Litfin (1999: 365) cites these conferences as an affirmation *"…that international cooperation has been essential in the pursuit of environmental [and human] security"*. These conferences serve to highlight the importance of international cooperation in affecting real and lasting change in human well-being, with the positive outcome of increased human security. As a point of criticism, much of the current debates and decision making remain imbedded in traditional realist-centred political structures, while more radical changes are needed in international structures if these were to be effective in influencing the security situation of the 21st century.

Within this framework, there is a need for defining the concept of environmental security, either as a concept that exists in its own right, or as part of a wider conceptualisation of security. This issue is considered in the following paragraphs.

6. Conceptualising environmental security

The state of the environment poses such a significant threat to both political stability and to social and economic well-being that it necessitates a proper demarcation of the environment as a security consideration in the 21st century. Thus far, various authors have contributed towards a conceptualisation of the environment as a security concern (Gleditsch 1998;

[29] Also see Chapter 5, paragraph 3.

Gleick 1993; Homer-Dixon 1999; Haas 2002; Mathews 1990; Obi 1998; Pettiford 1996; Polunin 1998). The environment has gained considerable recognition in political circles as an area that may have a severely negative impact on the political security of nations, as well as at the regional and global level (Gleick 1993: 81). However, the environment cannot be seen solely in terms of its significance in the political arena. One must ask if environmental security's only reason for existence is rooted in its value as a political security risk, or if the environment also constitutes a broader security concern not as easily reduced to a political level? When focusing on security, the threats that non-political concerns, such as the environment, pose towards global, regional and local political security is not easily ignored, but in order to understand the significance of the environment in terms of security, one needs to explore the issue more expansively at first.

In a non-politicised form, environmental security firstly points towards the environment as providing a non-threatening living context in which humans can fulfil their basic needs. Security, according to Conca (1994: 12) rests on an image of insulation in which people are free from dangers or deprivations that cannot be controlled. Translated into environmental security terms, society and individuals are, therefore, able to protect themselves from uncontrollable environmental impacts and threats. The inverse of security in environmental terms would place humankind in an environment where their lives and livelihoods are threatened at the most basic individual, group, community and societal levels.

Various authors and agencies (Brown 1998; Harrison 1993; Myers 1998; Sutherland 2000; UNFPA 2001) have pointed out issues such as growing resource scarcities, the loss of biodiversity and the overarching impact of human-induced factors such as population growth, resource consumption and pollution on the environment, and ultimately on human survival. Concern over these issues reflects the degree of insecurity experienced by humankind over the ability of the environment to continue sustaining life on earth and the ability of humankind to control the effects of environmental change. Specifically, global environmental issues such as global warming, ozone depletion, the decline of fisheries, biodiversity loss, freshwater scarcities and the decline in non-renewable resources continuously highlight the precarious position in which humankind finds itself in relation to the natural environment. Humankind's insecurity over the long-term sustainability of the

natural environment is aptly summed up by Brown (1998: 252) in his reflection on the state of the environment during the 1990s:

> *"In the second half of the nineteen-nineties, evidence that the world is on an economic path which is environmentally unsustainable or worse can be seen in shrinking fish-catches, falling water-tables, declining bird-populations, record heat waves, and dwindling grain-stocks – to name just a few of the many situations giving rise to concern or downright alarm."*

While the impact of environmental insecurity on these dimensions of life cannot be reduced to simple cause and effect (environmental insecurity as a cause for political insecurity), it is undeniable that environmental insecurity serves to heighten insecurity at other levels, with some notably adverse effects on political stability[30]. As Singh (1998: 116), in referring particularly to resource scarcities, points out: *"…resource scarcities do not necessarily in themselves lead to social unrest, they exacerbate poverty by widening the gap between the majority poor and the elite in a society, and the unrest that ensues raises national [political] security alarms"*.

Resource scarcity is a particular powerful environmental issue that has served to highlight the effects of environmental change on different dimensions of social life, most notably on the political sphere. At the political level, environmental security encompasses that environmental problems, particularly resource scarcities, be treated as equally important threats to political peace and stability as ethnic, religious, group and territorial threats. Environmental security in the political arena could be seen to rest on two premises. Firstly, environmental issues create or exacerbate social and international conflict, and secondly environmental issues have become a security threat equal to that of war (Conca 1994: 104).

In Africa, freshwater scarcity played a notable role in the development of social and political upheavals in the past, these range from some localised clashes between herdsmen and horsemen in the basin of the Senegal River, during 1999, over access to water sources, to the outright conflict between Ethiopia and Somalia in 1963-1964, over disputed territory in the Ogaden Desert where critical water and oil resources were located (Gleick 2000: 1; Yoffe *et al.* 2003: 1109). In spite of often overwhelming evidence pointing towards natural resources as pivotal factors in the development of these conflicts, they are masked as so

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[30] Various proponents support the position that environmental insecurity is a powerful determining factor of political instability. However, counter-arguments also exist. Haas (2002: 7) points out that environmental insecurity is often treated as an independent variable to which any situation of political unrest and violence could be attributed.

In a traditional political frame of reference (underpinned by the realist political paradigm) environmental concerns are not treated as security threats *per se*[31]. Yet, there can be no doubt that political institutions have realised the importance of the environment as a security concern. The rationale behind these political institutions' inclusion of the environment as a security issue may, however, differ radically from that of other proponents of environmental security.

For traditional political and military institutions, environmental security provides a new objective in the absence of the nuclear threats posed by the cold war, while also serving as a means for greening traditional military practices (Litfin 1999: 362). To a certain extent, environmental security invokes a strong technocentric image in which existing institutions are relying on technological (military) advances and human ingenuity to manage the environmental security risk[32]. In this regard, political and military institutions are seen as having a responsibility of managing environmental resources and promoting sustainability. In effect, this viewpoint is not without merit, since political and military institutions have considerable power over a wide variety of natural resources. However, traditional political institutions and actors have not failed to recognise that environmental security can be used very effectively to promote traditional political goals such as territorial protection and expansion.

Apart from a managerialist, technocentric view, mainstream politics also encompass an element of Malthus's politics of resource scarcity. In a classical Malthusian paradigm environmental resources are seen to become increasingly scarce due to the impact of human-induced factors of population and consumption. Growing scarcities will eventually reach a threshold after which human well-being is threatened and in which people will compete violently for control over a scarce resource base. Haas (2002: 3) emphasises what this means for political relations as follows: *"Malthusian policy responses tend to be hierarchically designed, with a strong state based managerial bent aimed at reducing population growth and resource usage."* This viewpoint provides states with the ideal motivation for increased military and political empowerment in the name of environmental security. It is argued by proponents of this view that environmental scarcities could lead to rivalries and war among political entities.

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[31] Refer to paragraph 3.2 of this chapter for a more in-depth discussion of the traditional perspective on political relations, namely realism.
[32] For a more detailed discussion on the technocentric worldview see Chapter 2 paragraph 4.

The entire traditional view in support of including environmental security to this extent is summarised as follows by Pettiford (1996: 296):

> *"Such views would therefore argue for the inclusion within a more or less conventional definition of security, of a recognition that wars may start over resources, that wars destroy resources once they have started and that the environment may be manipulated for military purposes."*

In sum, political institutions are, for the most part, only committed to environmental security in so far as it serves their own political interests. This approach to environmental security is severely criticised by proponents wishing to elevate this concept to a level where it exists in its own right and not as part of a wider conceptualisation of political security. The main argument against this approach is discussed in more depth in the following paragraph.

7. The environment, society and political security in the 21st century

The environment and human population and the socio-economic condition of a society is interlinked in a complex web of reciprocal linkages where changes in one component certainly will have implications for the other components and more importantly in this context, cause insecurity at the political side. Therefore, to come to terms with importance of the environment as a security concern in the 21st century, it is necessary to briefly consider the implications of the environment on the societal components of population and development (socio-economic) in relation to political security.

7.1 The population/ environment linkage

Population is a powerful demographic factor in environmentally-induced conflicts due to the impact that population pressure not only has on diminishing resources, but also due to the inequalities and strengthening of ethnic identity it creates. Ethnic tensions, historical rivalries and group identity conflicts all develop increased importance in the face of population pressure and environmental decline. At its core, population pressure translates into decreased availability of resources and this may accelerate competition over those resources. The scarcity of resources serves to intensify people's solidarity with a particular ethnicity or group and fosters an *us-against-them* stance towards rival groups.

In South Africa, population pressure in the former homelands under the Apartheid system contributed to serious resource scarcities in already stressed environments. Scarcities of land,

fuel wood and water in the former homelands spurred large scale rural-urban migration among the black inhabitants of the homelands, and this, in turn, worsened resource scarcities in urban areas. The result is described by Homer-Dixon (1999: 141) as *"…increased social segmentation and deepened 'we-they' cleavages in townships and squatter settlements, further inflaming struggles over remaining environmental resources in those communities"*. He further emphasises that when different ethnic or cultural groups are brought together under stressful circumstances – such as presented by resource scarcities – intergroup hostilities with a strong identity dynamic often develops. Singh (1998: 117) also asserts: *"Elite groups may become more powerful, and group identity is reinforced as competition accelerates. This may manifest itself in ethnic conflicts."*[33] Resource competition provides the ideal breeding ground for stronger groups to exercise their power and gain control over scarce resources. These groups and their leaders then manipulate the resource scarcities to strengthen their own position at the expense of other weaker groups.

[33] Population pressure as a driving force of environmental scarcity, and particularly water scarcity receives detailed attention in Chapter 4.

7.2 The political security/ socio-economic security linkage

Socio-economic security would encompass that a certain degree of economic means is available to individuals, groups and states that can be used to obtain necessary life-sustaining goods and services. To understand this dimension of security adequately it is, however, more useful to look at the transverse of socio-economic security, namely economic insecurity.

Socio-economic insecurity is manifested in the poverty experienced by a large number of the world's people. This insecurity incapacitates people to provide for their most basic human needs – food, safety and shelter. Insecurity at this level of society also exacerbates insecurity at other levels of social existence. It leads to and worsens inequalities among groups and nations and leads to a sense of powerlessness among those experiencing it. As the UNFPA (2002: 14) states:

> *"The poor are deprived of services, resources and opportunities as well as money. Their limited resources are inefficiently deployed. Energy, water, and food all cost more per unit consumed – paradoxically poverty is expensive for the poor."*

Socio-economic insecurity is inextricably linked to other facets of security such as environmental security and political security, and goes hand in hand with aspects such as access to education, and the availability of infrastructure and services to people subjected to poverty.

On a global scale, economic conditions serve to divide the world into two distinct zones[34] – the developed North and the developing South[35]. The South's precarious economic position has long been a source of concern for the developed and developing world alike, especially since the end of the Cold War. The Cold War spurred wealthier nations to invest in

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[34] This aspect – the distinction between the developed and developing worlds – is also dealt with in Chapter 4, paragraph 7.

[35] The distinction between developed and developing countries remains a crude demarcation of states based on the World Bank categorisation of countries according to their per capita GNP. The developed countries refer to the industrialised countries of the Northern hemisphere that include the United States, Canada, Western Europe, Japan, as well as Australia-New Zealand in the Southern Hemisphere, while the developing countries refer to the whole of Africa, Latin America, the Caribbean, Asia, Melanesia, Micronesia and Polynesia. Not all countries in the South can be considered developing as the case of South Korea points out. This country has advanced to a truly industrial society able to compete with the Northern developed states in terms of economic growth in spite of its geographic position as a Southern nation (Kegley & Wittkopf 2001: 141; UNFPA 2002: 76).

Southern states through economic aid to strengthen their own security position during this era. When the Cold War ended the incentive for providing aid to these states disappeared and this increased the economic vulnerability of many Southern states (Kegley & Wittkopf 2001: 155). The removal of foreign aid heightened economic insecurity in these states – one of the important factors that led to the increase in armed conflicts in Southern nations during the decade following the Cold War.

Economic insecurity is currently recognised as a factor working towards decreasing political stability in various parts of the world because of its negative impact on political security of states and as a threat to global political stability. Poverty has, as a result, become a matter of concern for political decision-makers and economic development is at the core of many developing states' human and social development strategies. At an international level, economic stability and economic security, has also been highlighted in various international agreements as a means of increasing overall human development and security at other levels of existence. In fact, since the 1960s the ending of poverty has been an international aim (UNFPA 2001: 28). Among the most recent efforts at the international level to achieve economic security for more of the earth's population was the Millennium Summit of the United Nations in 2000 that focused on *"…concentrating the efforts of the international community and the United Nations system on ending poverty"* (UNFPA 2002: 52).

Resource consumption is another force in exacerbating resource scarcities. As countries such as China, among others, increasingly industrialises and adopts developed patterns of production and consumption, competition over the world's resources, energy and food in particular, creates cause for concern. Industrial superpowers such as the United States may regard China's resource needs as competition for their own, resulting in conflicts over the control of energy sources, while the growing food needs of a large population such as China, could impact world-wide on food supplies (Brown 1998: 269; Gray 2002: 22).

Furthermore, the United States' involvement in the Gulf since the early 1990s has primarily been to maintain control over the oil reserves in this region. Oil in the Gulf region is still relatively cost effective to extract, compared to other costlier options. In an industrialised nation such as the US, economic survival is dependent on maintaining control over cheaper energy sources. In many respects, conflict among industrial nations for control of resources

constitutes a return to geopolitics[36] (Gray 2002: 22). Geopolitics surfaces strongly in terms of the need for geographic control of resources. Therefore, political power continues to determine the ability of nations to exercise control over their own, and other's, natural resources.

7.3 Environmental linkages and political security

Environmental problems act as a powerful negative force in internal political stability. Environmental decline, for example, affects the economic performance of a country, or region, and this would again affect socio-economic conditions and political stability indirectly (Mathews 1990: 4). In this sense, environmental problems act as a destabilising factor that affects relationships between interest groups, ethnic groups and political rivalries. Environmental problems are, therefore, at the core of many ethnic conflicts and civil strife occurring in the world today, or at the very least, heighten the conflict potential in situations where historical and ethnic strife exist. As Gleditsch (1998: 382) points out: *"…environmental degradation may be viewed as a contribution to armed conflict in the sense of exacerbating conflicts or adding new dimensions"*. Very few conflicts in the developing world can be wholly separated from the environmental concerns in these nations. In conflict-ridden countries such as Haiti, Rwanda, Somalia and Sudan environmental pressures certainly played a part in shaping political perceptions and group identities that eventually culminated into full scale civil conflicts

Secondly, environmental deterioration, and specifically resource scarcity affect political security by prompting groups or nations to attempt to protect their control over scarce resources through political means. Therefore, the environment constitutes a very specific security concern in the 21st century.

The conflict potential of environmental decline and resource scarcity has attracted support from various fields, but the proposition that environmental problems may be responsible for, or influential in, creating and exacerbating political conflict is not without its critics. Some authors have suggested that there is no direct correlation between resource scarcity and conflict and, therefore, that environmental concerns have been incorporated into political security debates with nothing more than circumstantial evidence to support these assertions (Haas 2002: 7). Increased environmental decline and growing resource scarcities,

[36] Geopolitics stresses the influence of geography on state power (Kegley & Wittkopf 2001:58).

however, cannot be disregarded as potential sources of conflict between groups competing for these resources, especially in the face of population pressure.

With growing resource scarcities, the likelihood of conflict over these resources becomes more likely and thus, environmental issues will be a major factor in determining the nature of relations between interest groups. In effect, political relations increasingly come down to securing and maintaining control over scarce resources. The past twenty to thirty years have witnessed a number of conflicts at the international level to secure control over scarce resources, while many more such conflicts occurred at regional and local levels. These conflicts were not always violent, but were often manifested in negotiations and the signing of international agreements that secured access and control over resources. As many authors have pointed out, environmental scarcity does not necessarily lead to violent conflict, but may be a risk factor in destabilising a nation or region politically. Authors such as Homer-Dixon (1999), have explicitly highlighted the impact of humanly-induced environmental pressures on national and international security, while others have taken a more radical position, going so far as to suggest that major conflicts and wars in the twenty-first century will be fought over natural resources (Kaplan 1994).

Sustainable development approaches and the ecocentric approach to environmental problems provide the strategies and mechanisms needed to attain environmental security[37]. Ecocentrism favours a comprehensive and more radical approach to environmental problems in which changes to human social processes that drive environmental degradation take precedent. The strategies used to attain environmental security rest on the premise that current political systems are unsuited to cope with these new security concerns and should be either transformed or replaced by more effective institutions able to deal with these security concerns.

Sustainable development strategies to attaining environmental security are not as radical as those approached by some adherents to ecocentrism. The sustainable development approach also encompasses a strong managerial element in which deliberate action on many levels of social existence is necessary to ward of environmental risks, while cooperation and interdependence among different institutions is also advocated (Haas 2002: 3). With this

[37] For a more detailed discussion on these two approaches see Chapter 2, paragraph 4.

approach there is a preventive element in which environmental security is attained before it constitutes a political security risk, while cooperation also constitutes a move away from the *us-against-them* stance taken in the traditional political system.

8. Conclusion

This chapter focused on the different dimensions of security and gave an exploration of the ways in which approaches to political relations influence the importance that social, economic and environment security concerns are accorded in political decision making. More specifically, environmental concerns as a factor in political relations are not given equal attention by proponents of different political theoretical approaches. The mainstream approach to political relations and security has had a crucial impact on political decision making throughout history and this will also be the case in this century.

Realism which constitutes the dominant approach on which political decision making is currently based does not take issues other than political ones into consideration in domestic and international decision making. It was argued that this approach with its state-centric focus is grossly inadequate in dealing with the security demands placed on states and the international community by non-political security concerns. Therefore, the current realist-centred focus of political relations needs to make way for an approach to political relations in general, and political security in particular, that meets the challenges of the security concerns of the 21st century.

A new approach to political relations needs to focus more broadly on other dimensions of society as potential sources of political insecurity. Liberalism, with its focus on human security and cooperation among states in the international arena, may be more appropriate in dealing with security challenges presented by environmental issues, among others.

In subsequent chapters, the impact of political approaches will receive more attention in the context of their appropriateness in dealing with the issue of water scarcity and conflict, both in a historical context and in future political decision making. However, in order to understand the impact of political approaches in specific socio-economic and socio-political contexts, attention must be devoted to establishing a framework for analysing the various socio-economic and socio-political factors involved in creating particular social environments in which water scarcity and conflict develop. The aim of chapter 4, is

therefore to outline a socio-economic and socio-political framework for analysis. This framework will be used in following chapters to explore specific water basins in terms of the factors involved in exacerbating water scarcity, the impacts of water scarcity on the social fabric of the societies living in these basins and the existing strategies, policies and mechanisms that exist to deal with water scarcity and potential conflict over freshwater resources in these societies.

More to the point, the current political paradigm governing interstate politics with its state-centric focus is grossly inadequate in dealing with the security demands placed both on states and on the international community by non-political security concerns, such as scarcity of fresh water.

Chapter 4
The relationship between population dynamics, socio-economic development and water scarcity

1. Introduction

Human populations and human society are continuously undergoing changes - in the size and growth rates of the population, the distribution of people and the migration patterns of people within the geographic boundaries of a particular society. Changing demographic patterns - particularly declining fertility rates and lower population growth rates - across the globe have strengthened the notion that fears of unmanageable population increase to the extent of causing such extreme pressure on resources as to spur political conflict may be overly pessimistic. This position encompasses optimistic forecasts of the potential utilisation of *'new'* water (such as glaciers and desalinated sea water), projections about diminishing population growth rates, increased prospects for water conservation, better water resource management and historic evidence of more cooperation than conflict over shared water resources (Hunt 2004). Emanating from this view is a technocratic, managerial approach to water scarcity that comes out strongly in favour of managing future scarcity of fresh water through transboundary water-sharing agreements and the managing of water supply through cooperative water bodies that determine how much water, when and in what form is delivered to various countries and sectors[38]. By managing water in this way, it is assumed that future conflicts over water could be prevented or averted through cooperative relations between nations sharing water resources.

On the other hand, proponents of a looming world water crisis sketch a much grimmer scenario in which growing water scarcity is projected to have devastating impacts on human society and have severe implications for human and political security[39] (Ohlsson 2006; Petrella 2001). At this end of the spectrum, increasing water demands resulting from

[38] See Chapter 2, paragraph 4.1.
[39] See Chapter 2, paragraph 4.2.

population pressure and endeavours to improve the living standards of a growing world population is seen to result in a severe imbalance between the availability of fresh water and the water needs of the human population. This opposing side of the argument that emphasises the significance of demographic change on future water scarcity has lost ground in recent years as a result of the emphasis on managerial solutions to the issue of water scarcity and conflict.

With the above in mind, this chapter firstly seeks to contextualise the relationship between population and environment. The interface between demographic and environmental realities is surfacing strongly as a determinant for decreasing human security across the globe, but more specifically in the Southern African region, with a concomitant negative impact on future political stability and interstate cooperation. A critical analysis of the demographic realities and related socio-economic issues facing the world and the Southern African region is undertaken to highlight the challenges that render this region vulnerable to scarcity of and conflict over freshwater resources. The Southern African region is vulnerable to tension resulting from the challenges posed by populations that are still growing (albeit at a slower rate), urbanisation, large youthful populations and HIV/AIDS, amidst the environmental limitations of declining water and crop land availability (Cincotta *et al.* 2003; Yoffe *et al.* 2003). Each of these demographic realities will be discussed in turn. First, however, a conceptualisation of the relationship between the human population and the natural environment is warranted.

2. Conceptualising the relationship between population and the natural environment[40]

People depend on the natural environment for various aspects of their existence. The environment in general provides food, water, shelter, energy and countless other commodities and benefits to human populations (NPU 2000: 27). In using the commodities, services and benefits supplied by the environment, human populations are constantly interacting with the environment and have, through the beliefs, values, practices and social organisational patterns that underlie this interaction, over time, become a significant

[40] The relationship between population and environment has specific significance in this chapter due to the specific emphasis on population-related factors as driving forces for environmental scarcity. This aspect also received attention in Chapter 2.

influence in the functioning of virtually every aspect of the natural environment. The relationship has mostly benefited humankind, but has largely been to the detriment of the environment. Many ecological processes have been altered so severely that it has become irreparably damaged and degraded (Petrella 2001: 7). Pearson (2000: 3) succinctly states: *"[w]e have become a force of nature comparable to volcanoes or to cyclical variations in the Earth's orbit"*. Malthusian proponents have long argued that there is a firm relationship between escalating human numbers, growing resource scarcities and increased poverty, unemployment and rising social and political discontent[41] (Homer-Dixon 1999: 55; Kaplan 1994: 3). In the same vein Sadik (1998: 12) emphasises that *"[e]xperience tells us … that social and environmental change of this magnitude, involving so many and growing numbers of people, is unlikely to take place without social tension and painful adjustments"*.

Several analyses have endeavoured to demonstrate a direct relationship between population growth and environmental degradation, among these Harrison (1993), and Myers (1998)[42]. Harrison (1993: 243) concludes that population growth is a principle factor in a wide range of environmental problems such as deforestation, livestock growth and overgrazing, expansion of arable land, irrigated agriculture and resultant environmental problems (Table 8).

Table 8: **Proportion of environmental impacts attributed to population growth**

Environmental problem	Indirect impacts	% attributed to population growth
Deforestation	Loss of biodiversity	79% (1973 and 1988)
Livestock growth and resulting overgrazing	Overgrazing, desertification, soil erosion, methane output	69% of livestock increase in developing countries
Expansion of arable land	Desertification, deforestation and deterioration of natural environments	72% (1961-1985)
Irrigation	Salinisation, waterlogging, increased methane output	72% in developing countries (1961 – 1988)
Carbon dioxide emissions	Global warming	42% in developing countries (1960-1988) 36% globally (1960-1988)

Source: Constructed from Harrison (1993) & Myers (1998).

[41] For further elaboration on the association between population and human security refer to Chapter 3.
[42] Refer to Chapter 2, paragraph 3.2 for a theoretical analysis of the relationship between environment and population.

The impact of population on the environment is, however, best ascribed to the combined effects of increasing population numbers, increased consumption levels and technological advancement[43]. Homer- Dixon (1999: 55) postulates that population pressure, combined with the effects of prevailing social structures, technologies and consumption patterns, is convincingly linked to worsening environmental degradation and exacerbated resource depletion. Also prominent in the relationship between population and environment are gender roles and relations, political structures and governance. It is, therefore, increasingly being recognised that linkages between population and environment cannot easily be detached from societal and developmental factors such as those mentioned above (UNFPA 2001: 2). Myers (1998: 22) points out in this regard that the specific and precise role of population growth is separated from problems of environment and development with great difficulty. Following from this, human population and the natural environment are undoubtedly closely linked in a complex and reciprocal manner. The links between these two factors are largely dependent on the nature of a particular context and vary from one setting to the next (UNFPA 2001: 2).

The natural environment, in turn, influences the human population. Firstly, the environment sets boundaries for interaction and may also potentially act as a constraint on population increase. One study has, for example, found a correlation between desired family size and the availability of per capita arable land in sub-Saharan Africa (Engelman 1998: 61). Secondly, as Myers (1998: 27) points out, environmental problems can exacerbate population problems. As the environmental resource base declines, the livelihoods of people dependent on these natural environments are eroded. All human societies are at risk from the erosion of the natural resource base, but the effects are particularly serious for societies where people rely more directly on natural resources and where there are few alternatives for economic advancement. These traits are mostly found in developing nations and in these societies one is confronted with the fact that population problems are intensified by the deterioration of the natural environment. Poverty, lower living standards, lower status of women, lack of educational opportunities, lack of employment and less access to health care all contribute to

[43] For a more in-depth theoretical analysis of the relationship between population, consumption and technology, refer to Chapter 2, paragraph 3.2.

population growth and in an environment that is deteriorating, the population impact is more severe (NPU 2000: 29).

Population pressure then becomes a major factor in human insecurity through the pressure it exerts on other facets of human society. Increases in population numbers undoubtedly impacts on the distribution of natural as well as socio-economic resources and is often a central factor in competition and conflict over such resources, thereby decreasing the stability of the society and greatly decreasing the levels of human security (Sadik 1998: 7, 9)[44]. Tickell's (1994: 374) remark in referring specifically to population growth in developing countries is particularly telling: *"…as populations get out of kilter with natural resources, there is the prospect of continuing poverty, and accompanying famine and disease"*.

The relationship between population and environment is brought into perspective by exploring the relationship between population and water.

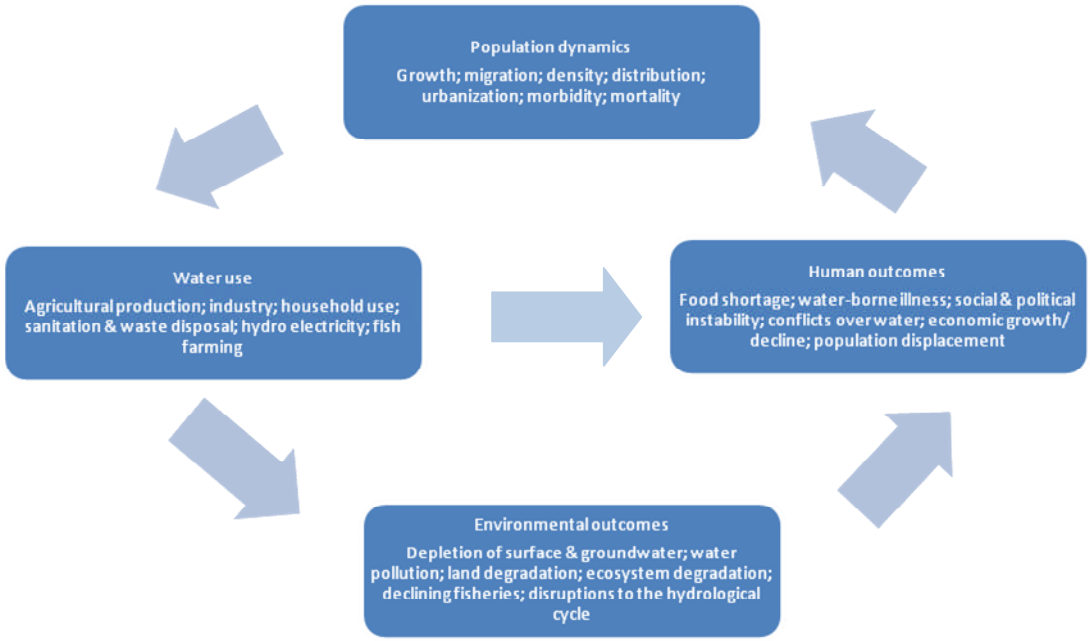
3. The relationship between population and water

Population and water are linked in a complex web of relationships not easily reduced to merely increasing numbers of people having to access a set amount of fresh water available. In this regard, Turton *et al.* (2003: 4) rightly stress that *"[t]oo often the analysis [of water scarcity] is rooted in simple per capita sums, from which unsustainable assumptions and ideas are extrapolated"*. At the most basic level, more people require a greater consumption of fresh water for hydration, sanitation, food production, an increase in the manufacturing of consumer goods and increased energy generation - all of which place pressure on the available freshwater resources. Figure 4 illustrates the most significant linkages between population and water and outlines the demands that population place on freshwater resources. The relationship between population and increased water scarcity is, in view of this, complex and also reciprocal, where population dynamics fuel water scarcity and water scarcity in turn affect other social processes such as migration and poverty. Population dynamics (growth, migration, spatial distribution etc.) impact on water use, in turn, resulting in environmental outcomes such as the depletion of water resources, decreasing water quality and disruptions to the water cycle. From a societal perspective these outcomes, in conjunction with water use, affect overall human security as epitomised by food shortages, socio-political instability,

[44] Human security is dealt with in more depth in Chapter 3.

socio-economic decline and population displacement. These factors may again affect water resources as illustrated.

Figure 4: **Population-Water Links**



Source: PRB 1997: 4.

The fact that the amount of fresh water generated through the natural cycle remains more or less constant, causes population increase to place an increasing demand on available fresh water (UNFPA 2001: 11). Currently, it is estimated that 54% of all available fresh water is being used and if it is assumed that consumption per person remains constant, the proportion of fresh water being used could increase to 70% by 2025 (UNFPA 2001: 11). Some worse case scenarios estimate that by 2050, almost seven billion people in 60 countries will face water scarcity, while even the lowest projections suggest that around two billion people in 48 countries may experience chronic water scarcity by the middle of the century (UNESCO 2003: 13). The reasons for growing water scarcity in the face of growing population numbers are many, and not easily isolated from other social, environmental,

economic and political factors. However, most projections on water scarcity paint an ominous picture of growing demand and an inability of nature to supply.

Ultimately, more water is needed to satisfy the demands of the growing world population. However, since the amount of fresh water generated through the natural cycle remains more or less constant, population will place an increasingly greater demand on available fresh water (UNFPA 2001: 11). The devastating impact of population growth on the ability of the freshwater system to replenish sufficiently is evident in the shrinking of lakes, the depletion of aquifers and rivers being sucked dry long before reaching the sea. In India, for example, water in underground aquifers is being pumped at double the rate of recharge from rainfall to supply water to the one billion people in this country. With approximately 18 million million people being added to the Indian population annually over the next 40 years, the fact that aquifer depletion could result in grain harvests being reduced by around 25% causes concern over the impact of water scarcity on food security in this country (Brown & Hallweil 1999: 1; PRB 2007).

Although most current estimations of fresh water availability rests on the assumption that there is a set amount of fresh water available on earth, human activity may even ultimately reduce the amount of available fresh water. Particularly in the case of renewable resources such as fresh water, the issue of renewal through the natural hydrological cycle is severely affected by increased demand. Water is constantly renewed through the natural hydrological cycle, but pressure on water resources is affecting this cycle dramatically by influencing precipitation patterns, altering river flows and reducing water run-off (PRB 1997: 6; UNESCO 2003: 12). Growing human populations have created demands for fresh water in excess of the environment's capacity to supply through the hydrological cycle. Therefore, as population numbers and per capita consumption increase, the natural hydrological cycle is increasingly taxed. For example, the spreading of urban areas may increase runoff and reduce the amount of groundwater reacting with surface water systems (Hunt 2004: 44). Global warming further impacts on the natural water cycle in such a way that freshwater renewal may decrease. Currently, insufficient scientific data exists to indicate the effects of global warming on the natural water cycle, but the issue of climate change must be borne in mind in assessing future projections of water availability. For the foreseeable future, however,

global population numbers and consumption patterns remain the most significant indicators of future water availability.

By influencing this natural ecological process, more than freshwater availability is affected. Freshwater ecosystems also provide a whole range of services and goods that in economic terms are estimated to be worth several trillions of dollars (Harper 2004:95). Therefore, by impacting on freshwater cycles, humans are also negatively affecting their physical, social, economical and emotional wellbeing. Human population is, therefore, placing an increasing burden on available freshwater resources and may run up against the limits of water availability if current population and consumption patterns continue. With this in mind, the issue of population growth needs in-depth scrutiny within the context of scarce freshwater resources.

4. Population growth and water scarcity

The unprecedented growth of the human population over the past 200 years is an undeniable fact. For millennia the world population grew very slowly. In over a million years the population only reached about one billion people by the early 19th century. However, in only 130 years more, another billion people were added to the world population and in the next thirty years another billion, and a fourth billion fifteen years later. Currently, the world accommodates 6.6 billion people (PRB 2007).

Factors contributing to this staggering increase in human population numbers range from improvements in food production and agriculture, to advances in health care and living standards. Aspects such as religion, culture, socio-economic and political considerations contribute in shaping the population size and distribution of societies and, therefore, the population dynamics help shape the social contexts within which resource scarcity develops[45].

In addition to this ability to reproduce, their consumption levels and the scope of technology in many respects outpace population numbers. Natural resources are exploited at a much

[45] Population increase is certainly not the sole factor in determining resource scarcities. As was pointed out in Chapter 2, levels of affluence, the technology used by the population in conjunction with population numbers influence the impact of people on the environment. However, for the sake of explanation and of clarity, the different factors need to be isolated first to capture the influence of each on fuelling resource scarcities.

faster pace than in the past, and if resource use is not kept within sustainable limits[46], scarcities almost certainly develop. The devastating impact of population growth on the ability of the freshwater system to replenish sufficiently is evident in the shrinking of lakes, the depletion of aquifers and rivers being sucked dry long before reaching the sea. The exponential growth in human population numbers have unarguably led to a shift in the balance between resources and population, with resources being overexploited for the benefit of the growing human race.

While the specifics with regard to numbers and time-scales are always subject to subtle changes in the various facets of society, there are some definite demographic trends that are identifiable. According to Engelman (1998: 67), three trends can be identified with reasonable certainty. Firstly, the world population will continue to grow considerably before stabilising or reaching a peak. Secondly, the greatest proportion of this growth would take place in the developing regions of the world and thirdly, as population growth rates slow down, the world population will continue to age dramatically. The global figures, however, disguise vast disparities between regions and continents with regard to population trends.

4.1 Continued growth of the world population

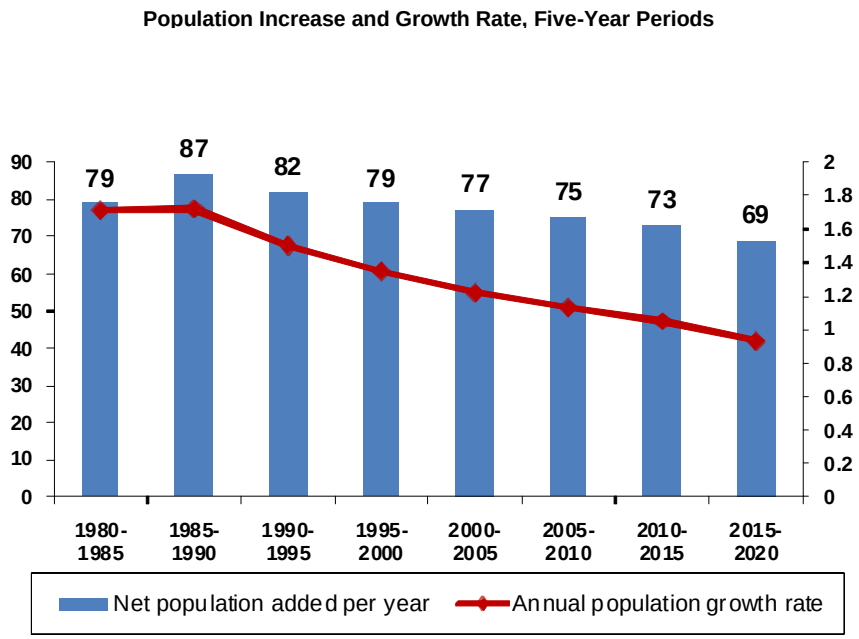
Currently, the world accommodates 6.6 billion people and while the overall population growth rate is slowing, world population will continue to grow for some time as a result of the built-in momentum of current high numbers of population. Since 1950, the world population growth rate has declined from 1.81% to 1.2% in 2007, having peaked at 2.1% in the 1960s (

Figure 5). The projected growth rate of 0.38% in 2050 indicates that although the growth rate is declining, and therefore the world population is growing at a slower pace, in terms of actual numbers, more people will still be added to the world population in the coming half century (UNDP 2004). By 2050, most projections indicate a stabilisation of the world

[46] For a discussion on the argument of sustainability see Chapter 2.

population at approximately 9.3 billion people (CIA 2004:1; Engelman 1998: 53; PRB 2007; UNESCO 2003: 12; UNFPA 2002: 72).

Figure 5: Trends in Population Growth Worldwide

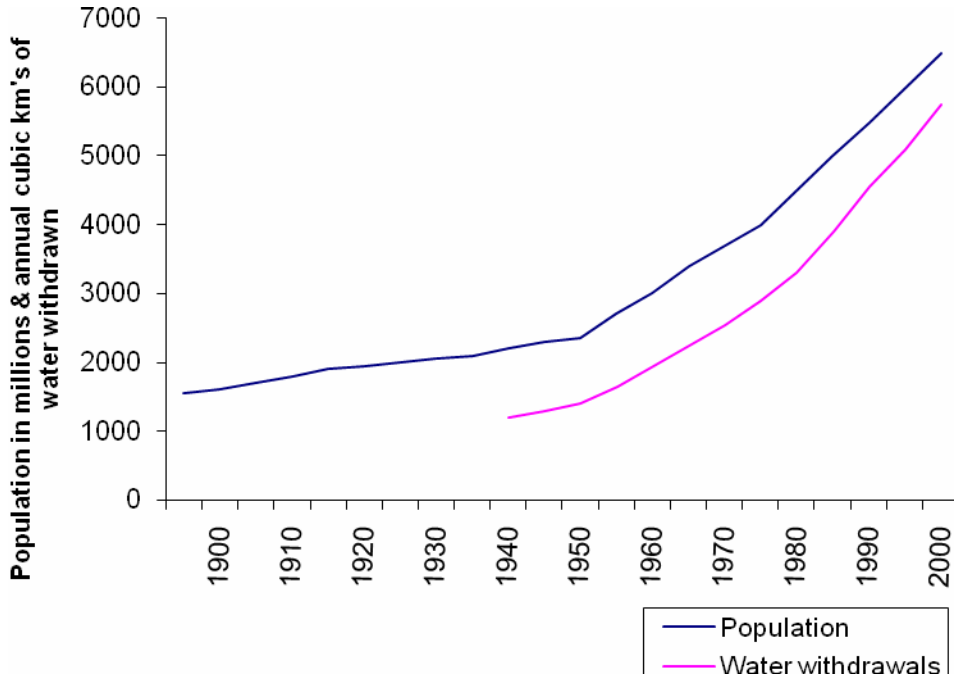


Source: PRB 2003.

In spite of projections that fertility rates will fall to below replacement level in most countries within the next two decades and subsequently lead to lower population growth rates, almost 3 billion people will be added to the world population between 2000 and 2050 (De Souza *et al.* 2003: 35; PRB 2007). Even at slower population growth rates, an additional 80 million people are still being added to the world population annually (95% of these additions are in developing countries). To satisfy the water needs of these additional

approximately 80 million[47] people annually, an amount of water equal to the annual flow of the Rhine is needed if current consumption patterns of water remain the same. To emphasise the impact of population and consumption on water resources, it is useful to note that since 1940, world population has doubled, while water use has increased fourfold (Engelman 1997: 29).

Figure 6: **World Population and freshwater use**



Source: UNESCO 2003: 13.

The centrality of population pressure as a factor in water scarcity is such that UNESCO (2003:12) remarks: "…there is little doubt that population growth has been and will continue to be one of the main drivers of changes to patterns of water resource use" and "... the increase in numbers of people will still be a major driver of water resource management for at least another fifty years". The PRB (1997: 5) puts it stronger still in asserting that "[b]y far the most important demographic trend affecting water resources is population growth". The relationship between water use and population increase is illustrated in Figure 6.

[47] This projection is based on UNFPA demographic and social indicators for 2005. The world population growth rate is currently calculated at 1.2% per year, although it varies from between -0.1% (Swaziland) to as high as 3.6% (Mayotte) (PRB 2007).

The above illustrates a simple linear relationship between population growth and the use of fresh water. However, the relationship between freshwater and population is more multifaceted than the above suggests. Population growth, however, is certainly one of the most visible and dramatic elements of population change and have significant implications for all aspects of resource use[48] (UNESCO 2003: 12). This is because population pressure compounds the impact of other factors on resource availability. Population pressure, for example, adds pressure to the effects of intermittent droughts and limited freshwater reserves on water availability in arid parts of the world such as the Middle East (Roudi-Fahimi *et al.* 2002: 2).

Although increased population numbers will most certainly affect the availability of fresh water some question the *'water bomb'* argument that views population growth in the face of a limited and shrinking resource base as the primary reason for the impending world water crisis. As Petrella (2001: 30) emphasises: *"…it is an argument which overlooks the enormous inequality of consumption between human beings in the North and those in the South"*. Global trends belie vast disparities between developed and developing nations of the globe. In this regard, Sadik (1998: 6) reiterates that the world is not confronted by a single population growth-problem, but by *"scores of national, regional and even continental population growth-problems"*.

The divergent population growth trends of developed and developing nations are well-documented and publicised and this disparity has on numerous occasions brought negotiations on environmental matters to a head[49]. Developed nations, primarily situated in the Northern Hemisphere with the exception of Australia and New Zealand, overall are displaying more stable growth trends and many nations in the developed world have either achieved stable population growth rates, or have rates that are in decline.

In Europe, population growth is currently negative at -0.1%, while in the United States and Canada the population grows at 0.6%. Higher levels of socio-economic development, better living conditions, decline in desired family size, and better access to health care and

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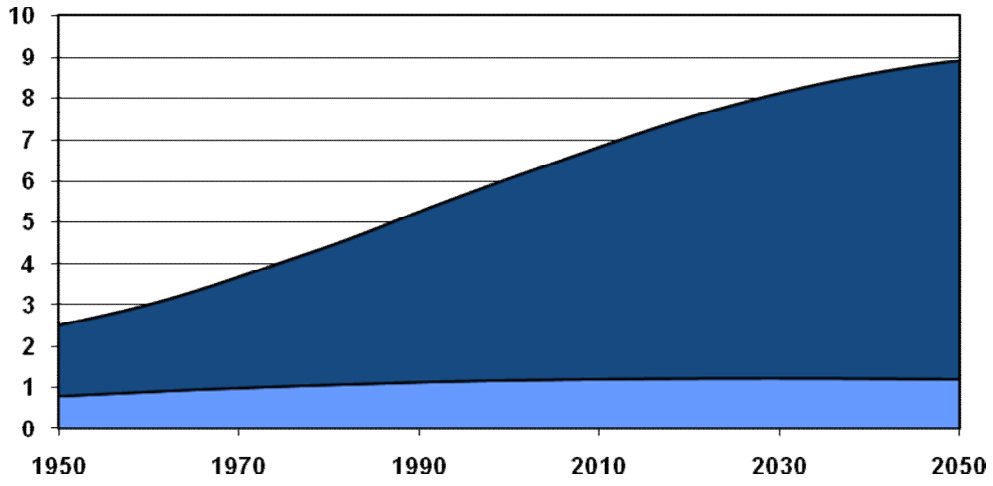
[48] When discussing resource scarcities, the focus will fall almost exclusively on the exploitation of renewable resources to highlight the fact that population factors influence the natural ecological system in regenerating used resources. The exploitation of non-renewable resources, although also subject to population pressure, is of less importance in this chapter, since these resources' exploitation is strongly regulated by economic factors of supply and demand. As pointed out by Sadik (1998: 8), the rules applying to non-renewable resources are entirely different from those applicable to renewable resources.

[49] Consider for example the International Conference on Population and Development (ICPD, 1994); Bucharest 1974 (Weeks 2005: 549).

contraceptive availability are some of the factors attributed in achieving this demographic profile. Combined with, and related to these low growth rates, developed countries are also characterised by low fertility rates and low child mortality rates. The average total fertility rate for more developed regions is 1.6 and the average family size has fallen from 2.7 children in 1960 to 1.6 currently (Engelman 1997: 3; PRB 2007; UNFPA 2002: 72).

On the other end of the spectrum, developing nations are characterised by higher population growth rates in comparison with developed nations and an array of socio-political and socio-economic factors that negatively affect both demographic trends and environmental stability. These nations are expected to contribute up to 95% of the world's total population growth annually, but have the least capacity to cope environmentally and socially with these growth rates. Between 2005 and 2050, less-developed regions will have increased from 5.4 billion to 8 billion people, comprising, 86% of the 9 billion world population in 2050 [50] (CIA 2004:1; PRB 2005; UNFPA 2001: 3; UNDP 2004; UNFPA 2005: 111).

Figure 7: **Population growth in more and less developed regions (1950 - 2050)**



Source: PRB 2003.

[50] This is according to United Nations medium population projections.

The situation in Southern Africa is characteristic of trends found in the rest of the developing world. First, the issue of population growth needs to be outlined within the Southern African context

4.2 The Southern African context

The Southern African region had a combined population of approximately 86 million people in 2005. Population growth trends indicate a regional growth rate of 0.9% for 2000 to 2005, but by 2025 the growth rate is projected to decrease to 0.6%. By 2025 the population is projected to increase to more than 97 million people, while by 2050, Southern Africa will have a projected population of just under 110 million people, while Africa's population, with a growth rate of 2.1%, will increase from 905.9 million in 2005 to 1.937 billion in 2050 (UNDP 2004;. UNFPA 2005: 111). South Africa has the largest population of all countries in the region (47.4 million), followed by Mozambique (19.8 million) and Zimbabwe (13 million). Therefore, the largest proportion of the region's population currently (2005) lives in South Africa (55%), while 23% of the region's population live in Mozambique. By 2050, 44% of the region's population will reside in South Africa, followed by 34% in Mozambique (UNDP 2004). With the exception of South Africa, all nations in the region are characterised by total fertility rates of more than 3 children per women. Moreover, all countries in the region, with the exception of Lesotho, will continue to increase their populations in the coming half century, albeit at a slower rate, based on current growth rates for these countries (Table 9).

Table 9: **Population projections for Southern Africa – 2005, 2025, 2050**

Country	Population size (millions)			Population growth rate %
	2005	**2025**	**2050**	2000-2005
Region	86 857	97 122	109 414	0.9
Botswana	1 765	1 655	1 658	0.5
Lesotho	1 795	1 690	1 601	0.7
Mozambique	19 792	27 556	37 604	1.8
Namibia	2 031	2 519	3 060	1.7
South Africa	47 432	48 297	48 660	0.8
Swaziland	1 032	975	1 026	0.8
Zimbabwe	13 010	14 430	15 805	1.7

Source: UNDP 2004.

As indicated in Table 9, the region as a whole will still experience population increase in the next 45 years with only Botswana, Lesotho and Swaziland having less people in 2050 than in 2005. Therefore, population growth is still a factor to contend with in future water resource management decisions in Southern Africa. Furthermore, even in the face of slower growth rates, unequal distribution of water resources in the region, combined with low levels of socio-economic development and the challenges posed by the HIV/AIDS pandemic may serve to decrease the levels of human security in the region to the extent that conflicts over scarce resources, particularly water, is brought to the fore.

Demographic trends in Southern Africa have, over the past decade, increasingly been affected by the impact of HIV/AIDS. The HIV prevalence rate of the 15-49 year age category reveals high rates for all countries, except Mozambique[51]. Swaziland and Botswana both have prevalence rates of higher than 35%, while Lesotho is approaching a 30% prevalence rate. Mostly as a result of HIV/AIDS, many of the past estimates predicting high and sustained population growth rates for Southern African countries have not materialised. Pelser (2004: 173) emphasises with regard to South Africa, that decision-makers *"need no longer assume a steep rise in population numbers in their calculations of population needs in the future. At the same time, however, the drop in population growth rate will be accompanied by a relative rise in dependency and poverty owing to AIDS-related illnesses and other effects"*.

Therefore, HIV/AIDS may significantly affect the overall human security of the Southern African region and will for at least the next 50 years contribute to increased poverty levels, and decrease prospects for future socio-economic development. Socio-economic conditions as mentioned above greatly increase, or decrease, the level of human security experienced by the people living in these different nations and this in turn, impacts on the potential for and nature of conflict experienced in different parts of the world.

Furthermore, a youth bulge and projected urbanisation trends will contribute in shaping the demographic profiles of developing nations such as those in Southern Africa. Socio-economic factors such as migration, urbanisation and poverty could place severe stress on

[51] The low prevalence rate of Mozambique is possibly as a result of a lack of institutional capacity to gather reliable data and does not point towards an actual lower prevalence rate in this country compared to the rest of the region

the natural resource base and become an important factor in heightening social and political insecurity. These factors will receive attention further on.

5. Population structure

A further set of demographic factors affecting human impact on the environment is population composition. The structure of the population in terms of age, life, expectancy, family size and marital status impacts on the environment through the effect thereof on consumption.

5.1 Developed nations: ageing and higher life expectancy

Developed countries are characterised by an age structure comprising of a large proportion of people in the adult age categories, and roughly equal numbers of people in the under-15 and over-60 age groups. By 2050, it is estimated that the over-60s will comprise up to 33% of the populations of these countries, outnumbering under-15s by more than 2 to 1. Significant developments in health care, nutrition, sanitation and living conditions, particularly in developed countries, have greatly increased the life expectancy of people in these nations causing great increases in the number of people reaching the age of 65 and beyond. The aging of populations in developed nations combined with decrease in desired family size and lower fertility levels are altering the age structures of these nations dramatically over the next 50 years (Harrison & Pearce 2000: 18; Redelinghuys & Van Rensburg 2004: 269).

To this effect, nations in the developed North can certainly not be accused of contributing to the world population growth problem and to the environmental problems associated with increased numbers. However, in many respects their populations exert more pressure on environmental resources through overuse of resources stemming from affluence, rather than through actual increases in numbers. In addition, aging populations may exert greater pressure on resources because over 60s consume more per person than under 15s do, while smaller households generally also have higher consumption levels because they tend to live in individual dwellings with their own heating, lighting and consumer items such as refrigerators and televisions (Harrison & Pearce 2000: 19).

While impacts associated with ageing and higher life expectancy dominate the demographic profiles of developed nations, a opposite trend has emerged in developing nations, namely a youth bulge.

5.2 Developing nations: the youth bulge

The fact that developing nations are characterised by youthful populations implies a built-in momentum for future population increase, since these young people are only entering their reproductive years and will thus want to have children, even if these nations all succeed in lowering the average fertility rate immediately. Thus, the age distribution leaning towards the younger age cohorts in developing nations will affect fertility rates in these countries for the foreseeable future and thus adding to environmental stress in these nations.

Younger populations require more resources to be allocated to education provision and job creation. Younger people will also form individual households as they leave there families of orientation to form families of their own, thus increasing the number of households and the number of inhabitants per household. Younger populations exert a particular strong impact on environmental and social spheres since young families increase reliance on environmental resources such as firewood, building materials, clearing of land for subsistence farming in order to provide for larger numbers of children, while there is a greater need for education and economic development[52] (NPU 2000: 29). A high number of youthful dependents are significant in the context of water as a development and environmental resources due to the demand that youthful populations will make on the future provision of potable water and sanitation in nations already challenged by low levels of socio-economic development and constrained by hydrological realities such as in Southern Africa. With regard to the implications of a youth bulge for human and political security, Cincotta *et al.* (2003: 75) found that in nations at risk of civil conflict, the number of youthful adults (between 15 & 29 years) in relation to the number of older adults is often more than 40%.

Furthermore, many developing countries are caught in what Myers (1998: 25) so aptly refers to as a *'demographic trap'*. When in this trap, nations experience high population growth and this growth prevents them from achieving the economic growth necessary to reduce

[52] Many developing countries, South Africa included, are characterized by a large contingent of children under fifteen and an equally large number of aged, placing dual pressure on a country's resources. Often the demands in terms of public funding of these two groups are conflicting, making decisions with regard to public spending difficult (Pelser 2004: 178).

population growth. At present, 85% of the world's youth (15-24 year olds) live in developing countries and nearly 45% of these youth (515 million) survive on less that $2 a day (UNFPA 2005: 45). For the period 1995 – 2000 the youth dependency ratio for Africa was 78.6 and this places a large burden on families and governments in terms of providing for education, health and employment, while also hampering savings for future developments (Commission of African Union 2004: 22).

In addition to developing countries still displaying fairly worrisome growth trends, the populations of many developing nations are also showing signs of aging and, in some cases, increased life expectancy. In line with the global trend, aging is a characteristic of population structures in many developing parts of the world. Approximately 75% of the world's elderly will live in developing countries by 2050, and it is expected that the poorest regions of the world will have the largest increases in elderly populations. Unfortunately, many of these nations will find it extremely difficult to meet the needs of the elderly in terms of health, housing and finances (Pelser 2004: 178). In future, the aged population will increasingly contribute to high age dependency ratios across the region which could also place significant pressure on natural resources. High numbers of aged requires more resources in order to stay healthy, for example, or in the case of aged in developing contexts, to survive.

Increased life expectancy is attributed to improvements in health and medical breakthroughs that results in better infant and child survival and lower maternal mortality. Global life expectancy has increased to an average of 68 years and generally people, even in developing countries, are healthier and can potentially grow older than before. However, developmental factors result in much slower progress in developing regions. Current life expectancy in sub-Saharan Africa is only 49 years, far lower than the world average of 68 years (Pelser 2004: 179; PRB 2007).

6. Population migration and urbanisation

Environmental considerations have from the earliest times played a considerable part in the migration and settlement patterns of people. History reveals that people are drawn towards certain natural environments because of the perceived advantages that this environment holds for their existence. For this reason, people have for centuries developed communities and civilisations near large water sources such as rivers.

On the other hand, people are often motivated or compelled to abandon areas due to the natural resources being depleted. In the presence of severe environmental degradation, migration is not a choice, but a survival strategy. Land degradation, water scarcity and the threat of famine are powerful factors forcing people to migrate. The drought in the Sahel displaced more than 2 million people from Burkina Faso, Chad, Mali, Mauritania and Niger since the mid 1980s. (Renner 1996: 107).

A large proportion of the urbanisation experienced in developing regions can be attributed to environmental decline in rural areas[53]. Arable land density has been increasing over time from around 180 people per km² in the 1960s to more than 400 people per km² by 1999 in Africa. This has resulted in imbalances in land carrying capacity and these imbalances in turn have increased land degradation, soil erosion, biodiversity loss and deforestation. Faced with shortages of cultivable land and limited alternatives for employment in rural areas, people flock to urban areas (Commission of African Union 2004: 22). In another example, in rural India, population growth in the Karnataka State has contributed to increased demand for water. The population attempted to meet their water demands through the drilling of more boreholes, resulting in the depletion of groundwater sources and ultimately water scarcity. The scarcity of water, in turn, spurred rapid migration to urban areas (PRB 1997: 6).

Over the past 50 years, the populations of developing regions have been transformed from predominantly rural to increasingly urban, with some critical environmental consequences such as destroying natural ecosystems and depleting natural resources (Livernash & Rodenburg 1998: 12). Growing urban areas are constantly faced with the challenges of providing potable water for human consumption and maintaining adequate sanitation to protect human health and the environment (Hunt 2004: 47). Rising domestic demand for water has placed an increasing burden on water resources within countries and as a result, more water has to be appropriated from outside these nations.

In both developed and developing countries, clashes between the agricultural and urban sectors are becoming more frequent and additional sources of water is increasingly being sought to alleviate pressure on available water resources. Domestic water supply and

[53] Developing nations experience 'overurbanisation' – more urban residents than the economies of cities can sustain as a result of overruralisation – more residents than the economies of rural areas can sustain (Weeks 2005: 486).

agriculture continue to compete for a share of the available fresh water, but it appears that with increasing population pressure in urban areas and the concomitant increased demand for water and sanitation, domestic water needs will in future increasingly affect decisions over access and distribution of scarce water resources.

Already agricultural production consumes 81% of available water in the developing world, compared to 46% in the developed world, while domestic water use comprises 11% in the developing and 40% in the developed world respectively. With regard to South Africa, Balance & King (1999: 12) project that rising urban demand for water will increase by 219.5% between 1996 and 2030, while agriculture and forestation will demand 28.6% more water in 2030 than in 1996. A large driving force behind Namibia's proposed water diversion scheme in the 1990s that brought this country into conflict with Botswana was Namibia's rising demand in Windhoek, the main urban centre in this country.

Table 10: **Sectoral water withdrawals (%) in Southern Africa**

	Agriculture	Industry	Domestic
Botswana	**43**	**19**	38
Lesotho	**19**	**41**	40
Mozambique	**87**	**2**	11
Namibia	**63**	**5**	33
South Africa	**73**	**10**	17
Swaziland	**--**	**--**	--
Zimbabwe	**86**	**5**	10

Source: WRI 2005.

In Sub-Saharan Africa the percentage population having access to water services is much higher in urban than in rural areas (Turton *et al.* 2003: 10). This results in the domestic water sector increasingly competing with the demands of agriculture for a larger share of fresh water. The Southern African region is rife with cases of decreasing river flows resulting from increased agricultural and urban sector utilisation that impact severely on rural communities more directly dependent on river water for their day-to-day survival. In the tensions that ensue rural communities often point out that in times of water scarcity, such as during the recent drought in Southern Africa, the needs of commercial farming and urban areas are placed before those of poor rural communities (Tsedu 2004: 11).

At present, South Africa and Botswana both have more than 50% of their populations urbanised and by 2030, 70% of South Africa's and 66% of Botswana's population's will be urban. Namibia and Zimbabwe are expected to increase their proportions of urbanised

people from 34% to 51% and from 36% to 52% respectively between 2005 and 2030, while Mozambique's urban population will increase from 38% to 60% over this period (Table 11). As a result of increased demand for water services in urban areas, rural areas have often been disadvantaged in terms of access.

Table 11: Percentage of the population urbanised - 2005, 2015, 2030

	2005	2015	2030
Botswana	52.5	57.5	65.7
Lesotho	18.2	21	29.8
Mozambique	38	48.5	60
Namibia	33.5	39.8	50.9
South Africa	57.9	62.7	70
Swaziland	23.9	27	35.6
Zimbabwe	35.9	41.4	51.8

Source: UNDP 2004.

The demographic trends discussed so far indicate that population and development contexts are transforming more rapidly in developing countries than was the case in the developed world. Due to this rapid transformation, developing regions are more vulnerable to the environmental and socio-political impacts of demographic changes. An additional issue that developing nations must deal with is the need for continuous socio-economic development in the face of demographic and environmental challenges.

7. Water scarcity, population pressure and socio-economic development

Developing nations are also plagued by a wide array of social, economic, political and environmental issues that decreases their socio-economic capacity to effectively deal with an impending crisis such as growing water scarcity. Therefore, these countries are economically and institutionally ill prepared to adequately deal with these challenges[54]. Subsequently, water scarcity in developing nations, fuelled by demographic pressure becomes a serious human security concern that greatly increases the risk of political insecurity, both at the national and international levels.

Moreover, vulnerability to water scarcity and drought familiarly diverge along the lines of socio-economic development (Pelser 2001: 19). Falkenmark & Widstrand (1992: 10) indicate

[54] Institutional capacity will receive attention in Chapter 6.

that countries that are ranked low on the Human Development Index (HDI)[55] are disproportionately concentrated in areas where hydrological preconditions constrain access to fresh water, indicating a correlation between levels of human development and water scarcity. These countries are mostly situated in the transition regions between the tropics and temperate climates in latitudes of about 20 to 30 degrees north and south of the equator and are characterised by high evaporation, limited and fluctuating rainfall and risk of drought. Such areas consequently suffer under a burden of socio-economic insecurity and are hampered by water scarcity in bettering the prevailing socio-economic conditions. Socio-economic insecurity creates a context conducive to the spread of tension and intergroup competition over scarce water resources.

Judging by the current experience on the African continent, attaining even the minimum standards of human security is severely challenging for many developing nations, particularly in sub-Saharan Africa. The importance of human development is acknowledged and recognised through the inclusion of environmental sustainability as a Millennium Development Goal (MDG), with improved access to fresh water and sanitation set as explicit targets for achieving the goal of environmental sustainability. If a higher level of human security as envisioned by the MDGs is not attained it may drive continued environmental decline and lead to increased poverty, among others, and may ultimately lead to heightened political tension and the spread and intensification of political conflict.

[55] The HDI is a combined measure of social and economic indicators that estimate average quality of life in a country and is comprised of an aggregated score of life expectancy at birth, literacy rates and GDP per capita. Countries are ranked from 0 to 1 on the index and the closer the score to 1, the higher the overall quality of life in the country (Harper 2004: 327).

Table 12: The Millennium Development Goals

Goals	Selected targets
Goal 1 Eradicate extreme poverty and hunger	Halve the proportion of people suffering from hunger
Goal 2 Achieve universal primary education	Ensure that all children can complete primary school education
Goal 3 Promote gender equality and empower women	Eliminate gender disparity in al levels of education
Goal 4 Reduce child mortality	Reduce under-five and infant mortality rates by two-thirds
Goal 5 Improve maternal health	Reduce by three quarters the ratio of women dying in childbirth
Goal 6 Combat HIV/AIDS, tuberculosis, malaria and other diseases	Halt and begin to reverse the spread of HIV/AIDS and the incidence of malaria and other major diseases
Goal 7 Ensure environmental sustainability	Halve the proportion of people without access to improved water sources
Goal 8 Develop a global partnership for development	Develop further an open trading and financial system that includes a commitment to good governance, development and poverty reduction – nationally and internationally

Source: UNESCO 2003; UNFPA 2004.

Africa is already behind in reaching the MDG of halving the proportion of people living in poverty. Since 1990, the number of people living on less than $1 a day (the ultra poor) has not decreased significantly in Africa. In fact, between 1990 and 2002 the proportion of people living on less that $1 a day decreased from 44.6% to 44%, while the actual number of people living in extreme poverty actually increased by 140 million. In comparison, worldwide the proportion of people living in poverty decreased from 28% of the developing world's population in 1990 to 19% in 2002 (DESA 2006: 4). By 2002, Sub-Saharan Africa was also not on track with reaching its target of halving the proportion of people without access to safe drinking water by 2015 (Africa Renewal 2005: 12). A similar situation with regard so hydrological constraints and socio-economic development transpires in Southern Africa.

7.1 Linking demographic realities in Southern Africa to socio-economic development

All countries in the region are characterised by high evaporation, fluctuating rainfall patterns and vulnerability to drought. Turton *et al.* (2003: 24) summarises the water resource situation in Southern Africa as typified by uneven distribution and variability in terms of both time

and space[56]. Where nations are already constrained by hydrological realities, scarce water resources will need to be utilised to a greater extent and with greater skill in order to attain and maintain adequate standards of human well-being. As has been mentioned, even in nations where population growth has slowed, either due to decreased fertility, or the impacts of HIV/AIDS, or a combination of these, the impact on water resources continues to be large due to development pressures. These factors have implications for human security, developmental prospects and overall social stability, but also have implications for water resource availability and utilisation.

All countries in Southern Africa are ranked in the medium or low development ranges according to the HDI. South Africa ranks 120, followed by Namibia, (125), Botswana (131) and Zimbabwe (145), Swaziland (147) and Lesotho (149). Mozambique (168) falls into the low development range (UNDP 2005). High poverty levels are further revealed in the percentage of people living on less than $2 a day in the region. Zimbabwe and Mozambique have the highest proportions of people living in absolute poverty according to this benchmark (83% and 78% respectively), while in Botswana, Lesotho, Namibia more than half (56%) of the population fall into this category. South Africa and Swaziland are in a slightly better position with regard to the number of people living in poverty. In South Africa, 34% and in Swaziland, 23% of people survive on less than $2 a day (PRB 2005). Thus, Southern Africa is characterised by a low levels of human development and high levels of economic insecurity as illustrated by the HDI ranking of countries from the region and the high proportions of people living in poverty across the region.

Eradicating poverty, or even halving the number of poor in Southern Africa, can only be accomplished if people have access to basic services, including access to safe water and adequate sanitation. However, development of access to water and sanitation relies heavily on water resource utilisation, thus contributing to decreasing quality and quantity of available fresh water. The benefits of adequate sanitation and potable water for various facets of human and societal well-being are, however, unquestionable. Thus, the challenge is to increase human security at this end, while not in the long term decreasing security due to increasing water resource scarcity.

[56] Refer to Chapter 1 for a more in-depth discussion of the hydrological context in Southern Africa.

Meeting the MDGs in Southern Africa will become even more difficult to attain in light of the fact that water scarcity is becoming more widespread. This will put further constraints on the continent at large, and the region in particular's ability to reach the international targets with regard to human development. Apart from isolated successes, such as improving access to water resources in Lesotho, Swaziland and Namibia, there has not been a substantial improvement in the proportion of people having access to sanitation and water in the region. Zimbabwe only managed to increase access to water and sanitation by 3% respectively, while more than half of Mozambique's population (58%) still do not have access to safe water and 68% lacked access to improved sanitation. South Africa has only managed to provide an additional 5% of its population with access to fresh water since 1990, while the proportion of people with access to adequate sanitation has actually decreased from almost 70% to 65% since 1990.

On the other hand, adopting living standards of industrialised countries would lead to increased demand for services and goods associated with a more affluent lifestyle, placing added pressure on natural resources (Livernash & Rodenburg 1998: 11). If consumption rates of water increase globally to reflect the current level of consumption in the developed world, up to 90% of the available water may be used annually (Baumann 2002: 1). Overall, while global water use has increased by an average of 2.5% to 3% per year since 1940, water withdrawal in developing countries have in fact increased by 4% to 8% over the past decade (Hunt 2004:48). To raise the GDP of low and middle income countries, for example, to be on par with that of developed nations requires that more renewable and non-renewable resources are needed and due to the low level of socio-economic development, this additional stream of goods per capita will require higher inputs of energy, space and commodities than is the case in developed nations (Livi Bacci 2001: 197). Consider in this regard Harrison's (1993:53) observation that water will set the development ceiling for many developing nations in Africa, since water shortages are set to constrain improvements in agriculture, industry and domestic use.

Most countries in the region are already approaching the limits of agricultural production due to lack of water, while future economic development is also reliant on the share of water available to this sector and the industrial sector. Namibia's agricultural sector has barely managed to keep pace with population growth since 1995, a trend attributed directly to

below-average rainfall over the past few years. The agricultural sector in this country will, as a result, experience poor growth in the next few years. Also in Botswana, the contribution of agriculture to the country's GDP has decreased from 40% in 1966 to 2.5% in 2003, in part attributed to the impacts of recurrent droughts. South Africa is constrained by water scarcity in increasing the number of hectares of land under irrigation. In the central and western parts of the country, suitable soil for agricultural expansion is found, but expanding irrigated agriculture is hampered by lack of water. Irrigation comprises 62% of the total water requirements in South Africa, while the agricultural sector as a whole uses 73% of the country's available water (FAO 2006: 3; WRI 2006).

Providing the region's people with socio-economic security and improving the quality of life of the region's population is dependent on the ability to use and share current scarce freshwater resources in a sustainable manner. Furthermore, water availability is a potential limiting factor to the economic growth of countries in the Southern African region and as a result can trigger conflict, but may also spur cooperation (Turton *et al.* 2003: 28).The fact that the most economically developed country in the region, South Africa is also the most water-stressed of all countries in the region – based on per capita availability of water – drives home the fact that water availability is and will become even more so, a critical socio-economic development issue, particularly for South Africa.

South Africa's water demands may increase by more than 50% by the year 2030, a scenario aggravated by the fact that the country is expected to experience a situation of more or less permanent drought between 2002 and 2040 (Balance & King, 1999:20; Yeld, 1997:46). This country is placing pressure on resources because of efforts to erase past inequalities in terms of access to and distribution of resources, but also in its quest for greater economic growth. South Africa's freshwater demands are placed into context when seen in terms of its role and place within the hydropolitical complex of Southern Africa as contextualised by Turton *et al.* (2003:29).

These authors distinguish between pivotal states, impacted states, pivotal basins and impacted basins in the region. Pivotal states refer to the most economically developed countries in Southern Africa[57], notably Botswana, Namibia and South Africa who are

[57] In demarcating the Southern African region, Turton *et al.* (2003) include all 14 countries of the SADC.

reaching their limits of readily available fresh water. Impacted states share transboundary rivers with one or more pivotal states. In Southern Africa, these states include Mozambique, Swaziland and Lesotho. These states' water availability may be impacted upon by the need and the ability of pivotal states to access scarce water resources, while they have limited capacity or choice in using water to drive their own socio-economic development. Pivotal basins are shared between pivotal states and in this complex include the Orange and Limpopo basins. Both these basins have reached the limits of their supply and more water for economic development can only be utilised at the cost of the environment or the economy. Lastly, impacted basins are international basins shared by on pivotal state and impacted state. In this regard, impacted states have limited options in utilising the impacted basin for its own development. These basins in Southern Africa include the Okavango, Incomati, Maputo and Zambezi.

Honey (2004: 27) observes, specifically in the Limpopo river basin, identified as a pivotal basin, that damming, the proliferation of weirs and farm dams in the Crocodile and Marico river catchments reduce the water flow to the Limpopo River. This river is shared by Botswana, Mozambique, South Africa and Zimbabwe. Presently, water use in Zimbabwe and South Africa reduces the flow of water from the Limpopo River to Mozambique to the extent that the river is dry for three to four months a year, although it can actually increase to eight months a year (FAO 2006). The same applies to the Orange River Basin, another pivotal basin in the region. The flow in the lower parts of this river has been reduced by nearly two thirds in the past 35 years as a result of transfers from this river and the Caledon River through the Orange River Project (ORP) to supply water to cities in the Eastern Cape Province. A similar situation is evident with the Zambezi River. Half of Namibia and Mozambique's external water comes from the Zambezi River which is shared with Angola, Botswana, Zambia, Zimbabwe, Malawi and the United Republic of Tanzania (FAO 2006).

The above represent but limited examples of how the increased extraction of water from shared rivers in the region increases water scarcity for different groups and nations dependent on these water resources, but this does not yet shed light on the issue of how water scarcity contributes to vulnerability to political conflict. This issue is imbedded in the overall socio-political capacity of nations burdened by scarcity of fresh water to deal with the tension that may arise from competing interstate and sectoral demands.

7.2 Linking demographic realities, water scarcity and political conflict

Developed nations are, almost without fail, characterised by political systems based on democratic principles and are politically relatively stable. Countries with higher levels of socio-economic development, therefore, experience less internal conflict, less overt conflict with other nations and can therefore offer their citizens greater levels of political and human security. Developing nations, on the other hand, are often either newly established democracies; in the throes of political instability as various groups seek to establish their rights, or in the hands of totalitarian regimes[58]. During the 1980s and 1990s most armed conflicts have taken place in developing countries characterised by low levels of economic development (Hauge & Ellingsen 1998: 304). These authors (1998: 312) have also found that countries experiencing environmental scarcity have a 20% probability of incidence of civil war and a 45% probability of domestic armed conflicts. This makes many developing nations politically unstable and lessens the levels of political and human security experienced by citizens of these nations. Haiti is an extreme example of a nation in which low levels of human and political security manifests itself in continuous social and political unrest. Economic crisis, an endless power struggle between the two main ethnic groups, expropriation of surplus wealth by the ruling regime, unsustainable population growth and severe environmental decline all contribute to the current social and political unrest experienced in this country (Homer-Dixon 1999: 135).

The alarming conflict trends of particularly the post-Cold War 1990s, spurred a series of studies to explore the underlying conditions that put states at risk of political tension and conflict (Cincotta *et al.* 2003). Among these, Homer-Dixon (1999) emphasises the interplay between supply or demand of natural resources and various demographic elements, as well as the impact of structural forces, such as resource distribution and risk of political conflict. A study by Population Action International (PAI) in particular, link the four factors discussed in this chapter, namely a youth bulge, rapid urban growth, HIV/AIDS and competition for cropland and fresh water to increased vulnerability to political conflict (Cincotta *et al.* 2003).

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[58] Historically speaking the democratically elected nation is a relatively recent phenomenon. By 1980 only 37 of the 121 countries in the world were democratic (only 35% of the world's population), but particularly during the 1990s, democratisation increased dramatically and by 2000, 60% of the world's population live under democratic elected governments in 144 of the world's 192 nations (Kegley & Wittkopf 2001: 62).

All these demographic features that increase vulnerability to conflicts are present in Southern Africa. Apart from the lingering and potent impacts of past rapid population growth rates on current and future resource utilisation, the region is characterised by a rapidly changing and uncertain demographic context influenced by the impacts of HIV/AIDS, high rates of urbanisation and a large youthful population burdened by poverty. Population growth in the region as a whole, and in different nations across the region, will undoubtedly still impact on per capita availability of water in the coming half century. It is significant that over the next 45 years, the Southern African population will increase from 86 million to 110 million people (2005 – 2050). Moreover, per capita water availability will decline in all countries in the region over this period, except in Lesotho[59]. Therefore, an increasing overall population in the face of decreasing availability of fresh water is a reality that the region must deal with in current and future decisions over fresh water. HIV/AIDS as another defining feature of the Southern African demographic context, contributes much to decrease the overall levels of human security in the region by impacting on socio-economic stability from the individual level to the regional level and decreasing the overall capacity of the region to deal with environmental crisis.

Compounding the problems of population increase already explained is the large youthful population in the region, an outflow of past high population growth and high fertility rates across the region. The high proportions of children under 15 (as high as 44% in Mozambique) increase the economically dependent population in the region as illustrated by the high age dependency ratios. This considerably impacts upon the levels of human security. The entire region's nations fall within the medium and low human development range on the HDI, indicative of among others high poverty levels and a low health status. The former is brought about by a combination of factors, among others by the impacts of population pressure, while the latter is brought about mainly by the impacts of HIV/AIDS on the health status of the region's population. A last demographic trend that is of importance in the context of human security and also resource distribution is urbanisation. As has been discussed, the region is characterised by high rates of urbanisation that brings the issue of tension over resource allocation to the fore, but also places an extremely high burden on infrastructure development and demands for fresh water.

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[59] See Chapter 1, Table 3.

The above demographic and development realities translate into high and growing levels of human insecurity, compounded by the developmental constraints imposed by the hydrological context in which the region's population finds itself. Southern Africa states affected by rapidly changing demographic and developmental contexts lack the social and economic resources as well as the institutional capacity to deal with the effects of demographic change through investing in education and primary health care or adapt to technological innovation that promote economic growth, but reduces the environmental impacts (Livernash & Rodenburg 1998: 35). Although these factors may explain some of the underlying tension over scarce resources, these factors alone do not catapult groups or nations into conflicting relations over fresh water.

Political processes in Southern Africa have been characterised by political instability and armed conflicts, particularly from the 1960s to the end of the 20th century, ranging from civil wars in Mozambique and Zimbabwe, armed resistance against Apartheid in South Africa and Namibia and military *coup d'états* in Lesotho, among others, with the last major conflict in 1999, between Botswana and Namibia (Olonisakin 2002: 234-236; Steyn 2001: 34). Steyn (2001: 34) maintains that even in the face of the political stability achieved in the region during the 1990s, political instability and conflict may still present a serious challenge to the political institutions of the region. The ongoing land crisis in Zimbabwe is a recent example of such a challenge for the region's political stability. Moreover, the case of Zimbabwe reveals the linkages between environmental stress, demographic change, human development and political instability.

If water scarcity seriously constrains a nation's human development prospects, history has revealed that nations with the ability to do so would go to extreme measures to secure water for their population and development needs which increases the likelihood of conflict with other nations also dependent on these resources. Steyn (2001: 4) emphasises that water allocation patterns, especially in developing countries in arid climate zones will likely change as competition over water increases.

8. Conclusion

Global consumption rates of fresh water will largely increase because of increased water use in the developing world, firstly resulting from population pressure and secondly resulting from developmental pressure. Thus, in spite of slower population growth rates, population factors will still influence freshwater availability in the coming half century. Furthermore, the impacts of demographic change on overall levels of human security need to be considered in determining the potential for conflict over scarce water resources. In addition, developmental factors such as meeting the MDGs and environmental factors such as increasing frequency and intensity of drought is set to impact on water distribution and availability in the region and add to socio-political tension.

In the Southern African region, scarcity of fresh water and competition over this resource is likely to revolve around changing demographic patterns – increased population numbers will decrease the per capita availability of water; increased need for urban domestic water supply takes place at the expense of agricultural and rural development in the face of urbanisation; and lastly, a large youth bulge and the HIV/AIDS crisis increases dependency ratios, heightens poverty and thus impact on the level of human security in the region. The presence of these demographic and socio-developmental factors may gain increased importance in the presence of decreasing freshwater availability on the one hand, and a decreased capacity to access, distribute and manage scarce water resources on the other hand. Ultimately, the socio-demographic realities of the region generate a volatile and unstable context that may heighten tension over scarce resources, particularly of a life-sustaining resource such as fresh water. The influence of population variables in future development prospects and environmental sustainability need to be well understood and demarcated, since demographic factors in combination with resource scarcity can ultimately decrease overall levels of human security to the extent where conflict and competition over fresh water become widespread and serious.

Lastly, future water security is reliant on the effectiveness of political institutions in nations affected by water scarcity to cope with social, economic, political and environmental change and the impacts thereof on human security. On the plus side, a regional policy framework that deals pertinently with the supply, distribution and management of scarce freshwater

resources has been developed in Southern Africa in recent years. However, the current water context in Southern Africa tends to downplay the significance of demographic realities on the availability and distribution of resources on the one hand. The risk of this approach is that while agreements exist in on paper, their functionality and efficacy may only be assessed once the region is already confronted with severe conflict over its water resources stemming from population pressure and human security challenges. Thus, cognisance needs to be taken of the demographic and socio-economic challenges that may render the region, or individual states, vulnerable to decreasing levels of human insecurity and an inability to deal effectively with the challenges that these risk factors pose to future relations over scarce water resources. Ultimately, the answer to dealing with water scarcity in Southern Africa lies in an integrated approach to policy and practice that addresses not only the managerial side of water distribution, but also the demographic and socio-developmental challenges that are part of the Southern African context.

The following chapter deals pertinently with the policy framework regarding water resource management.

Chapter 5
The policy and legislative landscape for regulating international water relationships and disputes

1. Introduction

Growing global concern over the state of the environment and the impact of environmental issues on human security and political stability has, since the 1960s, spurred a series of international conferences to discuss and address environmental concerns (For example, UNCHE, 1972; UNCED, 1992; ICPD, 1994; WSSD, 2002). In response to these issues, and culminating from the international conference dynamic of the past three decades, environmental issues have become crucial in political decision making, from the local to the international levels, and have been placed on the political agenda at various levels. This has resulted in an escalation of environmental policies, legislation and institutions dealing with environmental issues at the international, the regional and the local levels (Litfin 1999: 359; UNEP 2002: xx). The importance of fresh water on international, regional and national policy agendas has likewise been duly acknowledged since the 1970s. The unprecedented increase in water consumption, the realities of growing water scarcity in the face of population pressure, and the resultant socio-political tensions associated with competition over this scarce resource have all served to focus increased attention on both water scarcity and the issues surrounding this concern.

To understand the current situation with regard to water scarcity, the capacity of the existing policy and the institutional framework to deal with water issues, it is necessary to devote some attention to an historical analysis of the main policy and the legal and institutional developments that are currently shaping how water issues are dealt with at both the international and the regional policy levels. Furthermore, the international conference dynamic that has shaped international environmental policy and institutions in general, and water policy and institutions specifically need to be outlined and analysed. A legislative framework has furthermore emerged concomitantly with the policy and institutional

frameworks. Moreover, since legislative considerations are gaining increased importance in the context of international cooperation over water, attention is thus also devoted to the development of an international legislative framework to deal with water issues. Lastly, developments at the international level have filtered down to inform regional policy and institutional framework on water in the Southern African region. This framework developed within the bounds of two larger developments. Firstly, a growing awareness of water scarcity in the region provided impetus to the development of a regional instrument, the SADC Protocol on Shared Watercourses, to govern relations in respect of water in the region. Secondly, within the larger regional political and economic framework, emphasis is placed on regional cooperation and integration at various levels. The process by means of which the regional framework for cooperation over freshwater resources developed is discussed and critically evaluated in terms of its efficacy to prevent and intervene in conflicts over freshwater resources in the region. This chapter therefore focuses distinctly on two aspects, namely the international policy and legislative framework and the regional policy and legislative framework for dealing with water issues. In addressing the international and regional policy and institutional landscape, this chapter also includes references to data gathered by means of in-depth interviews with key informants and thus also comprises an empirical component. Attention is first devoted to the historical context of the development of water policy.

2. Water policy development in the historical context: shifting emphasis

The political importance of water was recognised very early in the history of humankind, and since early historical times water has played a major role in political decision making. Prominent agricultural and urban developments in history all took place near large sources of water, such as along major rivers and on the banks of lakes. Wong *et al.* (2007: 5) even go as far as to state that human civilisation was born on a river bank. By developing near water sources, societies took advantage of the ecological services and benefits that these water bodies provided, such as the possibility of flood-recession agriculture. However, owing to the need to use freshwater resources more effectively for societal needs, the need to manage and control these natural systems by means of political decision making also arose. Political leaders accordingly used the manipulation and control of water to prove their power and win

the favour of citizens. The ruler of Assyria during the 9th century BC was reported to have had her tombstone inscribed with a reference to her constraining the *'mighty river'* to flow according to her will, thereby providing water to fertilise previously barren uninhabited lands (Postel & Richter 2003: 36). The mindset of controlling and managing water, which today still influences water policy and water-management practices, is therefore deeply imbedded in societal memory. Over time, technological advances have made the control and management of large water bodies increasingly possible. Society has progressed far beyond the building of aqueducts to relay water to the large cities in ancient history, for example, to the engineering feats of dam-building and water transfer schemes of which society is today capable.

Traditionally, though, water was viewed as an infinite substance that should be made readily available to all competing sectors. During the 20th century, emphasis in policy was thus largely placed on satisfying increasing human demand for fresh water, without taking cognisance of the adverse effects of this practice on water availability and on the natural environmental systems that support such water resources. Epitomising this view, Winston Churchill in 1908 envisaged that every drop of water draining into the Nile River Valley would one day be divided among the people and that the river would one day *'gloriously'* perish and not reach the sea (Postel & Richter 2003: 36).

Until the 1960s, there was no clear conception in the minds of people, or in the minds of those in decision-making positions, of the gravity of society's actions on the state of the planet in general, and more particularly on water resources. Water scarcity was dealt with by increasing the supply of water to the area of scarcity, and the entire policy and institutional framework that developed until late in the 20th century was geared to meeting demand and managing the allocation of water to the various user sectors. Emphasis was therefore placed on increasing supply and the policy environment was characterised by a supply-orientated approach. Water policies were thus geared towards advancing water supplies to the various sectors of society – agriculture (food security), domestic (urbanisation and health issues) and industrialisation (for economic development) (Steyn 2001: 2). As a result of such supply orientation, water policy became foremost centered on satisfying humanity's rising demand for irrigation, domestic and industrial water supply, as well as on flood reduction and hydropower generation. This aligns with the technocentric spirit that characterised

environmental thinking during much of the 20th century[60]. With regard to the currently dominant worldview, Petrella (2001: 12) states that, humankind's views of society have increasingly been permeated by a *'techno-economist'* culture.

The emphasis placed on large-scale infrastructure further fits into the realist political mindset that dominated the political arena during the 20th century and in which the protection of national interests over the interests of other parties took a central position[61]. During the Cold War era there was an increase in dam building that in effect started with the building of the Hoover Dam on the Colorado River in the 1930s. The building of large infrastructural developments in this era are, according to Turton (2007: personal interview) linked to larger political and economic advantages over other nations. These developments provided countries not only with water security but also with other political and economic benefits derived from these infrastructural developments. With the building of the Hoover Dam, for example, America increased its strategic advantage over German forces in World War II. The dam provided cheap hydroelectricity to produce aluminium, a key component in aircraft production. Since the USA could outpace German production of aircraft as a result of the hydroelectricity generated by Hoover Dam, the Allied Forces won some crucial battles that turned the tide of the war in the favour of the Allied Forces.

This societal emphasis on technological ability and economic advancement is reflected strongly in many policy frameworks on water developed until the 1970s. However, the rising demand for water, exacerbated by the focus on supply management, in combination with the environmental impacts of ecosystem alteration, caused the depletion of water supplies, triggered large-scale damage to ecosystems and placed a large share of freshwater life at risk of extinction (Postel 2002: 2). Furthermore, during the last 50 years of the 20th century, significant emphasis in the political arena was placed on national sovereignty and the protection of and control over resources within geopolitical boundaries.

In the case of Southern Africa, water was firmly linked firmly with political interests and issues such as sovereignty, even during colonial times. Collaboration between countries was limited, especially over the sharing of natural resources. Within this orientation, water-resource developments usually took place at a localised level and did not involve a wide array

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[60] Refer to Chapter 2, paragraph 4.1 for a more in-depth discussion of the technocentric paradigm.
[61] Refer to Chapter 3, paragraph 3.2 for a more in-depth discussion of the realist paradigm.

of stakeholders, let alone the catchment as a whole. During the 1940s, when Swaziland was still a British Protectorate, the Commonwealth Development Corporation (CDC) built a large weir, the Issys Canal, on the Komati River to supply irrigation water to farmers in Swaziland, but there was no consultation with downstream farmers in South Africa. The building of this weir led to decreased water flows to farmers in South Africa to the extent that the South African farmers took the CDC to court to restore some of the water flows. Eventually an agreement to release 45 cubic seconds of water from the Komati River to South Africa was reached in the 1940s (Dlamini 2006: personal interview).

In the face of growing water scarcity, it has become increasingly important to view the development, utilisation and management of water resources interdependently – as has indeed been the case with policy developments in recent years. Dlamini (2006: personal interview) links the above conflict between South African farmers and the CDC with later developments in water cooperation between Swaziland, Mozambique and South Africa. This reflects the growing emphasis on interdependence in water resource management. He relates it as follows:

> *"So this is the key thing that started the whole cooperation on the Komati. It started in 1945 when these small farmers [in South Africa] started complaining to the CDC, 'We don't even have drinking water', But as that happened there were more developments ... [t]here was major developments of commercial farmers in this area [South Africa]. ... But that resulted in a major increase in demand for water, because suddenly these people here [needed water] not only for domestic but even for participation in agriculture. As a result of encouragement by the Department of Agriculture, they started demanding more water and then there was conflict now and the whole issue went back to square one. 'You are taking all the water'. That was the biggest problem. As years go by the colonial era passed - it ended in 1970 – and the [South African] government was in a predicament. They were no longer talking to Britain, but Swaziland Government and Swaziland Government look at this (agriculture) as a major asset ... It employed a large number of people. ...[It] became very difficult, until this whole thing came to a point where South Africa and Swaziland agreed to talk about it."*

Since the end of the Cold War at the end of the 1980s, the world has undergone some dramatic social, political and economic changes that have challenged the policy frameworks and institutional setups developed during and resulting from the Cold War. Those governing in the post-Cold War context must have the adaptive capacity ability to function in situations of rapid change. Thus, the rapidly changing social context demands that institutions and

governing bodies adapt to change quickly and also have second order resources – social adaptive capacity and social ingenuity - in place that so that they could be positive agents for change and cooperation (Turton 2007: personal interview; UNESCO 2003: 370). On the political front, the Cold War was the dominant force that divided the world into distinct zones during those decades. Political relations revolved around a struggle for power and dominance between the world's superpowers, and the ability to protect a nation's political independence and territorial integrity became paramount (Pettiford 1996: 292). In this context, Kegley & Wittkopf (2001: 551) state that most states rejected measures such as reformation or integration of "… *governmental procedures for democratically making national security decisions…"* and the building of institutions for world law[62]. Some political changes, amongst others increasing internationalisation and an emphasis on closer economic collaboration in the context of globalisation, have emphasised the need to collaborate on the sharing of increasingly scarce natural resources.

In response to the emerging recognition of socio-economic, socio-political and environmental challenges, the United Nations responded by initiating and sponsoring a number of cross-cutting conferences starting in 1972, which attempted to deal with the multifaceted nature of the world's environmental and population issues. This conference dynamic will now be considered.

3. The international conference dynamic and the impact on water resource management[63]

The policy developments that took place within the international conference dynamic can broadly be divided into decadal time periods. The first significant set of developments took place during the 1970s, starting with the **UN Conference on the Human Environment (UNCHE)** in 1972. Further developments took place in the 1980s, the 1990s and since 2000.

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[62] For an in-depth discussion of the political paradigms underlying the current international context, refer to Chapter 3.

[63] While this paragraph only highlights the main conferences that have influenced policy developments in the field of water, these are by no means all the conferences linking socio-economic development, environment and population. Some other conferences not discussed in this paragraph, which have played a lesser role in policy development, are the World Summit for Social Development, 1995; the UN Fourth Conference on Women, 1995; UN Conference on Human Settlements (Habitat II), 1996 and the World Food Summit, 1996.

3.1 1970 – 1980: linking human actions with environmental consequences

The first international conference to highlight the interrelatedness of social and environmental factors in achieving a sustainable world, was the landmark UNCHE in Stockholm (1972) organised by UNESCO. This conference "…*considered the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment"* (UNEP 2006: 1). Emphasis was placed on humankind taking better cognisance of the environmental consequences of its actions, while the growing interconnectedness of environmental problems formed the point of departure for this conference. An important focus of the conference was international cooperation on the environment and environmental issues. This conference led to the establishment of environmental agencies and ministries in more than a 100 countries, while growth in the number of NGOs dealing with environmental issues also skyrocketed. On the international front, the conference led to the establishment of the UN Environmental Programme (UNEP) for promoting the results of the conference. Thus, this conference facilitated the development of a general institutional framework to tackle environmental issues at the international and the local level. Furthermore, the Declaration and Action Plan resulting from the Stockholm Conference were also instrumental in the development of international environmental law after this conference[64]. (Brynard & Stone 2004: 25; Harper 2004: 410; UNESCO 2003: 24). To a large extent, the technocratic worldview dominant in this era also infused the conference content with the notion that technological solutions could be found to all environmental problems facing the world at that stage.

3.2 1980 – 1990: focus on sustainable development

The **Stockholm +10 Conference** in Nairobi, Kenya, was held as a follow-up to the 1972 Conference. During the 1980s, addressing environmental issues became more comprehensive and the social and economic drivers of environmental problems began to receive attention (Brynard & Stone 2004: 25). In 1980, the World Commission on Environment and Development (WCED) was established and proceeded with unlocking the relationship between the environment and the economy. The conclusions of this

[64] Refer to paragraph 4 for an in-depth discussion of international law developments pertaining particularly to water.

commission were included in the 1987 *Our Common Future* report. Apart from entrenching the concept of sustainable development[65] in the environmental policy framework, the commission also argued strongly that the major ecological problems to be addressed by sustainable development were global-scale problems Humphrey *et al.* (2002: 290) see a significant contribution of the Commission's work being that it led to a measure of compromise among representatives of world governments, environmental organisations, international NGOs and development agencies on the apparent contradiction between economic growth, development and environmental sustainability. Therefore, through the Commission's work, a certain level of agreement was reached that environmental issues could be dealt with more effectively by cooperation and agreement between parties, and that the nature of environmental issues necessitated the involvement of higher levels of governance and multiple disciplines.

3.3 1990 – 2000: the decade dominated by the Earth Summit

The 1990s were characterised by a search to increasingly understand what sustainable development entailed, both conceptually and in terms of its significance. Sustainable development became the central idea steering the **United Nations Conference on Environment and Development (UNCED)** held in Rio de Janeiro in 1992. The Rio Conference, or Earth Summit, culminated both in the Rio Declaration on Environment and Development and in Agenda 21. The former expressly emphasised establishing a new and equitable global partnership through creating new levels of cooperation between states and people. Brynard & Stone (2004: 26) noted the latter, commonly regarded as the blueprint for all environmental policy and implementation, emphasised the holistic management of fresh water and the integration of water plans and programmes into national economic and social policy (UNESCO 2003: 25). Agenda 21, specifically called for the holistic management of fresh water and the integration of water programmes within national economic and social policy, thereby entrenching the linkages between development and water issues (UNESCO 2003: 25). In Chapter 18 of Agenda 21, water resources are given specific attention and the overall goal is to ensure that the supply and quality of water is sufficient to meet both human

[65] The theoretical and conceptual aspects of sustainable development, as well as the discourse surrounding it are dealt with extensively in Chapter 2.

and ecological needs across the world (UNESCO 2003: 301). According to Petrella (2001: 23): *[t]he Rio conference did indeed help to reaffirm, within the framework of Agenda 21, the urgent need for a world water policy".*

At an institutional level, the United Nations Commission on Sustainable Development (CSD) was created to see to it that the decisions, resolutions and agreements of the Rio Conference were translated into practice. This commission became an important centre for discussions and meetings on water issues, and two influential world conferences on water were a direct result of discussions preceding the sixth session of the CSD in 1998, organised by the German and French governments respectively[66] (Petrella 2001: 23).

The **International Conference on Population and Development (ICPD)** of 1994 was markedly more population centered. One of the outcomes of the ICPD was the Programme of Action that underpinned many of the principles expressed at the UNCED. The ICPD reiterated that a healthy environment was crucial towards meeting the basic human needs of a growing world population, and that access to water and sanitation was fundamental in achieving a healthier environment for the world population (UNFPA 2001: 61; UNFPA 2004: 17). Linking with sustainable development, this conference further emphasised that population, environmental and poverty eradication factors should be integrated in sustainable development policies (WWC 2005: 2).

3.4 2000 and beyond: the integration of population, development and environmental factors into policy frameworks

In 2000, governmental heads of state, through collaboration between the World Bank and the United Nations in an effort to focus development assistance more effectively, negotiated a **Millennium Declaration**. (UNFPA 2001: 61; UNFPA 2004: 11) .This Declaration encompassed eight MDGs in the areas of life expectancy, education, housing, gender equality, trade and environmental protection to be achieved by 2015. Significantly, these goals reinforced one another and an integrated approach was therefore followed in achieving the targets set (UNFPA 2002: 6). For example, water security holds implications for reaching all of the eight MDGs as a result of the direct and indirect impact of water resource

[66] Each of these conferences later receives more attention paragraph 4.4.

availability on dealing with developmental challenges such as poverty, hunger and disease (UNESCO 2003: 7-9; UNFPA 2004: 11). Water scarcity was thus considered to be a factor that constrains prospects for attaining human security as envisioned by the international policy framework, and emphasis was placed on providing adequate access to fresh water for all people. A further characteristic of the MDGs was the recognition by the Summit of the sovereignty of nations to determine their own needs based on their culture and history, while past experience with international cooperation was important in informing and shaping action (UNFPA 2002: 6).

The **World Summit on Sustainable Development (WSSD)**, in Johannesburg (2002) built on the above and made it clear that freshwater availability was vital to sustainable development and further had implications for all areas of concern identified by the Summit. The WSSD focused intently on the identified gaps in implementing the agenda set in Rio for the achievement of sustainable development. Among these gaps, it was recognised in the PrepComs preceding the WSSD that, amongst others, there was a fragmented approach to sustainable development and core items such as water, energy, health, agriculture, and that biodiversity had received insufficient attention. Therefore, the issue was not the ideas inherent in the quest for sustainable development, but rather the implementation of said ideas. Two outcomes of the Summit included the Johannesburg Declaration on Sustainable Development and the WSSD Plan of Implementation. The former recognised that the eradication of poverty, the changing of consumption and production patterns and the protection and management of the natural resource base formed the foundation of socio-economic development and were essential to achieving sustainable development. This document further identified the most important instruments for a sustainable development policy and these included capacity building, forming new partnerships and good governance, among others. The latter document is regarded as the central document produced by the Summit and provides a list of actions to be implemented to enforce Agenda 21. With regard to water, it is again emphasised that clean drinking water and adequate sanitation are necessary to protect the health of people and the environment. The goal of halving the proportion of people without access to safe water and adequate sanitation by 2015 – as set in the Millennium Summit – is again agreed upon again in the Plan of Implementation (Brynard & Stone 2004: 27; UNESCO 2003: 28).

Table 13: Outline of the major conferences on population, environment and development - 1972 – 2002

	Conference	Outcome
1972	**UN Conference on the Human Environment, Stockholm**	Stockholm Declaration Action Plan
1982	**Stockholm +10 Conference in Nairobi, Kenya**	
1992	**United Nations Conference on Environment and Development (UNCED), Rio de Janeiro**	Rio Declaration on Environment and Development Agenda 21
1994	**International Conference on Population and Development (ICPD), Cairo**	ICPD Programme of Action
2000	**Millennium Summit, New York**	Millennium Development Goals
2002	**World Summit on Sustainable Development (WSSD), Johannesburg**	Johannesburg Declaration on Sustainable Development WSSD Plan of Implementation.

Source: Own Construction.

The overarching outcome of these and other conferences was that environmental, population and developmental issues were recognised as the foundations of sustainable development and human well-being (CDP&D 2004: 2). More significantly, the premise that population factors and environmental resources cannot be detached from social developmental factors was widely acknowledged and imbedded in the international policy framework governing environmental sustainability (UNFPA 2001: 2). With regard specifically to water, the international policy framework emanating from the above recognises water security as integral in achieving the well-being of current and future generations.

4. International policy developments pertaining specifically to water

Concurrently with the above international conference dynamic, some specific international policy developments pertaining to water also occurred since the 1970s.

4.1 1970 – 1990: water is placed on the international policy agenda

The 1970s saw the first international conference specifically dedicated to water, namely the **United Nations Conference on Water, Mar del Plata** (1977). An outlook similar to that in Stockholm characterised this conference with regard to a technocentric mindset and emphasis was largely placed on the assessment of water resources, while the processing and compilation of data were seen thus far to have been neglected. This conference defined water as a common good and declared the right of access to basic drinking water for all people. The main issues dealt with in this conference were the assessment of water resources, as well as water use and efficiency (UNESCO 2003: 24; WWC 2005: 1). Petrella (2001: 22) notes that Mar del Plata managed to outline the basic facts on water and made water a top issue on the international political agenda. Philips *et al.* (2006: 23) summarise the contribution of Mar del Plata as essentially arguing for *"…better informed and more flexible water plans; viable institutions for the implementation of such plans; comprehensive and updated water laws to create an adequate enabling environment; and participation by all stakeholders"*.

During the next 15 years, until the Earth Summit in 1992, no major conferences were held that specifically focused on water issues. However, the decade from 1981 to 1990 was declared the **International Drinking Water Supply and Sanitation Decade (IDWSSD)** by the UN. Efforts during this decade were aimed at providing every person with access to an adequate and safe supply of water and a satisfactory means of excreta and sullage disposal by 1990. In spite of ambitious efforts worldwide, this goal was not achieved, and in 1990 the **Global Consultation on Safe Water and Sanitation for the 1990s** took place in New Delhi. An important contribution made by the Consultation was putting across the idea that supplying safe water and proper waste disposal should be a central aspect of integrated water resource management (IWRM). The IDWSSD, as well as the Safe Water and Sanitation Consultation, brought to the fore the issue of human development as a central aspect of water policy (Petrella 2001: 23; UNESCO 2003: 24).

4.2 The Dublin Declaration and its impact

In 1992 the **International Conference on Water and the Environment,** a preparatory session to the Earth Summit, was held in Dublin[67]. While the Earth Summit was largely successful in addressing many environmental issues on the international policy agenda, it was generally deemed a failure by water specialists. However, the Dublin meeting did succeed in placing water on the global development agenda (Philips *et al.* 2006: 23). This conference dealt with a number of issues, amongst others, the economic value of water, women, poverty, conflict resolution and natural disaster awareness, and it resulted in the Dublin Statement on Water and Sustainable Development (or the Dublin Declaration) that encompasses four basic principles on water (UNESCO 2003: 25). These principles were (Petrella 2001: 65; UNESCO 2003: 25):

- Principle 1: Fresh water is finite and vulnerable, essential to life, development and the environment.
- Principle 2: Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
- Principle 3: Women play a central part in the provision, management and safeguarding of water.
- Principle 4: Water has economic value in all its competing uses and should be recognised as an economic good.

The contributions of the Dublin meeting came to play a central role in guiding policy developments by modernising thinking on how to deal with the emerging global scarcity of water. It further paved the way for better water management underpinned by participation and recognition of the holistic nature of water resources. In the aftermath of Rio/ Dublin, the societal perception of water scarcity became so strong that Philips *et al.* (2006: 24) note that this perception led to a scramble to secure supply of water at all cost and water resource management was *"…elevated to the …realm of national security"*.

[67] Following Dublin and Rio, in 1994 the Ministerial Conference on Drinking Water Supply and Environmental Sanitation was held in Noordwijk, where the main issues addressed were drinking water supply and sanitation.

It is against this background that the water sector increasingly came to realise the importance of finding common ground in dealing with issues of growing scarcity and potential conflict over water resources. Particularly in view of the importance of international cooperation in addressing the world's water issues jointly, the UN proclaimed 2005-2015 as **The International Decade for Action, *"Water for Life"*** (UNEP 2007: 154).

4.3 The World Water Forums

During 1996, two NGOs working in the field of water were formed, namely the World Water Council (WWC) and the Global Water Partnership (GWP). Both the WWC and the GWP were formed through the collaboration of various UN agencies, some countries (Sweden & the Netherlands, amongst others) and some private water corporations. The WWC's purpose was to act as a policy think tank on water issues and to create and promote a common world vision on water-related issues, while the GWP established itself with the aim to support countries in sustainably managing their water resources by getting public institutions and private companies to work together on water policy. In 1997, the WWC organised the **First World Water Forum** in Marrakech and undertook to organise similar forums every three years from then on (Hunt 2004: 275; Petrella 2001: 23, 26).

At this first forum it was explicitly recognised that water might be at risk of becoming a marketable and expensive resource that could become an object of conflict in the same way as oil had. Prioritised areas of discussion included drinking water and sanitation, preservation of ecosystems, gender equity, water-use efficiency and the management of shared water resources. Through the Declaration of Marrakech, this Forum linked back to previous international efforts to guide the way forward in addressing the world's water issues. To this effect, the WWC was charged with the task of producing a global Vision for Water, Life and the Environment. Emphasis was placed on providing *"… policy relevant conclusions and recommendations for action to be taken by the world's leaders to meet the needs of future generations"* (WWC 2007:1). The Council set up the World Commission on Water for the Twenty First Century to oversee the drafting of this Vision under the chairmanship of Ismail Serageldin, World Bank vice-president and chair of both the GWP and The Consultative Group on International Agricultural Research (CGIAR). The Commission in turn formed a Vision Unit to achieve the objective of drafting this vision. The Vision Document was presented and discussed at the **Second World Water Forum** in The Hague, 2000. (Hunt 2004: 275;

UNESCO 2003: 26; WWC 2005: 3). Five recommendations for action were outlined in the document (Hunt 2004: 276):

- Involvement of all stakeholders in integrated water management
- Moving toward full-cost pricing of all water services
- Increasing public funding for research and innovation in the public interest
- Increasing cooperation in international water basins
- Increasing investments in water

The World Water Vision Document highlighted the scarcity of the resource and that it was a vital social and economic asset. Water thus had to be brought under the market laws governing the use of other natural resources such as oil. Flowing from this, it was further stated that the rational and efficient management of water resources required scrupulous economic culture and practice. Furthermore, since water was a primary factor in health, rational and efficient water policy should aim towards the best possible quality by investing in infrastructure and maintenance. This entailed that water policy became a financial issue, guided by access to investment and profitability (Petrella 2001: 26).

The Vision Document did not however provide a unified vision on dealing with water issues, the whole process being wrought with disagreement amongst those involved and by conflicting positions on various issues. Eventually the document, subtitled *"Making Water Everybody's Business"*, lacked clarity. The vagueness of the document led the Commission to draft its own report advocating clear actions under the categories of water pricing, institutions, research, and data and investments. Another document, *"Towards Water Security, A Framework for Action"*, was produced by the Global Water Partnership (GWP), another prominent NGO, to be presented at the Second World Water Forum. This NGO's goal was to help developing countries in the sustainable management of their national water resources (Hunt 2004: 276).

Two other significant developments took place at the Second World Water Forum. Firstly, conflicting viewpoints were brought to the fore when at an *ad hoc* meeting of NGOs, primarily working in the fields of environment and labour, took a strong position against the pro-corporate stance of the Commission, the GWP and the WWC. This group of NGOs strongly advocated the position that access to water and sanitation and a healthy

environment were basic human rights, while food and water insecurity were linked to the current global trade system embodied by the World Trade Organisation (WTO). No resolution of viewpoints was accomplished, even after a meeting of the NGOs, the Director of the World Water Vision Unit, leaders of the GWP and Serageldin, chair of the Commission. Instead, the GWP and the WWC belittled the statement of the NGOs and accused them of being a divided group (Hunt 2004: 278).

What transpired from this process was the fact that the task was given to the WWC of developing a unified perspective on the conflicting issue of how to approach water scarcity in the 21st century and of ensuring water security for all. Although this institution attempted to fulfil the objective of drafting a common vision, the process lacked participation and eventually the result was that the document strongly reflected the values of the WWC, but lacked definite recommendations for future action. It is also significant of the conflicting views between the Vision Unit and the Commission that the Commission thought it necessary to draft another document with much clearer recommendations for action. A further indication of the lack of agreement at the international level on the way forward at that stage was the fact that the GWP chose to draft yet another document to guide actions for water security in the 21st century. However, in spite of these apparently conflicting positions, there are a number of similar positions held in each of these documents as outlined in Table 14.

The second development to take place was the Ministerial Conference that ran concurrently with the Second World Water Forum. This conference, in which 158 delegations, representing 130 countries participated, was organised by the Netherlands government and produced *The Ministerial Declaration of The Hague: Water Security in the Twenty-First Century* (2000). In compiling this document, the conference drew on inputs provided by the Commission, the WWC, the GWP and the NGO caucus in addition to other sources and experiences from delegates (Hunt 2004: 278). The Ministerial Declaration emphasised that neither the threats to water security, nor the attempts to address these threats were new, that discussions and actions to this end had continued since Mar del Plata through to the Second World Water Forum and that this process would continue in the future. Seven challenges and concordant actions to meet these challenges were outlined in the Ministerial Declaration. In summary the challenges included (WWC 2007: 1):

- Access to safe and sufficient water and sanitation were basic human needs, essential to health and well being;
- Enhancing food security was needed, with specific reference to the poor and the vulnerable;
- Ensuring ecosystem integrity through sustainable water resource management was crucial in achieving water security;
- Promoting peaceful cooperation and developing synergies between water users at all levels, also in the case of boundary and transboundary resources weree necessary;
- Providing security from water related hazards was an important aspect of water security;
- Water needed to be managed with regard to its economic, social, environmental and cultural value, with emphasis on the pricing of water services to reflect the cost of its provision, while taking the needs of the poor and vulnerable into account;
- Ensuring good governance of water resources was essential.

The Declaration also strongly emphasised the Ministerial Conference's commitment to IWRM, taking into account the social, economic and environmental factors in managing water resources. To achieve IWRM, the need was expressed for coherent national, regional and international policies that would overcome fragmentation. To this end, the Declaration recognised the importance of increasing coherence in international water-related activities. The United Nations, multilateral institutions, international financial institutions and bodies established through intergovernmental treaties were specifically mentioned in the Declaration to work towards strengthening water-related policies and programmes to achieve water security and address the challenges identified by the declaration. Also significant in this Declaration was the recognition of collaboration and partnerships ranging from the individual citizen through to international organisations (Hunt 2004: 280; WWC 2007: 2). However, although the Ministerial Declaration included a reference to water sharing between states and users as a challenge for the 21st century, the importance of water sharing between countries was not elevated above the other six challenges identified (UNESCO 2003: 301).

Table 14: Contributions to water policy development (Second World Water Forum)

The World Commission on Water for the 21st Century	Global Water Partnership	Vision Unit	Ministerial Conference
	Towards Water Security: A Framework for Action	**World Water Vision: Making water everybody's business**	**Minsterial Declaration of The Hague on Water Security in the 21st Century**
• Water pricing – full cost-pricing of water services • Institutions – broader role of private sector and smaller role for public sector • Research and data – funding for agricultural research • Investments – subsidies to facilitate entry of private operations	• Water wisdom • Expanding and deepening dialogue between stakeholders • Strengthening capacities of organisations in water management • Ensuring adequate financial resources to pay for actions required	• Involvement of all stakeholders in integrated water management • Moving toward full-cost pricing of all water services • Increasing public funding for research and innovation in the public interest • Increasing cooperation in international water basins • Increasing investments in water	• Meeting basic needs: access to safe and sufficient water and sanitation. • Securing food supply, with particular reference to the poor and the vulnerable • Ensuring ecosystem integrity through sustainable water resource management • Promoting peaceful cooperation and developing synergies between water users at all levels • Managing risks: providing security from water-related hazards • Managing water with regard to its economic, social, environmental and cultural value, with emphasis on the pricing of water services to reflect the cost of its provision, • Governing water wisely

Source: Own Construction.

The **Third World Water Forum** was held in Kyoto in 2003. According to the report *World Water Actions* released by the WWC at the forum, significant progress was made since the second forum and the optimistic view was expressed that, through the continuation of current efforts, it was possible to meet the water challenges that the world faced (WWC 2006: 4). Priorities set at this forum were: governance, integrated water resources, gender,

pro-poor policies, financing, cooperation, capacity-building, water-use efficiency, water-pollution prevention and disaster mitigation.

The most recent **Fourth World Water Forum** was held in Mexico in 2006, during which emphasis shifted strongly towards implementing local actions to confront global water problems (WWC 2006: 5). At this Forum, a Ministerial Declaration was again signed by the ministers participating. This declaration reaffirmed the critical nature of fresh water for all aspects of sustainable development and it again stressed the importance of including water and sanitation as national priorities. The declaration also recognises the continued role of the CSD process in keeping water on the sustainable development agenda (WWC 2007: 20).

Despite the above tension-ridden process, the GWP has been playing a significant role in creating a neutral multi-stakeholder partnership that aims at bridging the gap between the various stakeholders in the water sector. In the regional context (SADC), the GWP-Southern Africa (GWP-SA) links stakeholders from the regional to the local level by creating a platform in which needs and challenges are identified and addressed within the framework of IWRM. Takawira (2007: personal interview) thus highlights the significance of the GWP in the regional context:

> *"[GWP] goes beyond intergovernmental [cooperation]. We cut across. We bring up right from the local level right up to the regional level. We are kind of bridging that gap. We are trying to see how this vertical integration is [functioning]. And what we do is capacity development of institutions. What we are trying to do is talking up and making sure that [for example] Lower Manyane [a sub catchment] is integrated within the Zambezi [River Basin]."*

The GWP-SA has also played an important role in helping the SADC in developing a regional SADC Vision for Water Life and Environment. Beukman (2007: personal interview) indicates that this process formed part of the global vision process, but Southern African stakeholders were very active in the regional vision process that ran concurrently with the global process.

4.4 Contributions outside the World Water Forum process

Since Rio, a number of influential international conferences on water also took place outside of the dynamic of the World Water Forums. First among the former, the **International Conference on Water and Sustainable Development** was hosted in Paris in 1998. The

second, the **International Conference on International River Basin Management,** an initiative of the German government, was also held in 1998. Both these conferences were organised in the run-up to the Sixth Session of the CSD in that same year, which focused on applying Agenda 21 in the protection of water resources (Petrella 2001: 24).

The first major international conference on water since the Millennium, apart from the Second World Water Forum, was the **International Conference on Freshwater** in Bonn (2001), where, 118 national governments, 47 international organisations and 73 organisations from civil society convened to discuss and plan recommended actions on how to cope with the issue of water as a key to sustainable development (Brauer 2002: 15). Two outcomes of the conference were the Ministerial Declaration and the Recommendations for Action. Main issues discussed at the conference included governance, mobilising financial resources, capacity building and sharing knowledge. The Ministerial Declaration stressed the importance of combating poverty to achieve equitable and sustainable development, while acknowledging that water plays a central role in human health, livelihood, economic growth and in sustaining ecosystems (UNESCO 2003: 27). Bonn also specifically raised the issues of transboundary water management and virtual water. With regard to transboundary water resources management, it was accepted that water may be a source of conflict among different water users in a water basin, but it was emphasised that water can promote regional cooperation when watersheds, lakes, river basins and aquifers become the primary frame of reference for water resources management (Brauer 2002: 17). Therefore, Bonn had a strong focus on IWRM with the water basin as the main unit of analysis.

Table 15: Overview of main water policy development milestones (1977 – 2005)

Year	Conference/ Event	Outcome (Policy)
1977	UN Conference on Water, Mar del Plata	Mar del Plata Action Plan
1981-1990	International Drinking Water and Sanitation Decade	
1990	Global Consultation on Safe Water and Sanitation for the 1990s, New Delhi	New Delhi Statement
1992	International Conference on Water and Environment, Dublin	Dublin Statement on Water and Sustainable Development
1994	Ministerial Conference on Drinking Water Supply and Environmental Sanitation, Noordwijk	Programme of Action
1997	First World Water Forum, Marrakech	Marrakech Declaration
1998	International Conference on Water and Sustainable Development, Paris	Paris Declaration
1998	International Conference on International River Basin Management, Bonn	
2000	Second World Water Forum, The Hague	World Water Vision
2000	Ministerial Conference on Water Security in the 21st century	Ministerial Declaration
2001	International Conference on Freshwater, Bonn	Ministerial Declaration
2003	International Year of Fresh Water	
2003	Third World Water Forum, Kyoto	Portfolio of Water Actions
2006	Fourth World Water Forum, Mexico	
2005 – 2015	International Decade for Action "Water for Life", UN	

Source: Own construction.

Since 1977, there has been considerable international consultation on the many dimensions and challenges that water represents. Petrella (2001: 22) notes that between the dawning awareness of a water crisis from the 1970s to the late 1990s, numerous action programmes, projects and resolutions were developed, which, apart from increasing awareness, also defined new concepts such as the right to water and new solutions. However, judging both from historical evidence since the Mar del Plata Conference and from current developments in the field of water, humankind is no closer to solving the problem of growing scarcity and potential conflict over water. In this regard, Petrella (2001: 21) emphatically asks: *"Why haven't we been able to lessen the scale of the water crisis in the world, despite the number of major national and international initiatives taken over the past twenty years, with considerable investment and the involvement of thousands of NGOs?"* Postel (2002: 1) remarks that despite a steady stream of global initiatives in the form of commissions, conferences and networks emphasising water's importance to food production, human health, poverty alleviation, ecosystem protection and political stability, the world's water problems have worsened markedly. While a number of reasons are put forth to explain the seeming lack of progress in dealing with water scarcity

and conflict, this issue is partly imbedded in a policy and institutional environment that still lacks coherent focus and that is characterised by many subtle tensions that prevent real and practical solutions.

Currently the world is faced with the same issues resurfacing at every international platform created specifically to provide a focused and agreed-upon framework for dealing with water issues. There is increasingly better information, assessment and monitoring of water resources and related issues, but still the social challenges of providing access to sanitation and clean water remain, while complete international cooperation in which the needs of the different sectors are balanced perfectly with the available water resources is still an idealistic and unattainable goal.

Against this historical background, the focus now shifts to an evaluation of the current legal and policy framework that serves both to prevent and intervene in water-related conflicts at the international level.

5. The development of an international legislative framework

International relations over water are influenced by the legislative framework within which decisions are made. The International Court of Justice (ICJ) points to three sources of international law that govern relations between states and that also apply to relations over water resources, namely international conventions, international custom and general principles of law (UNESCO 2003: 302). Although treaties or conventions have been a common method for governing international environmental issues, these agreements are not without problems. While political states may adopt a treaty, it does not imply that the state agrees to be bound by it (Adam 2007: personal interview). As Hunt (2004: 259) emphasises, states may support the treaty in principle, but hold back on final approval to see whether critical allies or opponents also adopt the treaty. Furthermore, in an effort to attract the maximum number of signatories, conventions or treaties may be agreed on the basis of the lowest common denominator, or tend to be very unspecific in their terms. A third problem is that compliance to the obligations of the treaty is often neither enforced nor monitored effectively.

Since the 1950s there have been a few attempts in international legislation to codify a set of rules or principles into international water law, but in many respects the development of international law is still in a formative phase; in fact, the lack of a codified body of rules acceptable to all states as customary international law has restricted the governance of fresh water (Steyn 2001: 6). Adam (2007: personal communication) emphasises that *" ... regional cooperation is ...a stumbling block and you can see it in a number of shared rivers. Many efforts have been made to ease things. The International Law Association (ILA), an NGO, and the International Law Commission (ICL), a subsidiary organ of the General Assembly of the UN, worked on the international rivers for many years".*

International water law has developed alongside the developments taking place in environmental law, while also simultaneously constituting a sub-set of international environmental law. Modern environmental and water laws trace their development back to the UNCHE in Stockholm in 1972 and the UNCED in Rio de Janeiro in 1992[68]. Principle 21 of the Stockholm Declaration and Principle 2 of the Rio Declaration form the basis of many current international environmental law conventions (Beaumont 2000: 478). In summary, these principles state that nations have the right to exploit their own resources in accordance with their own environmental and developmental policies, but must ensure that their activities do not damage the environment of other states beyond the limits of their national jurisdictions.

Since the 1800s several doctrines of water rights have been developed to guide the use and distribution of water among users. In that they are incorporated into international customary water law, these doctrines fulfil an important role in the relations between sovereign states over water resources.

5.1 International customary water law: doctrines of water use

The doctrines are divided into the theory of absolute territorial sovereignty, absolute territorial integrity, limited territorial integrity, community of interests, and, equitable utilisation theory (Beaumont 2000: 476; Eckstein 2002: 82). Another legal position widely adopted in earlier centuries is the doctrine of prior appropriation. This doctrine is based on

[68] The Stockholm and Rio Conferences are both discussed in more detail in paragraph 4 of this chapter.

the assumption that the earliest or first user has the right to the full amount of water, regardless of the needs of any subsequent users. This view, if put into practice, favours neither the upstream nor the downstream user, since the first user has the strongest claim. In the international arena this view is often taken by downstream nations, since downstream nations are often the first developers of water resources. Because of the perception of unjust water use associated with this doctrine, it is now not widely supported in international water law (Beaumont 2000: 477).

In contrast to the doctrine of prior appropriation, the **Harmon Doctrine**, also known as the **territorial sovereignty theory**, asserts a riparian state's exclusive, sovereign rights over the water flowing through its territory. This implies that a nation can use the water flowing through their borders in any chosen way without regard for other riparian states. Shiva (2002: 77) notes that this doctrine, too, has also never won complete acceptance since it violates the concept of justice and even nations that could benefit from this principle choose to concede rights to other riparians.

The **absolute territorial integrity** or **natural flow theory**, on the other hand, prevents states from altering the environment within their own territory in such a way that it disadvantages neighbouring states. Therefore, states may not affect the quantity or quality of water to the disadvantage of neighbouring or downstream states (Steyn 2001: 6). Lower riparian states are thus entitled to the natural flow of the river, and upper riparians must allow water to flow its natural course by adhering to reasonable use (Shiva 2002: 78). This view places certain duties on upstream states, but no reciprocal actions from downstream states are provided for, with the result that this position has not received wide support in the international law fraternity (Beaumont 2000: 477). Closely related to this doctrine is the doctrine of **limited territorial integrity**. According to this doctrine no one state can be the sole appropriator of a shared water source. This principle ensures that all states can utilise the waters of a shared source within reasonable limits. Applying this principle may however cause conflict, since issues such as determining reasonable use and equitable sharing of water are vague (Van Wyk 1998: 64).

Two theories built on the twin premises of the equitable and just sharing of water resources and of cooperation among states over shared water resources are the theories of **community of interests** and of **equitable utilisation**. The community-of-interests theory

holds that water should be regarded as common property, and that consultation and cooperation should therefore govern relations over water (Steyn 2001: 6). States have, according to this theory, equal rights to the waters flowing through the system. Theories of equitable utilisation/ equitable apportionment are closely related to the community-of-interests theory and state that international watercourses should be used equitably by different states. This theory is one of the principles on which the 1966 Helsinki Rules on the Uses of International Rivers were built (Shiva 2002: 78). These last two theories, according to Petrella (2001: 47), are a considerable step forward in helping to resolve certain conflicts over water. If these principles were respected more definitively, it would certainly serve to equalise some conflicting power relations over water. However, in practice it appears that if states are not compelled by legislative arrangements, such states tend to maximise their own interests, often at the expense of other states.

From these doctrines, the following general principles of law guide the use of shared water resources (Gleick 1993; Steyn 2001: 7; UNESCO 2003: 302). These principles were incorporated into the 1997 Convention on the Law of Non-navigational Uses of International Watercourses:

- The principle of equitable utilisation, according to which international law does not act in favour of any group or state;
- The principle of equitable apportionment, entitling every basin state to an equitable and reasonable share of an international watercourse. Equitability does not imply equal use, but rather that various factors be taken into consideration in allocating water rights;
- The principle of *Sic utero tuo ut aleneum non laedes,* according to which a state's right to use shared waters is limited by the rights of co-basin states using the same resource, without being harmed in a significant manner;
- The principle of reciprocity, which implies that every nation that acts within its rights and fulfils its obligations can expect the same conduct form other states;
- The obligation to settle disputes peacefully;
- The obligation to promote cooperative management of international rivers, implying that it is the duty of all riparians to participate in the development, use and conservation of the water system;

- The harmonious application of national laws in the case of conflict between states;
- The obligation to share information on activities that may affect other riparian states; and
- The obligation to share data relating to the shared water system.

One specific set of principles drafted in an effort to bring uniformity to international water law was the Helsinki Rules, mentioned above. They were formulated by the International Law Association (ILA) in 1966 (Steyn 2001: 6, 7). Adam (2007, personal communication) states that *"[t]he Helsinki Rules are widely adopted as a basis for international negotiation and collaboration on river basin development. The Rules include also the sovereignty of each state within its territory to a reasonable and equitable share of the beneficial use of the international waters".* Among the most notable contributions of the Helsinki Rules to international water law were the provisions in Article IV and Article V regarding the equitable and reasonable apportionment of water in transboundary waters. According to these provisions, states are entitled to a reasonable and equitable share of the uses of water in an international basin; but, as Beaumont (2000: 476) and Shiva (2002: 78) both point out, it is often difficult to determine or measure precisely how to share the available resources equitably[69]. The Helsinki Rules did come to play a crucial role in the development and codification of international water law and have also formed the basis for negotiations among riparian states over shared water. However, these rules never received recognition as official codifications of international water law, since the ILA operates as a private NGO without official status to develop international law (Eckstein 2002: 83).

During 1970, the International Law Commission (ILC), an organisation with considerably more authority in the international law arena, were entrusted by the UN with the task of drafting a set of articles to govern the use of transboundary waters. Gradually an in-depth legal framework for transboundary waters began to emerge following this assignment.

In 1992, a Draft Convention on the Protection and Use of Transboundary Watercourses and International Lakes was tabled by the ILC. This document formed the basis from which the UN tasked a working group in 1996 to draw up a framework convention on the uses of

[69] Another dimension to the sharing of water resources that complicates equitable sharing is brought into play when the emphasis shifts from the sharing of water only, to sharing of benefits (and costs). This issue is discussed in more detail in Chapter 6, paragraph 3.2.3.

transboundary water resources. The process of drafting an acceptable agreement brought the tensions and debates between upstream/ downstream nations surrounding equitable use to the fore yet again. The apparently irreconcilable views of these nations were, however, eventually reconciled to a certain extent, and the rights of and obligations on all watercourse states were accommodated in the 1996 Helsinki Convention for the Protection and Use of Transboundary Watercourses and International Lakes. This agreement was the first legal document to reformulate the 1966 Helsinki Rules. When this agreement was put to the vote in the Working Group, forty-three states voted in favour and three states – China, France and Turkey – voted against the agreement. (Beaumont 2000: 476; BICC 2006: 1; UNESCO 2003: 302). The Helsinki Convention obligates states to prevent, control and reduce water pollution and also provides for the use of water in a reasonable, equitable way (UNESCO 2003: 302). This agreement also deals very specifically with the issue of dispute settlement. However, this document does not apply to African countries[70] (BICC 2006: 3).

5.2 The 1997 United Nations Convention on the Law of Non-Navigational Uses of International Watercourses

In 1997, the United Nations Convention on the Law of Non-Navigational Uses of International Watercourses was adopted by the UN General Assembly after 27 years of discussion and negotiations. This is a potentially influential convention in terms of transboundary water issues. UNESCO (2003: 303) hails this convention as *"one post-Rio accomplishment that specifically focuses on transboundary water resources"*. The UN Watercourse Convention emanated directly from the perception of an emerging water crisis and the likelihood that water scarcity could lead to regional conflicts over water. The Convention thus emphasised establishing collaborative relationships between countries sharing international watercourses (Hunt 2004: 268). When this treaty was brought to a vote, 103 states voted in favour and three against the treaty. Burundi, China and Turkey opposed the treaty – all three being upper riparian states and significant actors in the world's major water basins, namely the Nile, the Mekong and the Tigris/ Euphrates Rivers respectively. In the case of China and Turkey, both were then in the process of developing their parts of the water resources in a way that might threaten the use by downstream countries, leading to

[70] The legal framework that exists in Southern Africa will be dealt with in paragraph 6 of this Chapter.

considerable tension in these river basins (Eckstein 2002: 86; Hunt 2004: 269). Only 16 countries signed, and nine ratified the Convention. This fell below the required 35 countries needed to bring the Convention into force. The Convention thus currently has no legal status (Adam 2007: personal communication; UNESCO 2003: 303). Similarly, in Southern Africa, at present Namibia and South Africa are the only two signatories to the Convention, making it impossible for the Convention to have any legally binding status on states in various shared basins[71].

Eckstein (2002: 88) emphasises that although the document is far from entering into force, the mere fact that the Convention was adopted signals that there is at least broad agreement in the international community on the basic principles that govern transboundary waters and that this Convention is indeed a positive step forward in laying down commonly accepted principles in water governance at the international level.

Three significant provisions of the Convention are the obligation not to cause significant harm, the need both for prior notification and for equitable and reasonable use of water resources. Equitable and reasonable use of resources, together with participation between states on the management of shared water sources are outlined in Article 5 of this Convention (United Nations Convention on International Watercourses (UNCIW 1997: 4). Article 5 also outlines the right to utilise watercourses and the obligation to cooperate in the development and protection of such watercourses. Thus, the principle of equitable apportionment and that of cooperative management are contained in this article of the Convention. Article 8.1 (UNCIW 1997: 6) further elaborates on the obligation to participate, stating that: "*Watercourse states shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefits and good faith in order to attain optimal utilisation and adequate protection of an international watercourse*". Another important provision of the treaty is that any watercourse state is entitled to participate in and become party to any watercourse agreement applicable to the whole international watercourse (Article 4.1). Vital human needs are explicitly protected by the stipulation that, in a situation of competing water use, highest priority is given to the human needs requirement (BICC 2006: 3).

[71] It must be acknowledged that despite the lack of signatories to this important international convention among Southern African states, all SADC states are subject to the SADC Protocol on the Non-navigational Uses of Watercourses, thereby providing a legal framework in this region able to deal with water issues.

The Convention also deals clearly with mechanisms for dispute settlement (BICC 2006: 3). Article 10 refers to the provisions made in earlier articles (5 and 7) that deal with equitable use and the obligation not to cause significant harm in resolving conflicts between users (UNCIW 1997: 4). In Article 33, specific stipulations for dealing with conflict situations are outlined. It states, amongst others, that parties in dispute must seek a settlement by peaceful means.

This Convention would, if ratified, provide a legally binding framework for managing international watercourses. However, as UNESCO (2003:303) indicates "... *the Convention … does not entirely resolve many legal questions concerning the management of internationally shared waters"*. Beaumont (2000: 480) points out that article 5.1 states that *"… an international watercourse shall be used and developed by watercourse states with a view of attaining optimal and sustainable utilisation thereof and benefits therefrom …"* (UNCIW 1997: 4). According to Beaumont (2000: 480), the word *'optimal'* can be interpreted differently by different countries – some might say that optimal use of water does not allow for irrigation under conditions of scarcity, while others may feel that irrigation should in this case only be practised in parts of the basin where evapotranspiration losses are minimal. Furthermore, the ability of the Convention successfully to prevent and provide a legal framework for intervening in conflicts over water is severely hampered by the fact that those nations appearing not to benefit from the Convention's stipulations are not willing to sign it. Hunt (2004: 268) emphasises that *"there appears to be an interesting but disturbing pattern in the countries … that have/ have not signed and ratified the Convention"* in that countries that may gain from dominating the water resources for their own needs and developments are not prepared to become signatories to such Conventions. In this regard, Petrella (2001: 46) observes: *"... [i]n most of the basins in question, the warlords are located in the upriver states. Asserting a principle of absolute territorial sovereignty, they claim to have exclusive ownership of water resources on their territory … and the right to use them in any way they see fit"*.

In spite of the promising developments in the international law arena in providing a solid legal framework for dealing with water issues, it appears that the impacts of these developments have been diluted by existing tensions between nations sharing watercourses (Chuita 2007: personal interview). The fact that nations standing to benefit from the signing and ratification of conventions have indeed signed, while those who would be disadvantaged by the enforcement of a legal instrument have not, is an indication that there exist some very

powerful underlying tensions that may not easily be resolved through legal sanctions alone . Therefore, while there appears – at least in theory – to have emerged a legal framework for cooperation, conflict prevention and intervention between states, the lack of ratification has rendered many of these instruments ineffective in preventing and intervening in potential conflict situations. One cannot enforce any country to be bound by an agreement to which it has in principle agreed, but has not actually ratified formally. However, UNEP (2007: 152) emphasises that these international policy and legislative developments are key components in achieving cooperation between stakeholders.

While the above outlines certain policy and institutional developments at the international level, it is also important to explore the regional policy and institutional landscape. Developments at the international level have influenced regional and local developments with regard to policy and institutional frameworks, but the environmental and social realities prevalent in the Southern African region have also called for more specifically tailored policy and institutional developments to deal particularly with the unique socio-economic, political and environmental realities of this region. These developments are now considered.

6. Regional policy and legislative developments

In line with the above international policy developments of the past 30 years, there is now general agreement among African governments that socio-economic well-being and a healthy natural environment are intertwined. Therefore, emphasis must be placed on policy options that safeguard vital natural resources such as water, while simultaneously striving to meet the development needs of the continent (Takawira 2007: personal interview). Referring specifically to Southern Africa, Ashton (2007: 81) remarks likewise that *"Southern Africa's pressing need for social and economic development has prompted governments of the SADC countries to focus on broader issues of social equity, and resource stewardship"*. Therefore, the development of a regional legal and policy framework to deal with water issues is firmly imbedded in the international policy developments of the past 30 years, while wider political and socio-economic developments taking place in the Southern African region, particularly since the middle of the 20th century have indeed had a significant impact on the development of a regional water policy and legal framework. To understand the impact of the larger socio-political and

economic forces that shaped developments in the water sector, it is useful briefly to outline the most significant historical political and social developments in the region.

6.1 Linking regional policy developments in the water sector with a wider social context

The current socio-economic and political context in Southern Africa has been markedly influenced by colonisation from Europe, which occurred since the 1600s. As a result of this process, Southern African states have firstly been artificially divided by arbitrary borders; secondly, across the region indigenous peoples have fought for their independence from colonial powers in a number of wars of independence. Southern Africa has, thus, historically been characterised by prolonged periods of civil and liberation wars that have left a legacy of weakened economies, fragmented governance systems, inequities created by past political dispensations and shattered infrastructure. These challenges place pressure on governments in the region (Ashton 2007: 80). Furthermore, specifically with regard to water and water policy developments, the colonial legacy has created a political environment in which water has for long been treated as a geo-political security concern and thus dealt with mainly by national states, without regard for the needs of other states sharing such water resources.

In the light of this tumultuous past and its ongoing legacy, Southern African leaders have attempted to ensure the political security of the region's nations through measures taken at the regional level. These measures include:, the formation of the Front-Line States (FLS) in 1979; the establishment of the Southern African Development Co-ordination Conference (SADCC) in 1980; and, the formation of the South African Development Community (SADC) in 1992 (Selebi 1999: 7). The purpose of the FLS was to assist in struggles for liberation from white-ruled states, and was formed by the United Republic of Tanzania, Mozambique and Zambia. As more countries in the region gained their independence, they joined the FLS. Angola joined in 1976, Zimbabwe in 1980, Namibia in 1990 and South Africa in 1994. These developments emanated from a growing concern over the strong position of South Africa within the region's economy, the subsequent dependence of the rest of the region on South Africa, and the fear of regional political domination by the Apartheid Regime that was in power in this country from 1948 to 1994. Following the demise of Apartheid in South Africa in 1994, the original liberation focus of the FLS inevitably changed to reflect the political changes in the region. These political developments also gave

rise to the transformation of the SADCC into SADC at the Windhoek Summit in 1992 (Dzimba 2001: 24; Steyn 2001: 31).

Since its inception, the SADC has established itself as the collective political voice for the region's nations (Steyn 2001: 31; Turton 2007: personal interview). Flowing from the changes in the political context, particularly the end of Apartheid in South Africa, the focus of the SADC changed from that of working towards greater economic independence from an Apartheid South Africa, to a drive towards cooperation and integration at various institutional levels in the region (Selebi 1999: 6). The signing of the SADC Treaty on 27 August 1992 in Windhoek, formally established the SADC, its goal being regional integration based on balance, equity and mutual benefit. This treaty made provision for member states to develop, negotiate, and agree upon a range of protocols that would give effect, through their objectives and institutional mechanisms, to achieving regional integration. Tagawira (2007: personal interview) thus sums up the mission of the SADC: *"I think in SADC the main thing is the drive towards regional integration and what the region is doing is supporting integration, which is in the SADC Treaty"*. Within this policy context, one of the first protocols to be developed within the provisions of the SADC Treaty was the SADC Protocol on Shared Watercourses (Ramoeli 2002: 105).

6.1.1 The impact of natural environmental realities on policy developments in the region

Coinciding with, and resulting from, these wider socio-political and economic developments were specific political and institutional developments in the water sector. In addition, since this region's early history, the realities of aridity, recurrent droughts, fluctuating rainfall patterns and water scarcity had to be factored into economic and political decision-making processes. Turton (2006: 426) remarks that water has always been of strategic significance in the region in the context of national economies that are constrained by water. Since early times, the arid climatic conditions of the region led to the adoption of a nomadic hunting-and-gathering lifestyle by the indigenous Khoisan people of Southern Africa. This lifestyle became increasingly difficult to follow as settlers from Europe took control of land and consequently also the water supply flowing through these lands. Between 1800 and the early 1900s, a process of water, land and institutional reform in South Africa increasingly linked water rights to land rights, while also recognising the importance of irrigation and agriculture

(Funke *et al.* 2007: 12). During this process, the issue of water scarcity was always a major precursor to important institutional, legislative and policy developments. In the case of South Africa, major institutional and legislative reforms not only coincided with larger changes in the political sphere, but environmental challenges also impacted upon these changes. New water legislation in 1912, 1956 and 1998 were preceded by political changes – Unification in 1910, the election of the National Party in 1948 and the election of the African National Congress in 1994 (Backeberg 2003: 1). Some of the major water infrastructure developments in the region were also influenced by political developments. The rapid decolonisation of the African continent in the 1960s led to a closer collaboration between South Africa and Portugal in an effort to hold onto their positions of power in Southern Africa. One result of the stronger ties between South Africa and Portugal at that stage was the *Agreement between the Republic of South Africa and the Government of Portugal in Regard to Rivers of Mutual Interest and the Cunene River Scheme (1964).* which laid the foundation for some major infrastructure developments, among which the construction of the Cahora Bassa Dam on the Zambezi River and the Ruacana Hydropower Scheme on the Kunene River. Water's strategic importance in the region is exemplified by the fact that both these rivers became important focal points for the armed struggle later on in the region's history (Turton 2006: 433 and Vaz & Van der Zaag 2003: 11).

Socio-economic and socio-political shifts are, therefore, closely linked to the importance of water in the region. Access to water at the national level has been a main driver of policy and institutional developments at the regional level, with nations continuously seeking and attempting to maintain collaborative relations with neighbours to secure access to water. To

this effect, many formal agreements over water have since 1926[72] been reached between Southern African states over the course of the past century.

As a result of the environmental realities of the region, there has thus been – at least in principle – an aspiration to pursue opportunities for cooperation over water, both at the regional and at the national levels. The examples of Southern Africa and also the Middle East illustrate that, while demographic pressure, socio-economic inequality and political tension may form part of the realities confronting these nations, a solid institutional environment can decrease the likelihood of tension over scarce resources. Even during the times of severe political conflict in the Middle East, Israel and Jordan embarked on secret *'picnic table talks'* to discuss issues surrounding the sharing of the Jordan River. Likewise, in Southern Africa, countries signed a number of river basin agreements in the midst of the wars of the 1970s and 1980s. South Africa, Mozambique and Swaziland managed to establish a Tripartite Permanent Technical Commission in 1983 to discuss the use of the Incomati River even in the face of tension over South Africa's involvement in the Mozambican Civil War and its Apartheid policy (Hobbs 2004: 3; Wolf *et al.* 2005: 2; Yoffe *et al.* 2003: 1117).

6.1.2 The SADC and policy developments pertaining to water

Legislative and policy reforms in the water sector have gained considerable momentum in Southern Africa since the 1990s. According to Beukman (2007: personal interview), all countries in the SADC region are *"in some process to reform their [water] legislation or their policies"* to make their countries IWRM aligned. She also emphasises that SADC is "*doing incredibly in terms of supporting the countries to make the transition, so that is a good thing*". The importance of SADC in water policy reform cannot thus be underestimated. Underpinning these reforms at the national level and at the regional level are principles taken from years of consultation and discussion in international forums and conferences discussed above. Among these, legislative developments in Southern Africa adhere to the Dublin Principles, while other notable

[72] In 1926 the Agreement between South Africa and Portugal Regulating the Use of Water of the Cunene River was reached between the Union of South Africa and Portugal, and is regarded as the beginning of South Africa's Hydraulic Mission with which it envisioned economic development and political stability founded on the development of hard infrastructure such as dams, pipelines and inter-basin transfers (Turton 2006: 426).

factors taken into consideration in the process of reform have been equity, efficiency, sustainability, political and public acceptability, fiscal impact and health (Stein 2002: 114).

Furthermore, at the regional level within the SADC institution, reforms have not only taken place to facilitate cooperation and integration in general, but also more specifically in the water sector. Transpiring from regional policy developments, the SADC has recognised the most serious security problems in the region as being political, social, economic and environmental issues that are solved more effectively through socio-economic development and democratisation rather than through military force (Dzimba 2001: 28). Therefore, the SADC focuses strongly on human security, recognising various socio-economic and socio-political drivers of insecurity. Tawana (1998: 195) maintains that the adoption of a wider security focus in the Southern African region should over time remove the core sources of human insecurity, such as access to food and clean water, health services, energy and economic opportunities. Environmental degradation in general and water scarcity particularly are, therefore, acknowledged in the Southern African political context through the SADC regional policy framework.

Given the central importance of water scarcity in the context of human security in the region, it was imperative that the SADC find ways to facilitate cooperation between states over water resources. With 70% of freshwater resources being shared by two or more countries in the SADC, a coordinated approach to the use and preservation of water had to be acknowledged at the regional level. It is thus not coincidental that the first protocol to be drafted by the SADC in 1995, namely the SADC Protocol on the Non-Navigational Uses of Shared Watercourses, was a protocol to deal with the water issues of the region (Green Cross International 2000a: 88; UNEP 2002: 155). This Protocol, in principle, is regarded as the foundation for cooperation over the region's scarce water resources and fits into the wider regional goal of integration and cooperation at various levels in the region and this is therefore now discussed in more depth.

6.2 The SADC Protocol on the Non-navigational Uses of Shared Watercourses

The SADC Protocol had its origins in the implementation of the Zambezi River Basin System Action Plan (ZACPLAN) to facilitate the management of the Zambezi River by the SADC in 1993. During the negotiations taking place to establish a Zambezi River Basin Commission (ZAMCOM) within the context of this plan, the SADC felt that instead of developing a single legal instrument applicable only to this river basin, it would be more beneficial to develop a regional legal framework on which all cooperative relationships in the region could be based. This decision set in motion a process of negotiation that led to the adoption of the SADC Protocol on the Non-navigational Uses of Shared Watercourses in 1995. Although the Protocol was met with some reservation by some member states, it was subsequently adopted by eleven of the fourteen member states, namely Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (Angola, Democratic Republic of Congo and the Seychelles did not sign the Protocol), allowing it to enter into force in 1998. Two-thirds of the States had ratified the Protocol by 2000. The concerns expressed by member states at the signing of the document in 1995 led to a process of consultation and negotiation that culminated in the adoption, in 2000, of the SADC Revised Protocol on Shared Watercourses. The SADC Protocol would remain in force until twelve months after the Revised Protocol came into force (Green Cross International 2000a: 88; Ramoeli 2002: 106). The Revised Protocol was signed by all member states and has subsequently been ratified (ZAMCOM 2008).

As was mentioned before, not only the acute awareness of water scarcity, but also the unequal distribution of water across time and space in the region have played a major role in bringing countries in the region to the point of establishing a regional instrument to facilitate cooperation over shared water resources (Ashton 2000: 102). The Protocol was developed within the international policy framework guided by international water law instruments such as the Helsinki Rules, the Dublin Principles and Agenda 21, and thus follows principles of international rules and conventions in the rights and obligations set out. As Ramoeli (2002: 107) points out in reference to the SADC Protocol, *"[i]t recognises international consensus on a number of concepts and principles related to water resource development and management in an*

environmentally sound manner". The Revised Protocol also takes into account the international legal and policy framework and recognises the progress made in international water law through the development of instruments such as the Helsinki Rules and the UN Convention on the Uses of International Watercourses. Recognition is also given to the provisions of Agenda 21, and specific reference is made to the concepts of environmentally sound management, sustainable development and equitable utilisation of shared watercourses in the region (SADC, Revised Protocol 2000: 3, 4).

In line with the regional policy framework, the SADC Protocol and Revised Protocol have as their primary objective the development of close cooperation for the sensible and coordinated use of shared watercourses and they also encompass harmonisation of sectoral policies and laws with the wider regional goals of integration and cooperation in SADC (UNESCO 2003: 297; Van Wyk 1998: 64). In referring to the issue of regional cooperation, Green Cross International (2000a: 88) emphasises that the SADC Protocol has offered states the opportunity for cooperation created by the natural partnerships existing through shared watercourses, and that such cooperation can then be transferred to other areas of mutual interest. The SADC Protocol has established an *"enabling environment"* for the development of water resource management to the extent that it could even become a powerful driver of regional integration (Beukman 2007: personal interview; Philips *et al.* 2006: 34). However, for this to transpire there needs to be a high degree of political stability and a commitment to negotiating outcomes beneficial to all stakeholders – positive-sum outcomes.

Principles specifically laid out in both the Protocol and the Revised Protocol are: the acceptance of the sovereignty of member states in utilising the water resources within their territories; the application of the doctrines of community of interests and equitable utilisation; the imperative of balancing development and environment needs; cooperation in joint projects and studies; sharing of data and information; the obligation of notification of emergencies and the establishment of an institutional framework. In applying the doctrine of community of interests, the Revised Protocol has also included the concept of benefit-sharing. Benefit-sharing takes cooperation on water resources to a higher level in the sense

that the water alone is not the main focus of negotiation and cooperation, but benefits derived from the water source are also additionally included into agreements[73].

The Protocol and Revised Protocol both make specific mention of establishing access to water through water-sharing agreements, while simultaneously maintaining a balance between the need for resource development to attain higher standards of living and the need for environmental protection and sustainable development and thus contributing to the positive-sum outcomes mentioned above. To the region's credit, many agreements over the sharing of freshwater resources exist, although it is not certain whether these agreements will prove resilient in the face of high levels of human insecurity and rising tensions over access to scarce water resources.

With regard to institutional developments, an SADC Water Sector was established in 1995, and Ashton (2000: 102) envisions that the SADC as an institution will become a strong regional force in preventing water conflicts. The Revised Protocol makes provision for the establishment of SADC Water Sector Organs that include a Committee of Water Ministers, a Committee of Water Senior Officials, A Water Sector Coordinating Unit and a Water Resources Technical Committee. At present, these institutions are established and are functioning to various degrees. Yet as Beukman (2007: personal interview) points out:

> *"Everyone knows there are capacity constraints within SADC. It is only small sectors for large regions. [However] SADC tries to work through their main partners and through their member states as well as those other structures like the Country Water Partnership that exists….So I think the will is there, it is that these things are still in [a process of] formulating and streamlining how in a SADC framework [the partners] can add value".*

Provision is also made for shared watercourse institutions. These institutions are to be established by watercourse states and include watercourse commissions, water authorities and water boards (SADC, Revised Protocol 2000: 12). A number of such watercourse commissions are currently functioning within the framework of the Protocol, for example the Tripartite Technical Commission that incorporates Mozambique, Swaziland and South Africa. This institution is *"in line with the SADC Protocol which encourages the development of river commissions"* (Dlamini 2007: personal interview). Another example is ORESACOM that was

[73] The tensions created by benefit-sharing are discussed in depth in Chapter 6.

also established between Botswana, Lesotho, Namibia and South Africa and functions within the framework provided by the SADC Protocol (Lesoma 2006: personal interview)[74].

Referring to prevention of and intervention in conflict over water resources, Article 6 of the Revised Protocol is specifically devoted to shared watercourse agreements, while Article 7 deals with settlement of disputes. Article 6 states that all watercourse states are entitled to negotiate and become party to any watercourse agreement, while the rights and obligations of states not party to a particular agreement shall not be affected under the provisions of this Protocol. Settlement of disputes in this Protocol encompasses the obligation to resolve all disputes regarding implementation, interpretation or application of the provisions in this Protocol amicably, and where this is not possible, that the case shall be referred to a Tribunal (SADC, Revised Protocol 2000: 13).

While the legal and policy framework provided by the SADC Protocol and Revised Protocol has certainly made the intentions of the region's states with regard to cooperation over water resources clear, some very important challenges persist. Heyns (2002: 169) states that the Protocol is difficult to enforce and remains essentially a gentlemen's agreement, since it is not able to prevent civil war, destruction of infrastructure, or to avoid natural water-related disasters such as droughts and floods. Such crisis situations will ultimately test the ability of this regional instrument to intervene effectively in and prevent conflict over freshwater resources. However, at the regional level, there is a definite need for transboundary institutional cooperation to deal with the management of transboundary water resources and to prevent and deal with conflict over shared water resources. The Protocol at least provides a mechanism that is mutually sustainable and acceptable for negotiating the peaceful use of shared water (Heyns 2002: 170). For this to happen, it is important that regional institutions have a mutually agreed framework of criteria and agreements as a basis for decisions regarding shared water resources.

Although instruments such as the SADC Protocol are a necessary step towards cooperation and prevention of conflict, the region is hampered by weak economies, a lack of technical and human resources, and vast differences between countries in terms of management

[74] The institutional landscape with regard to water in Southern Africa will receive more detailed attention in Chapter 6. Here reference is only made to some selected examples of shared watercourse institutions in the SADC region.

systems – all factors that make the implementation of such an instrument difficult (Ashton 2007: 81). With regard to these issues in the wider, continental context, but with specific relevance to Southern Africa, The Commission of African Union (2004: 32) emphasises that *"[n]eedless to say, Africa's future depends on how countries in the region address issues relating to economic and political governance, and the extent to which countries avoid civil conflicts, and undertake effective economic and social reforms to effectively address the poverty issue and bring about sustainable development"*.

Therefore, the ability of the regional policy and institutional framework effectively to prevent and intervene in conflicts over water would rest in large part on the institutional capacity to govern the region's stakeholders where water is concerned. Good governance of transboundary regional resources should encompass institutional structures – such as those created through the provisions of the SADC Protocol and Revised Protocol at regional level – to govern shared resources. In this regard, Ashton (2000: 86) states that it is in the interest of both societies and individuals that appropriate national and international institutions act jointly in developing management plans for shared river basins and draw up workable protocols to prevent conflicts over water. While individual governments are increasing their institutional strength, the same is not necessarily true of regional institutional structures. The SADC as a regional institution did not, for example, manage to resolve the Sedudu/ Kasikili dispute between Namibia and Botswana, despite provisions for dispute resolution contained in the SADC Protocol. (Ashton 2000: 99). Ramoeli (2002: 111) reiterates that although some efforts have been made towards implementing the Protocol, a number of challenges persist: establishing institutions at the basin level, dispute-resolution mechanisms and institutions, as well how to harmonise national legislation with the Protocol and other international water laws.

7. Conclusion

Since the 1970s considerable and regular international consultation has taken place on the many dimensions and challenges that water represents. Numerous action programmes, projects and resolutions have been developed that, apart from increasing awareness, also defined new concepts and new solutions. However, judging from historical evidence, the problem of the growing scarcity of fresh water and the continuous threat of conflict is far from being effectively addressed in practice by the existing policy and legislative frameworks

governing relations over water. This apparent lack of progress can be attributed to a number of reasons, although the issue is partly imbedded in a policy and institutional environment that still lacks coherent focus and is characterised by many subtle tensions that prevents real and practical solutions to be found.

Since the 1970s it has been increasingly recognised that environmental, population and development issues are linked reciprocally and, that water availability is thus central to achieving population- and development-related goals for the future. More specifically, the international policy framework has recognised water security as being integral towards achieving the well-being of current and future generations. Furthermore, particularly with regard to the development of a legal framework, the impacts of these developments have been weakened by existing tensions between nations sharing watercourses. These tensions centre on issues of national socio-economic development and on the advantages gained from use of water resources outside of the legal provisions and also on sovereignty issues. In theory at least, a legal framework for cooperation, conflict prevention and intervention between states have emerged, although the lack of ratification has rendered many of these instruments ineffective in preventing and intervening in potential conflict situations. Therefore, although there seem to be sufficient policy and legislative frameworks on paper, there is still a wide gap between the intended purposes and outcomes of such frameworks and any real action towards dealing with the impending impacts of water scarcity, both international, and also specifically in Southern Africa.

In Southern Africa itself a regional legal and policy framework has likewise developed over the past two decades. This policy and legislative framework has as its primary objective the facilitation of regional cooperation and integration, not only in terms of water, but also with regard to other sectors of shared interests and benefits. The importance of water in the water-scarce Southern African region is highlighted by the fact that the regional SADC Protocol on Shared Watercourses was one of the first legal and policy documents to be drafted by the SADC in 1995. In principle, the development of this document and its successor indicated a definite desire to cooperate over joint water issues in the region. However, it remains to be seen whether this document will prove to achieve the goal of cooperation in the face of potential crisis situations such as prolonged droughts – especially

in the absence of both truly effective governance and of adequate institutional capacity to enforce the requirements of the protocol.

From these developments at the international level some recurring dilemmas may in future hamper both the prevention of water conflicts and intervention in water conflicts, both internationally and at the regional level. Some such dilemmas that emerged from the foregoing discussion are the issue of sovereignty vs. regional cooperation; and the issue of the equitable distribution of water taking into consideration the competing demands of water as an economic asset or a common good and the tension between socio-economic development and ecosystem. Therefore, in order to explore the tensions between intentions and actual actions, one needs to deconstruct the recurrent dilemmas in the above international policy and institutional developments that are currently hampering progress in implementing practical and agreed-upon policy solutions to the world's water issues.

In the following chapter, attention will be devoted to these dilemmas and more specifically to the extent to which these issues are imbedded within the regional legislative and policy context. An analysis of these challenges becomes crucial when we consider that such dilemmas may serve to hamper effective prevention of and intervention in potential conflicts over water.

Chapter 6
Policy dilemmas and issues

1. Introduction

Water policy reform is an urgent need to avert severe national, regional and local water scarcity. Inadequate policy frameworks fail to transcend current dilemmas with which the water sector is grappling: they rather increase the risk of potential conflicts over fresh water. While there is a strong view in both academia and in policy circles that there are more indications of cooperation over water than there are of conflict, it is argued in this chapter that some pertinent underlying dilemmas may be detrimental to future cooperation in respect of fresh water. These dilemmas as such may also become more serious sources of potential future conflict in the water arena. Shiva (2002: x) has felt compelled to remark that the water wars that surround us even now are clashes related to water cultures and paradigms. These dilemmas form critical undercurrents that are causing stagnation and even hampering progress in international and regional policy and in institutional developments aimed at fostering cooperation and preventing conflicts over this scarce resource. Various authors have thus far remarked that policy needs to take a new direction (Postel 2002; Rosegrant 1995). With regard to the direction that future policy development needs to take, Postel (2002: 2) notes that a "*fundamentally new approach to water and human development will be needed during this new century – an approach that aims to satisfy the water needs of 8-10 billion people while protecting the ecosystems that sustain our economies and all terrestrial life*". This statement encapsulates the core issues today confronting policy in the water sector. It is argued that the dilemmas discussed in this chapter prevent a new direction in policy from being taken. These issues will need to be addressed as potential sources of conflict *per se* and because of their ability to foster a social and political environment conducive to conflicts over fresh water. These issues are found as recurrent themes in various policy and institutional setups and this may thus offer some explanation for the lack of progress in dealing with the real crisis of growing water scarcity.

Two overarching dilemmas surfacing in the international arena are the tension between regional cooperation and the protection of sovereign self-interests, as well as the issue of

equitable distribution in the face of competing demands. These dilemmas comprise several issues that need to be addressed.

This chapter aims to explore these issues and it argues that water policy reform and policy implementation will not progress if these dilemmas are not addressed adequately in current and future policy and institutional frameworks. First, attention is turned to the issue of political self-interest.

2. Governance issues: sovereignty, trust and the strategic nature of water

The concept *'water governance'* has appeared regularly since the 1970s. Ashton *et al.* (2006: 4), however, highlight the fact that the lack of agreement as to what precisely constitutes governance has been a key issue in current global and national debates on governance. As early as Stockholm (1972), international cooperation was identified as an important issue. Particularly since Rio, however, international goals pertaining to water governance have been set, and specific emphasis has been placed on managing environmental resources cooperatively, while governance and cooperation on environmental issues were also emphasised in the Brundtland Report (1987), at the Millennium Summit (2000) and at the WSSD (2002). Also since Mar del Plata (1977), in many conferences pertaining specifically to water, the issues of cooperation and managing water through participation in the international arena were raised. The Second Principle of the Dublin Declaration (1992) also refers to water development and management as being based on participation at all levels. The World Water Forums, furthermore, include the management of shared water resources as an important focus. This issue featured particularly strongly at the Second World Water Forum where cooperation was identified as one of the highest priorities for action (UNESCO 2003: 371). While the Second World Water Forum did not succeed in producing a unified vision on water for the 21st century, all the documents emanating from the discussions at and around this forum make reference to international cooperation on water resources and the involvement of all stakeholders. The issue of governance was also specifically raised at Bonn in 2001. Thus, cooperation, involvement of stakeholders and governing water with regard to its transboundary nature became deeply entrenched ideas in the current policy framework. Governing water in this way, however, tends to collide with

the political ideals of sovereignty and with the emphasis in national politics on the protection of sovereignty and national self-interests.

Governance is dependent on how water is valued and treated; how a nation feels about water determines the degree to which a nation will embrace the idea of cooperation in a regional sense (Charrier & Curtin 2000: 12; Turton 2007: personal interview). Water may be regarded as a public trust with its governance grounded in principles of stewardship, sharing, sustainability and accountability (Postel 2002: 4). However, water may also be regarded as an issue of strategic importance that cannot be shared comfortably without disadvantaging sovereign self-interests. Water governance thus raises important issues in the context of sovereignty *vs* the degree of cooperation over freshwater resources in which a nation is willing to engage in with other nations. According to UNEP (2007: 154) inadequate water governance is a significant hindrance to achieving water security for all in this century. Therefore, this issue needs to be adequately analysed and resolved. Van Wyk (1998: 59) states that *"[w]ater is likely to be a source of strategic rivalry depending on its degree of scarcity, the extent to which its supply is shared by more than one state or region, the relative power relationships of the sharing states and the accessibility to alternative fresh water resources"*. In addressing water issues – such as scarcity – sovereignty and the protection of self-interests therefore become important constraints in regional and international cooperation over freshwater resources.

2.1 The importance of sovereignty

In the current political arena, influenced greatly by security concerns created by Cold War politics, states place major emphasis on protecting national interests and on providing security at various societal levels. In most spheres of social life security is equated with the degree to which a state can guarantee national political security[75]. Political security is thus measured in terms of the degree to which the sovereign state can guard the interests of its people. As a result of historical struggles for political independence from colonial powers, sovereignty is a major issue for countries in Southern Africa. Turton (2007: personal interview), in reference to Southern Africa, points out: *"Sovereignty is hugely important. ...It is probably the single most important thing. ... More so in Southern Africa. Why? Because we have been through a bitter phase of liberation struggle [where] people have paid for sovereignty with blood. So that feeling*

[75] For more elaboration on the conceptualisation of security and the impact thereof on political relations, refer to Chapter 3, paragraph 5.

is too close. The importance of it is too high. ... Simply because we are still immature democracies, we are not about to give our sovereignty away to somebody else."[76] The importance, yet also the complexity, of sovereignty in the context of shared resources is reiterated by Dlamini (2006: personal interview), who emphasises that *"...you cannot ignore issues of sovereignty, nor [of] politics. This is one classical case, ... where the dams [in South Africa and Swaziland] are owned by [both South Africa and Swaziland], but really what would happen if suddenly South Africa and Swaziland would be in conflict?. ... That is exactly why South Africa protected the Katse Dam with the military. They had no choice, because they would say: we will not let you jeopardise our investment. So issues of sovereignty, [you] can't run away from [it]...and [it] goes down to the very lowest level. ... It is quite difficult".*

In this political context –where sovereignty was hard won through struggle – it is a challenge for countries not to let the issue of sovereignty hamper cooperation over water resources. Therefore, as the above illustrates, countries in the region still operate within a context of protecting their own national interests over those of other nations in the region, in spite of the emphasis at the regional level through the SADC on cooperation and regional integration,. This political mindset is in many respects counterproductive to the implementation of integrated water resource management and true cooperation over shared resources in the regional context. It therefore appears to be difficult for countries to steer clear of political self-interests in dealing with shared water resources, even when forums for cooperation are established and functioning. Chiuta (2007: personal interview) stresses the following in connection with annual conferences organised by the IUCN to thrash out issues with regard to the Zambezi River:

> *"Each year we organise a big conference ... bringing the exact group of stakeholders [together] trying to deal with the tension. [We] sort of bring people to share information so that Mozambique understands what Zimbabwe is planning and what Botswana is planning. But … every time we meet and we talk about something that has got the potential of controversy you'll find countries going back to sovereign[ty] and then you won't progress. ...This year we are saying we should [not] seat them [according to countries], because we normally seat them ... say [people from] Mozambique [together] and Zimbabwe [together]. We should mix them. We should look at the Zambezi as one ecosystem which we all share. ... And we should take this sovereignty issue out of the equation and that's what we are trying to do.*

[76] The socio-political historical context with regard to the wider liberation struggle in Southern Africa is discussed in Chapter 5, paragraph 6.

The Zambezi is one ecosystem. If one sovereign country does this [in] one corner, it affects the other sovereign country".

While transboundary resources represent a common pool that needs to be utilised and managed jointly by many different stakeholders at the regional level, the political paradigms of most countries do not really allow the countries to perceive river basins as single ecosystems that are shared (Chiuta 2007: personal interview). More often countries take a view similar to that summed up in the reference to the Zambezi. Countries therefore only tend to regard water resources in as far as the resources affect their own interests, and will therefore also attempt to protect their own national self-interests in the context of shared water resources. Water use in the Lower Jordan River Basin (LJRB) aptly reflects political control over water resources by Israel to protect their own interests. While Israel uses 57.1% and Jordan 34.7% of the water in this basin, Palestinians (West Bank & Gaza) use only 8.2% of water resources. The variation in use between Israel and Jordan reflects a variation in the available resources within each country, but for Palestine, the variation reflects political constraints and physical limitations imposed by Israel on supply (Rabi 2000: 33). Dlamini (2006: personal interview) illustrates the protection of self-interests in Southern Africa in reference to the Incomati River Basin:

"Once a country has secured its water and it is proving and showing beneficial use of the water, there is no way that it can forgo that water to another country, because it [will have] internal impacts in that particular country. If you take 10% of the water in Swaziland and in South Africa and give it to Mozambique, it's all well and noble, but what will that impact be on South Africa and Swaziland in terms of GDP, particularly in this area, this Incomati area, which is predominantly relying on sugar cane farming? If you just take out 30% of that, and you say do not irrigate because that water is required in Mozambique, what will that do to [South Africa's] economy? You have to find a substitute for that. What substitute is it going to be? There are no mines here."

The importance of sovereignty shapes the extent to which countries guard their own interests by securing access to scarce water resources. Turton (2007: personal interview) argues that with the original conception of the Lesotho Highlands Scheme, the main driving force for South Africa was *"[b]asically in this scarcity, how [do] you bring about certainty in the context of South Africa"*. The emphasis was thus on securing water for economic development in South Africa, where at that time the focus fell mainly on mining. Securing water for future development in the context of scarcity therefore *"was about extraction, it was about limited*

frontiers, very much based on the British notion of flying the flag from Cape to Cairo. So if you haven't got it here, you just expand your frontier and you get it somewhere else ..." (Turton 2007: personal interview). Dlamini (2006: personal interview) further explains that self-interest still governs relations over water and will take precedence in potential future cooperation between countries involved:

> *"The difficulty with this thing is you cannot undo what you've done in the past. You cannot adjust the borders of South Africa and Lesotho, they are fixed. So whatever agreement you do ... the first thing to accept is that there is a border between the two countries. So this IncoMaputo agreement [between Mozambique, South Africa and Swaziland) recognises this … and then moves on from there and says what we can do now to address the issues of Mozambique. [Mozambique] cannot suddenly say ... we want water out of these dams, because, remember, the two upstream countries they paid for the dams. Mozambique can pay for its share of those dams, but what does that do to me sitting down here and I have an allocation on that dam, because Mozambique purchased a share of that dam? Does that mean I lose my share of the water? What do I do to the people I have employed and so forth? It is a complicated thing."*

By securing water through water-sharing agreements, sovereign self-interests are brought to the fore. If future water scarcity may jeopardise the ability of current agreements to continue functioning, countries in need of water may revert to the protection of national interests in maintaining access to scarce water. The above illustrates the conflict potential inherent in the current political emphasis on the protection of self-interests in dealing with shared water resources. In support of sovereignty, Naidoo (2001: 7) argues that strengthening the state is *"a necessary precondition for the institutionalisation of peace and security"*. However, in the context of water, issues of sovereignty and the emphasis on the national self-interests do not seem to be conducive to long-term cooperation over water resources in the international arena. Rosegrant (1995:4) emphasises that *"[w]ater policy reform must transcend national boundaries. In many regions, long-term solutions will require international cooperation between countries sharing scarce water resources"*.

The SADC Protocol recognises the sovereignty of states in making decisions over their water issues. Cooperation between countries is encouraged, but the ultimate decision-making power still lies with the state structures dealing with water. Transboundary institutions, such as river basin organisations, are *"interstate mechanisms that do not have centralised decision-making authority. [They] will refer the decision back to the central authority and it should be like that"* (Turton

2007: personal interview). A practical illustration of how this works in practice is in the Incomati Basin. In the Joint Water Commission (JWC) between Swaziland and South Africa, Swaziland is usually represented by a Principal Secretary who is on the same organisational level as a Director General in South Africa. The Principal Secretary then heads the Swaziland delegation from Swaziland to the Commission (JWC) and also to the Committee (JPTC). The principal secretary, who is the second man in charge of the Department of Water Affairs, is thus the leader of the Swaziland delegation to the Commission and also to the Committee (JPTC), while in South Africa it is usually the Director General from the Department of Water Affairs who represents South Africa there. In the technical committee matters of policy are addressed, although it is called a technical committee (Dlamini 2006: personal interview; Keevy 2006: personal interview). Therefore, although the decision making is done at the committee level (river basin organisational level), the people in the decision-making positions represent their national governments and are from national government departments.

This also transpires in relations between the four countries sharing the Orange River Basin. The commissioners appointed to ORESACOM act in an advisory capacity to the Ministers of their respective countries and the mandate that the commissioners have for decision making within ORESACOM is obtained from their respective national ministries dealing with water issues (Lesoma 2006: personal interview). On a practical level, Tromp (2007: personal interview) emphasises that *"the communication between the commission and the government to which it must talk has to be very open. It must not be distorted and bureaucratic and a long stretched out process"*. However, the national interests of different countries take precedence in agreements and institutions that address water issues in the region. The only place where according to Turton (2007: personal interview), you have an *"erosion of sovereignty ... is between USA and Canada. They've got a regime that manages all their transboundary [waters], mostly around the Great Lakes. Now that's the only place where I know where you get an appointed commissioner. You do not represent Canada or the United States. You represent the basin. You are neutral and that's the only place where there is an erosion of sovereignty, but the sovereignty issues are sorted out. There have been centuries of recognition of the sovereignty issues. If you look at the big river basins in Europe, people talked about the Rhine or the Danube. Those are successful because they only deal with sub-sovereign issues. The instant sovereignty gets mentioned, they don't talk about it, it is off the agenda"*.

The fact that states are sovereign entities who tend to guard their territory and national interests zealously, and that these sovereign states also function in an international (and regional) system characterised by a lack of central authority, makes the joint management of shared resources problematic and potentially explosive (Philips *et al.* 2006: 27). A balance between national sovereignty and the transboundary management of shared water resources is, however, crucial in the light of the threat of water scarcity (Charrier & Curtin 2000: 13; Turton 2007: personal interview). There has, as a result, been much emphasis on decentralisation in institutional development, but issues of sovereignty interfere with this ideal and it often becomes inconsistent with the emphasis on regional cooperation. The SADC recognises the sovereignty of states in decision making but at the same time, emphasis is placed on closer regional integration. Beukman (2007: personal interview) explains that *"SADC works mainly with the government – national ministries",* while Takawira (2007: personal interview) emphasises that the SADC *"is an intergovernmental organisation ... working towards regional integration"*. Emphasis is also placed on managing shared resources jointly, although the institutions set up to achieve this aim still have to follow the mandates set by their respective national governments with respect to what decisions can be made and these decisions are made with the particular national interests of states in mind. As pointed out above, it is not necessarily negative that decision making has to be mandated by the state in the context of the hard-won sovereignty of most Southern African states. However, there is often a significant gap between what is expected at a political level and what is feasible at an implementation level. Tromp (2007: personal interview) points out that while the politicians often are optimistic and expect a rapid progression between planning and implementation of projects based on an agreement, this is often not feasible at ground level.

In the opinion of Woods (2000: 388) and Turton (2007: personal interview), dealing with the challenges facing society in this regard will require *"…a more sophisticated [international] order"* or regime. This order would perhaps entail that regional and international concerns are given priority over and above national self interests. However, in spite of regional and international institutions that are developed to foster increased harmonisation and integration, in practice, this alas remains only an ideal. How do you get South Africa, for example, who needs water for socio-economic development to forego socio-economic developmental needs in favour of greater regional benefit without some degree of conflict? Currently there are no institutional mechanisms in place that could really transcend national gain in the interest of

the regional and international good. The SADC Protocol as a regional instrument, and also the UN Convention, lack the capacity to really achieve this.

Furthermore, the current domination of political institutions at the international level by powerful Western states prevents any real reforms from being instituted to deal effectively with these challenges. In this regard, the growing problem of freshwater scarcity, together with a lack of institutional capacity to deal with the future scenarios of water scarcity and conflict, definitely causes concern. Carius *et al.* (n.d: 1) argue that *"the key variable [in water conflict] is not absolute water scarcity, but the resilience of the institutions that manage water and its associated tensions"*. Sharing of water resources may provide incentives for countries to collaborate over water, although where water is scarce, tensions may also rise more rapidly and frequently especially when these tensions coincide with economic, ideological and other differences between countries. With regard to cooperation, Green Cross (2000a: 37) emphasises that *"… people with the least water, and the greatest and most direct dependence on it, have the most to gain from cooperation"*, while shared water resources, such as rivers, offer natural partnership opportunities. However, cooperation is a slow process that takes time to develop and build out towards the end ultimate goal of states accepting regional responsibilities, challenges and opportunities (Green Cross 2000a: 38).

Yet another facet of the dilemma of governance is that cooperation is hampered by the fact that water is often considered a strategic resource in water scarce regions.

2.2 Strategic nature of water and issues of trust

There is no question that water is a resource of strategic importance in the face of growing scarcity, particularly in Southern Africa (Turton 2007: personal interview; Van Zuydam 2006: personal interview). Steyn (2001: 4) states that especially in developing countries, water is increasingly being treated as a political issue, since access to water determines the economic growth potential of a state. Utilising water is an essential component in a state's economic development and prosperity, since it relates to irrigation, food production and energy generation, while also being an important structural control mechanism in flood and drought control schemes (Van Wyk 1998: 59). In turn, economic power is linked to political power. Therefore, states need to be able to utilise the waters that flow through their territory, or obtain water needed through interbasin transfers (Charrier & Curtin 2000: 13). How water is

controlled within each country involved is thus an important aspect of international conflict or cooperation over water (Wolf & Hamner 2000: 65).

Securing resources for a nation's own economic development still takes precedence in regional negotiations over water resources and this underlines the strategic importance of the resource in the region. In a water-stressed region and in water-stressed catchments it becomes very important how states align themselves with regard to access to water. Dlamini (2007: personal interview) sums up how water allocation is dealt with in a water-stressed catchment:

> *"From a water-resource point of view, from an allocation point of view, it [the Incomati) is considered one of the water-stressed catchments. No more room for additional allocation. So, all the water that is available has already been allocated to somebody. The only thing you can do is to take it from A and give it to B."*

To take water *"from A to give to B"*, entails that countries have to think strategically in terms of where to get water and with whom to cooperate to obtain access to water, thereby creating a context of water security. The strategic nature of water emanates mainly from the aspiration to create a context of security within a realist, technocentric paradigm as Turton (2007: personal interview) expounds:

> *"We are going to make ourselves secure by building dams and hydrological security, etc. So, that hydrological mission now ultimately feeds into resource capture – we are going to build dams. We are the strongest and this is an arms race, but it is a hydraulic arms race. ... That drives conflict. ... Water is a weapon, water has power. The only way you can get out of it is ultimately you have to change the perception of threat and that starts leading to negotiated solutions and … negotiated solutions changes … the problem."*

The political importance of water is further demonstrated by the reluctance of key informants to discuss certain water issues with the researcher. In the case of the Orange River Basin, the Water Commissioner of Lesotho (also a Commissioner for ORESACOM) was very reluctant to allow the researcher to record an in-depth interview, and, after consultation with the Lesotho Minister of Natural Resources decided not to allow the interview to be recorded. He also refused to answer any questions with a political undertone because of the "*sensitive nature of water resource issues between the countries that are in the Orange-Senqu River Basin"* (Lesoma 2006: personal interview).

Tromp (2007: personal interview) also stresses the strategic importance of water for a country such as Namibia and illustrates why countries are concerned with developments in other parts of the river basins in question:

> *"If I look at Namibia from the outside, you know agriculturally it is not the friendliest country. So they see a big opportunity in developing agriculture alongside the Orange River and it is close to big markets and this is why they get a bit anxious if things happen in the upper reaches [of the Orange River]."*

Ideally, these anxieties are dealt with through river basin commissions, in this case ORESACOM, where decisions that will affect water availability downstream are put to the commission. Lesoma (2006: personal interview) relates the example of Lesotho proposing to build a dam in the South Phuthiatsana River, a tributary of the Senqu-Orange River, to augment the water supply of the city of Maseru. Developments such as these are reported to the Commission and have to be approved by all four countries that form part of the Commission. At the time of the interview, the decision to build the dam was held back by one of the three remaining countries who had not decided if they should vote for or against the building of the dam. The Commissioner could not say which of the three countries were holding back the proposed development at that stage, since disclosure could affect the outcome of the decision.

In the wider political context, the strategic value of water coincides with strategic political decisions and is imbedded in a large socio-political context. In the case of Israel and Palestine for example, the dispute over the political borders of the Israel State relates to the issue of water security in a very direct manner. Israel cannot, for example, give up its claim to the Golan Heights because it needs to protect the sources of Israel's water, arsing as they do, in the Golan (Shuval 2000: 46). Turton (2007: personal interview) highlights the strategic nature of water in reference to the position of Mozambique as opposed to that of South Africa and Zimbabwe during the Mozambican Civil War:

> *"Remember, up until then [the early 1990s] it was war between South Africa and Mozambique and the reason why there was a state of war was because Mozambique, in my opinion, foolishly made a decision to support Robert Mugabe. Mugabe set up SADC as the frontline stage against racism and colonialism and capitalism and then ... Mozambique decided that is what they are going to do and they battled and then it backfired and ... the reason it backfired is it's taken them out of the equation and it's made them the battle zone, and, at the end of the day Zimbabwe has not given them anything but*

toffees. Where they are downstream in Zimbabwe there are still no river basin commissions. Zimbabwe is still doing what they want to and basically Mozambique weakened themselves, and at the end of the day what you do in this business [is] you look after your national interest, so we get back to this realist kind of debate: Look after your national interests. What are your national interests? Essentially if you make a decision based on anything other than your national interests you actually shoot yourself in the foot and this is what Mozambique has done. ... Swaziland said, you have given me something, what's in it for me? And they took it. This resulted in a plus sum outcome for the upper basin area. In fact, Mozambique appeared to become progressively more marginalised to the extent that it was finally confronted by ... what can best be described as a zero-sum outcome. If you want to make an ideological choice, ultimately the dams are still built and later when the war is over and you sit down and you want to talk peace, and all the dams are built and all the water has been allocated, your are now left with [nothing]. Mozambique made the wrong set of strategic decision. Swaziland, Botswana and Namibia made the right set of decisions. The case of Zimbabwe was irrelevant simply because of the way the river flows... When Mozambique decided to support Zimbabwe in the establishment of SADC and come out as an opponent of South Africa, they limited their options... Now if you commit to [something] that is what it is, you got no more alternatives. It is now war and you build your dams and you don't talk to your enemy. At the end of the day, when peace comes, you've lost out."

Specifically in the case of Mozambique, their decisions regarding participation in water agreements were strongly influenced by their political situation at that time (Turton 2007: personal interview). The political situation ultimately put them in a position where their ability to negotiate was severely affected. Dlamini (2006: personal interview) expounds on the Mozambican case and highlights that Mozambique negotiated based on their water needs from the Incomati at that stage, even though it affected their participation in future water resource developments in this basin:

"Before [South Africa and Swaziland] could build these [dams] we have to get Mozambique to agree. Anything you build here [upstream from Mozambique], you are reducing water going to Mozambique. At that time, way back in 1986, ... Mozambique was in a civil war, so Mozambique could not participate in this whole thing. [The political situation in South Africa also played a role and if they could have participated then] it would have taken longer for the agreement to come, until the death of Machel and the collapse of the apartheid system. Maybe negotiations would have still been ongoing. At the end of the day it has to be the politicians who sign the agreement. ... In 1991 ... they signed the agreements. That's when the Mozambican Minister for Water said, gentlemen, you two upstream countries, go ahead and implement your project, provided you give us some water here and that was an

agreement of two m□/s. And remember, they agreed on two m□/s because they didn't have much need for water here, they just want two m□/s so that the little people that are there are able to farm and also to make sure that there is fish migration and things like that."

Turton (2007: personal interview) contrasts the position of Mozambique with that of Botswana who have strategically positioned themselves to obtain water from their neighbours:

"In the case of what happened to Botswana, they just opened up options. The one option is there is a pipeline coming down from the Okavango. They've tried from the Zambezi and they've been very clever to say, South Africa you can have a piece of this pipeline as well to pump water to the Hartebeespoort Dam. The greater the volume, the cheaper the unit cost. So if South Africa can get it, it is going to increase the volume and it is going to become more feasible, but then they said they want part of ORESACOM. It is just another option. They make sure they are not in the Mozambique situation. ... In the deep dark years of Apartheid, South Africa gave Botswana water from the Molatedi Dam. It was an interesting agreement if you go and look at it because the government of Botswana would not sign it, because they would be recognising the apartheid state and they would be pressurised not to recognise the apartheid state. So then it dropped down. The Botswanese said that they need the water, they don't want to get involved in this messy business, so they downsized their side and they had their agreement signed by the Water Utilities Commission. So they dealt with it as a subsovereign issue."

Chiuta (2007: personal interview) elaborates on the strategic significance by pointing out that, with regard to Botswana's proposed developments in the Zambezi, "*...again the question was being raised. Zambia was saying: what is our stake in that? How much are we going to say? How much are we going to get?. Even Mozambique that is further down was saying, how much stake are we going to have in that?"*

The above not only illustrates the strategic significance of water in Southern Africa, but it also highlights the powerful political and economic position of South Africa in relation to its neighbours. This results in a Big Brother scenario. South Africa is, in many respects, seen as playing such a powerful role in political relations in general and in relations specifically over water that this may constrain cooperation over shared water resources (Van der Merwe 2007: personal interview; Van Zuydam 2007: personal interview). With regard to the Lesotho Highlands Water Project (LHWP), the power relationship that governed negotiations between South Africa and Lesotho in 1986, for example, is pointed out by Van der Merwe (2007: personal interview):

"When the project was implemented, or when the decision was made between the two governments (South Africa and Lesotho) to implement, they were both undemocratic governments. You had a military government in Lesotho and you had a government in South Africa that was basically a minority government. The military government in Lesotho was under coercion from South Africa, let there be no illusions. They did not have a choice, they had to sign."

Thus, South Africa as the more powerful entity in the agreement influenced the decision made by Lesotho to enter into an agreement. Lesotho did, however, according to Van der Merwe (2007: personal interview) *"... negotiate fairly well and the settlement that was reached was to the benefit of both parties"* which again points out the strategic nature of water. Yet, Tromp (2007: personal interview) emphasises the dependency of Lesotho in the whole agreement:

"Say Lesotho plays an ugly [game] and closes that gates [linking the tunnel between South Africa and Lesotho), what is going to happen? After one or two years the dams [Katse and Mohale] will overflow and where does the water run to? Downstream to South Africa. The water runs down into the Caledon. It is going cost us money to bring in back [to Gauteng] but the water is not lost. Cahora Bassa is another story. If they close it, the water runs to the sea and you have no way of generating electricity. So this is a bit of a different story. [Lesotho] closes it and ... the dam at 'Muela will overflow and all the water would run into the Caledon ... So this is another political dynamic that plays a role here. Remember, Lesotho is in the heart of South Africa. It is fairly dependent on South Africa to a large extent. The two countries do not want to rub each other the wrong way and cause conflict."

The dependence of economically weaker countries on South Africa strengthens the perception that South Africa acts as a type of Big Brother who has more power to negotiate beneficial agreements over water with its neighbours. This 'Big Brother' mindset leads to underlying feelings of mistrust in institutions dealing with cooperation over water. This translates into a certain amount of guardedness when issues of conflict and cooperation over water are raised. The 'Big Brother' mindset could potentially spill over into institutional governance as Keevy (2006: personal interview) explains:

"This is another sensitivity. The moment when you have cooperation between two countries, the moment when Swaziland feels, for example, or Mozambique would come in and with South Africa that is the bigger partner, the bigger country with the stronger government structures. Let's say this country says he is going to let his regional office handle things, immediately it tells the two other countries, you are so unimportant that you can just as well deal with my regional office or my regional director as leader. And this is why South Africa has always had their head office, Water Affairs Head Office, as the

leader in the Joint Water Commission. It is the Director General or the Deputy Director General. We had, for a short period, the Regional Director as leader of the South African Delegation at the JWC, but it was not positive. At the moment we are back where one of the Deputy Director Generals are the leader."

For cooperation to take place at the transboundary level it is important that the communication between these different levels take place effectively (Tromp 2007: personal interview). It is therefore crucial to establish who communicates with whom and what the powers of those who communicate are. If these communication linkages are not effectively structured it could therefore lead to feelings of mistrust and to a situation where a country feels like an unequal partner in view of the stronger institutional capacity of its partner.

In referring to relations between South Africa and Mozambique, the same issue of mistrust is brought up by Van Zuydam (2006: personal interview): "*You might find up in Mozambique they mistrust you because you're from South Africa. Maybe it's a Big Brother issue ...".* However, Turton (2007: personal interview) points out that mistrust is so deeply imbedded in our political context and that although water could become a unifying factor bringing people together, it is hampered by a learned sense of mistrust:

"How do we understand water as a builder of nationhood? We've still got to build a sense of nationhood. We still have to get back trust. Now how do we find trust in this place where we have got a history of mistrust? What has made us survive is our capacity for mistrust. The fact that we don't trust those people is what keeps us alive. We always believe they did bad things to us, so how do we overcome that? That is deeply imbedded, almost [a] genetic, [a] hardwired sense of mistrust in our body."

Resulting from the strategic nature of water, issues surrounding water are often clouded in mistrust and countries deliberate thus carefully about what information to divulge in the context of international water relations (Van Zuydam 2006: personal interview). Van Zuydam (2006: personal interview) thus encapsulates the situation current in forums where countries come to discuss water issues:

"...in all your troublespots, the Nile ... Jordan, China, India and Pakistan, you sit down and initially you sense the tension. First of all, its people have been told you can't go and discuss certain issues. In their countries it is issues of strategic importance and they can only say a certain thing and then only tell you outside of the meeting, we couldn't say that because we have our colleagues from another country. ...Yes, it is strategically important ... it revolves around security. It [water] has been raised to a higher level where it becomes a security issue. You shouldn't say this, you're leaking information."

Cooperation over water is strongly influenced by what is happening in the political context, therefore the dynamics that drive cooperation at a political level also play an important role in the water sector. The more important issues of sovereignty are, and the less trust there is between political entities, the more likely it is that subtle tension will surface in cooperation over water. In Southern Africa, sovereignty is extremely important in that it defines hard-won political identities. Furthermore, given that the scarcity of water is increasing, countries that cooperate over water resources will necessarily have to build on relationships of political trust if these agreements are to stand the test of time. At present, there does seem to be no indications of strained relationships over water in the region. This was pointed out by a number of key informants. However, the issue of protecting national interests over the greater regional benefit cannot at present be adequately addressed in the existing policy and institutional framework and this could diminish trust and cooperation between these nations in the face of growing water scarcity.

2.3 Institutional implications and challenges

Institutional arrangements are imbedded in the overall socio-political and socio-economic climate prevailing at various levels of society, and emanating from this, institutions develop in response to the aim of putting policy into practice. Furthermore, institutions develop towards achieving specific objectives surrounding issues confronting society. The challenge with institutional arrangements is to translate agreed-upon principles into concrete action through agreed upon mechanisms and operational institutions (UNESCO 2003: 299). In this regard, Yoffe *et al.* (2003: 1124) stress the importance of assessing *"… water resource institutions, water resource needs, and the ability of riparian countries to work together and to cope with changes or stresses upon a basin's water institutions and hydrological systems"*. UNESCO (2003: 299), in turn, emphasises that "*equitable and sustainable management of the world's shared water systems requires flexible, holistic institutions capable of responding to hydrological variations and changes in socio-economic needs, political regimes and societal values"*.

With the current emphasis placed on decentralisation within the IWRM paradigm, a wide range of institutional structures were either developed or transformed to conform to the IWRM framework and to foster effective linkages between institutions vertically and horizontally at different institutional levels from the international through to the local levels (Beukman 2007: personal interview). In the current institutional framework in South Africa,

for example forums such as Irrigation Boards and other Water User Associations (WUAs) represent the lowest tiers of water resource management, while Catchment Management Agencies (CMAs) represent second tier in the management structure, with the DWAF representing the highest tier (Funke *et al.* 2007: 15). Similar decentralised structures also exist in other Southern African countries such as Zimbabwe and Mozambique. This decentralised institutional framework can in principle foster a greater sense of cooperation and increase trust between different institutions horizontally if institutions will adapt their mandates and mechanisms to allow this to take place effectively.

Furthermore, although the current power balance in Southern Africa may decrease trust and heighten the degree to which sovereignty is regarded as important, it is possible to create a structure in which cooperation rather than conflict is the norm. Current water relations in Southern Africa do to a large extent manage to create a context of cooperation amidst these socio-political challenges. In this regard Turton (2007: personal interview) notes that Africa is regularly criticised for way in which it manages water but Africans say *"this is as good as it gets"*.

3. The dilemma of equitable distribution in the face of competing demands

Water supports basic needs of people at various levels by providing life-sustaining fresh water, making sanitation possible, being a key element in food production (crop cultivation, fisheries), while also fulfilling a productive function in a range of services and security processes (manufacturing, power generation, etc.) linked to economic development (Gardiner 2000: 295). Available water is broadly divided between three sectors, namely agriculture, industry and domestic use, with agriculture getting the largest share of water, followed by industry and lastly domestic supply[77]. Ecosystems are now recognised within the framework of IWRM as a fourth sector that demands a share of the available fresh water. Equitable distribution between these sectors is emphasised in both the international and the regional policy framework. However, as will be discussed, there are a number of subtle tensions in dealing with the demands from these different sectors. The first issue that may

[77] Sectoral water use is also dealt with in Chapter 4, paragraph 7

hamper future cooperation over freshwater resources with regard to equitable distribution is the emphasis placed on treating water as an economic good.

3.1 Water as a tradable economic asset

The idea of water as a commodity that has economic value has surfaced frequently in policy and institutional arrangements on water resources. If this argument is advanced, policies advocating water pricing and the privatisation of water resources are viable solutions for dealing with water scarcity and thus preventing conflict. On the one hand, the law of supply and demand dictates that as scarcity of a resource escalates, the price rises up thereby restoring balance and preventing the resource from being exploited beyond a certain point. Rosegrant (1995: 2) adds that as scarcity increases, the rising economic value of water may serve to improve the cost-effectiveness of new water development projects. On the other hand, as pointed out by Philips *et al.* (2006: 16), attaching economic value to water is a Cornucopian approach that sees the issue as a problem of mismanagement rather than of scarcity. This Cornucopian mindset results in particular implications for policy that fails to consider the issue as other than being a question of better management and better economic control.

When water is treated as an economic asset – subject to market principles – this may cause tension between states that have competing demands for the resource, and these tensions may neither easily be managed nor controlled – as proposed by proponents of water as an economic good. Secondly when water is treated as an economic asset, water loses its definition as a common good that inherently belongs to humanity as a whole. By ascribing to the view of water as an economic asset, inequalities in terms of access arise, or are exacerbated, since power is then given to a few wealthy and powerful people to decide how and at what price water is allocated (as is the cases with oil). According to Petrella (2001: 32), the main causes of the water problem at any level of society relate to the political, technocratic, economic, financial, symbolic and cultural power exercised by those who have such power. For the powerful, water as such is a source of power, wealth and domination and with economic and political power comes the ability to alter, store and divert the natural flow of rivers and to tap *'unreachable'* sources such as deep underground water. As a result, the poor and the vulnerable lose control over access to the resource because if an inability to pay for it.

Adam (2007: personal communication) points out that this *"challenge was debated in many international and regional forums [with] two groups: each group [justifying] their case by looking into the matter from a different angle"*. While the one group *"insists on considering water as an economic asset [and] wants to economize on the usage taking into consideration the expected future scarcity, ...the other group considers water an essential need for daily usage, especially the poor"* (Adam 2007: personal communication). The contentiousness of water being viewed as having economic value is such that even when water is treated as a resource with economic value by sovereign nations, particularly based on the Dublin Principles, this position is often euphemised so that the position is not referred to that strongly in economic terms. Treating water as an economic asset sometimes becomes such a contentious issue that it constrains institutional participation in the international arena. Beukman (2007: personal interview) points out that *"[W]e [GWP] had people in South America that would not join the partnership because one of the principles of IWRM was the Rio/Dublin principles we adopted that water is an economic good. So we don't refer to the Rio/Dublin principles. We say the IWRM principles and make sure that we [also] address socio-economic good"*.

3.1.1 Water as an economic good in international policy

In the current policy framework, culminating from years of consultation and discussion in the international arena, the view of water as an economic asset has become widely entrenched in the international policy framework. Shiva (2002: 20) notes in this regard that *"[t]he global economy is shifting the definition of water from common property to private good, to be extracted and traded freely"*. Many conferences and official declarations all over the world have consequently endowed the idea of water as an economic asset with a high degree of political legitimacy and scientific and economic credibility (Petrella 2001: 12).

The idea of water as an economic asset has surfaced in the declarations and action plans emanating from the World Water Forums. The First World Water Forum recognised that water may be at risk of becoming a marketable and expensive resource; hence it could become an object of conflict similar to oil. Various documents emanating from the Second World Water Forum further built on the idea of water as an economic asset. Particularly, the World Water Vision drafted by the WWC states that water should be brought under the same market laws governing the use of other natural resources. Water, therefore, should become a financial concern in which infrastructure, maintenance and investment are guided

by market principles. This is also the position taken by the Ministerial Declaration of The Hague in which one of the challenges to water security is identified as that of managing water with regard to its economic value in society. The NGO caucus of the Second World Water Forum strongly supported the idea that water insecurity is linked to the current (capitalist) global trade system embodied by the WTO. However, international financial institutions such as the General Agreement on Tariffs and Trade (GATT), the World Bank, the International Monetary Fund (IMF) and the World Trade Organisation (WTO) are according the Hunt (2004: 281) *"[t]he international institutions with the most muscle by far concerning water management"*. Since the WTO and GATT have the ability to enforce their agreements through economic sanctions, these institutions have considerable power over individual countries in the international arena. Shiva (2002: 87) calls the World Bank *"…an instrument for corporate control over water…"* as a result of this institution's tendency to use loan conditions to privatise and trade water. Financing of water was also taken up as a theme in the Third World Water Forum, and the mobilisation of financial resources was also a main issue discussed at Bonn, 2001. More significantly in terms of international policy, the fourth principle of the Dublin Declaration states that water has economic value and should therefore be treated as an economic asset, and thereby firmly entrenching the perception of water as having economic value in water policy and thus constituting a significant component of many international agreements over shared water resources.

3.1.2 Water as a common good *vs* water as an economic good

In principle, water has for centuries been seen as a usufructuary right, meaning that though water cannot be owned, it can be used. In this view, ownership of water cannot be defined, since water is recognised as a common good that should not be owned privately (Ashton 2000: 90; Shiva 2002: 21). Shiva (2002: 19) fervently emphasises that "*more than any other resource, water needs to remain a common good and requires community management. In fact, in most societies, private ownership of water has been prohibited*". It is argued from this point of view that, when water is owned collectively, access to water is protected, and that the poor and the vulnerable are therefore ensured access. Rosegrant & Ringler (2004: 8), on the other hand, do not perceive any contradiction in treating water as an economic good or as a basic right, but see water rights as the foundation of efficient and equitable water management. Through water rights, users are, therefore, empowered by requiring their consent for reallocating

water and compensating them financially for water transferred. Water is thus increasingly being treated as a source of profit in the private/ public partnership domain (Petrella 2001: 14). Research on shared resources has revealed that, as in the case of water, where it is difficult or impossible to exclude users, where strong economies of scale favour monopolies, and where the use of the resource by one user has major impacts on others, private ownership tends to be ineffective and inappropriate. For shared resources, private ownership – in the form of tradable water rights – can however still form part of efficient resource management if attention is given to creating a framework able to regulate the resource with its characteristic common pool features in mind. For this to happen effectively there needs to be a combination of state control and user self-organisation (Meinzen-Dick & Bruns 2000: 34).

Philips *et al.* (2006: 16) note that the approach to water as an economic good is mainly advocated by developed countries and, as a result, it often fails to take the needs of many developing countries with regard to water into consideration. Adam (2007: personal communication) however emphasises that even when water is treated as an economic good it is only in extreme cases that *"some countries consider water as a commodity to [the extent of being] sold to neighbouring countries; however this was absolutely refused because water flows naturally in a watercourse without any investment being made"*. In most cases where water is commoditised, the economic value is imbedded in the infrastructure, in the management of the resource and in the ability to transfer water from one country to another in the case of transboundary resources. Therefore, inequalities in terms of access to water and the economic means to secure access are brought to the fore when water is seen as an economic asset.

In the Southern African context, it is particularly the more economically developed countries that benefit from viewing water as an economic good and that try to secure water for further socio-economic advancement with limited regard for the needs of their economically less advanced neighbours. South Africa, Namibia, Botswana and, until recently Zimbabwe, have all managed to secure access to water from less developed neighbours through water-sharing agreements.

Particularly in the case of South Africa, water will always have to be transferred since most of the centres for economic and urban development are situated at the edges of watersheds. Thus, interbasin transfers from across borders will always be a feature of South Africa's

water management. For these transfers, economic transactions need to take place. In the case of the LHWP, South Africa drafted a treaty with Lesotho that resulted in South Africa contributing financially to major water infrastructure developments such as reservoirs, transfer tunnels and hydro-electric power schemes within the borders of the Lesotho State, the aim being to supplementing the water supply of Gauteng, the economic heartland of South Africa.

The position of South Africa in terms of political and economic might in relation to its neighbours does not necessarily translate into equitable sharing of water resources. Since water is becoming a tradable resource in Southern Africa, many people and communities are in fact either denied access to water, or to the benefits that these agreements supposedly bring (Van der Merwe 2007: personal interview). This, in turn, leading to underlying tensions that are noticeable in institutional arrangements. In light of this, the second issue related to equitable distribution is the issue of water as a socio-economic good.

3.2 Water as a socio-economic good

Socio-economic development is a core issue in the context of water, since access to water plays such a fundamental role in enhancing socio-economic development and improving quality of life. However, this goal is often hampered by the emphasis on water as a tradable economic good referred to above. Although some proponents of water as an economic good do believe that equitability is increased when economic value is attached to water and water provision, this is far from true in practice, in that this point of view leads to communities and even countries feeling deprived of water, which, in turn, translates into tension that could spill over into more serious conflicts over access to water.

3.2.1 Socio-economic good in the international policy framework

The interrelatedness between social and environmental factors in creating a sustainable world was first highlighted at Stockholm (1972), while Mar del Plata (1977) declared the right to access to basic drinking water for all people. The 1981 – 1990 IDWSSD attempted to provide access to sanitation and water supply, yet this goal was not achieved. Particularly since the 1990s, the importance of meeting basic human needs has been stressed as a core issue in policy development. Dublin specifically highlighted the issue of socio-economic development in relation to water in two of the four Dublin Principles. The First Principle emphasises that water is essential to life, development and environment, while the Fourth Principle highlights the role of women in managing and protecting water resources (Petrella 2001: 66). Thus, the Dublin Principles encompass a holistic view of water that links social and economic development to environmental issues (Philips *et al.* 2006: 23).

The Millennium Summit[78] took the growing emphasis on human needs to a higher level by attaching specific targets in terms of meeting human needs in a number of areas. Water security is seen as impacting on the ability to reach all of the MDGs[79]. Specific targets for sanitation provision and access to water for those without proper access form a crucial part of these development goals. Sanitation and access to fresh water is generally regarded as a pressing issue in developing countries, and providing access to both safe drinking water and

[78] The Millennium Summit is discussed in more detail in Chapter 5, paragraph 7.
[79] The MDGs and related targets are discussed in Chapter 4, paragraph 7.

adequate sanitation therefore needs to form a central component of policy development, particularly in those countries where these needs have yet to be met (Gardiner 2000: 291; Postel 2002: 3). Commitment in meeting the MDGs will also bring added pressure to bear on states to come to institutional agreements over the sharing of water resources (UNESCO 2003: 294). At the 2002 WSSD, the socio-economic development issues of poverty eradication, and the health of people were recognised alongside the protection of the natural resource base and changing consumption patterns as essential towards achieving sustainable development. Access to water and adequate sanitation are not only linked to the health of people, but also to the environment by the WSSD Plan of Implementation.

The provision of drinking water and sanitation formed core areas of discussion in the World Water Forums and were linked with the quest for a healthy environment by many of the documents emanating from these Forums. Particular mention was made of the importance of meeting basic needs concerning access to safe and sufficient water and sanitation as essential components of health and well-being in the Ministerial Declaration of The Hague at the Second World Water Forum, while the Fourth World Water Forum reaffirmed fresh water to be critical for all aspects of sustainable development, and that water and sanitation should be national priorities.

Satisfying the water needs of a world population expected to grow to around 9 billion people by 2050 whilst simultaneously protecting ecosystems sustaining the world's economies is a challenging task for future water governance (Postel 2002: 2)[80]. As a result of the emphasis on sustainable development that has been incorporated into policy since the 1990s, growing needs for water for basic water supply and sanitation, food production and economic development now have to be weighed against the needs of the ecosystem that supports the renewal of water resources. UNCED (1992) specifically laid emphasis on the holistic management of fresh water, incorporating the safeguarding of vital natural resources into the international policy framework. Dublin recognised the finite nature of water, and declared, in the First Principle, that water is essential, not only to life and development, but also to the environment. Ensuring ecosystem integrity through sustainable water management was also recognised as a crucial challenge in achieving water security in the World Water Forum

[80] The issue of population growth and the impacts thereof on water scarcity and conflict receives explicit attention in Chapter 4.

process. Legislatively, the UN Convention on International Watercourses and the SADC Protocol both incorporate the obligation to cooperate in developing and protecting watercourses. Flowing from the international policy and legislative developments, most countries in Southern Africa have included ecosystem protection as part of their own national environmental and water policies.

3.2.2 Ecosystem protection *vs* socio-economic development

Postel (2002: 2) states that the importance of ecosystem services warrants that attention be given to the protection of natural capital assets in policy, that environmental flow requirements for rivers be established, dams operated in such a way that natural river flows and flood regimes are preserved, and that ecosystem service protection be a core mandate of river basin commissions. At present, however, few river basins are in practice truly managed with the river basin as the main unit of management, despite policy provisions for that purpose, and socio-economic interests of sovereign states often taking precedence over the holistic management of rivers as whole ecosystems and also despite policy provisions that emphases ecosystem protection. With regard to placing ecosystems on the policy agenda, Chiuta (2007: personal interview) states:

> *"... the ecosystem [must be placed] on the table, both as the provider of water, as well as the user of the water. On the user [side] of water there are competing demands and that's where we also want to put the ecosystem on the table, but we are also trying to influence the water sector that they need to protect the ecosystem as the provider of water, because without the ecosystem, the water we are talking about will not be there."*

The long-term benefit of allocating water towards vital ecosystem preservation is undeniable in the context of sustainable development. However, there is a subtle tension underlying the allocation of water towards ecosystem sustainability and the needs of society in the short term that impacts on relations over water, also at the transboundary level. Dlamini (2006: personal interview) states: *"Because if you look at the water itself, it's very difficult in terms of efficiency. Yes, you can avail, say 20% to 30% more water, but it's not gonna meet the needs. Bringing in environmental issues makes things even more difficult."* This view is echoed by Postel & Ricther (2003: 157-158) in a specific reference to South Africa's situation: *"South African river managers are grappling with a fundamental challenge confronting societies in many parts of the world: there is simply*

not enough water to fully meet all human and ecosystem needs. As the South Africans [through the 1998 Water Act] search for ways to solve this seemingly intractable problem in a fair, just, and ecologically sustainable way, the world is watching closely." In this regard, Green Cross (2000a: 38) states that many current systems of so-called cooperation are not directed towards sustainable resource use, but are merely geared towards extracting optimal benefits from the risky use of water for economic developments and short-term gains at the expense of the natural environment. The underlying tensions, brewing as a result of trying to reconcile the needs of society with the imperativeness of protecting aquatic ecosystems are placing strain on institutional development and on the implementation of mechanisms for cooperation in the international and regional contexts.

One case of conflict in the Southern African region in which this tension between socio-economic development demands and ecosystem protection surfaced strongly was in the 1997 dispute between Namibia and Botswana over the Okavango Delta. Namibia proposed to build a pipeline to take water from the Okavango to supplement the water needs of Windhoek, and the proposed scheme was fiercely objected to by Botswana. However, when one unravels this conflict, one sees that the conflict is not about the water *per se*, but that there are other underlying tensions, one being the economic value that the wetland – as part of this river – holds for both these nations. Botswana and international environmental lobby groups objected strongly on the grounds that the Okavango Delta, a RAMSAR wetland site, would be negatively affected by such abstraction of water, and that, as a result, the economic benefits that specifically Botswana gains from tourism to this site would be affected. Muller (2001: 34) writes that although both Namibia and Botswana are signatories to RAMSAR and are therefore obliged to promote the wise use of wetlands such as the Okavango Delta, this convention does not define how to strike a balance between the needs for the preservation of a wetland on the one hand, and the need to meet the water demands of socio-economically disadvantaged communities for basic water supply, on the other. Furthermore, the tension was exacerbated by the question as to who has the right to make decisions about this issue – thereby bringing the issue of governance to the fore. The distribution of water in both Botswana and Namibia is problematic since the sources are far from the main centres of demand. Furthermore, in both these nations, economic growth and prosperity are dependent on the nation's ability to secure additional supplies of water. This conflict could not be resolved adequately by the institutional mechanisms in place, namely OKACOM and

the SADC Protocol. The reasons for the inability of these institutions to resolve this issue, does not lie in the absence of mechanisms for conflict resolution, but rest in the tension between these two nations over the economic value of accessing the resource in different ways. This particular dimension of the dispute is however not addressed by the institutional mechanisms in place.

3.2.3 Policy and institutional interfaces

Many countries, particularly in Southern Africa, rely on inflow of water from upstream states. Thus, improving the socio-economic status of the region's population cannot depend on water only from inside a specific country's borders, while countries that are only now progressing in terms of development may be constrained by precedents set for water use through existing agreements. This is particularly true in the case of upstream countries having to part with water under existing agreements with downstream countries, while the upstream country may now need more water than when the agreement was entered into (UNESCO 2003: 294). Any nation wishing to achieve their development goals needs access to fresh water. In Southern Africa, a degree of tension has been surfacing recently at both the interstate and the group-state interfaces in this regard.

- **Interstate tension**

Mozambique serves as an example in this regard. This nation is currently attempting to rebuild the country after the civil war, thus requiring more resources and consequently also placing more pressure on water resources. Currently, South Africa, Swaziland and Mozambique are struggling with issues surrounding water transfers to Mozambique via the Incomati River. Dlamini (2006: personal interview) explains the positions of the various role players in terms of their development status:

> *"They feel that the white man was able to grab up the good land upfront and utilise free water all these years and now suddenly they are bringing in new requirements for having to pay for water. It is developmental history that causes these tensions. You are where you are, because I couldn't be where you are, therefore, you must help me to be like you. ...So it is all confused economics. And it is that tension which a lot of people can split into smaller ... problems. It's because they say, well they've taken all the water and we don't have water ... We always cause this problem. ...I also want the prime spot in the Johannesburg CBD [but I] can't get it. Somebody already owns that and you can only give it to me at a price. How different is water? It's not different."*

On the one hand, the perception from South Africa and Swaziland is that Mozambique agreed to the existing agreement although they were not a part of the agreement, based on their socio-economic and political realities at the time. Keevy (2006: personal interview) explains that Swaziland and South Africa were only prepared to implement their agreement with the approval of Mozambique and this led to the Piggs Peak Agreement, in 1992, in which Mozambique gave their approval for the development of the Driekoppies Dam (in South Africa) and the Maguga Dam (in Swaziland). The agreement was that there would, on average and over a three-day period not be less than 2m□ of water per second going through Komatipoort at the Ressano Garcia border into Mozambique.

However, currently Mozambique is in the process of stepping up socio-economic development, and as a result, more water is now needed. At present, Mozambique is relying more on water from the Kunene and Umbeluzi Rivers, although, in future, they will probably begin to focus more on the Komati River. As a result of population growth and economic development in Maputo, Mozambique will in all likelihood in future need more water from the Incomati Basin, which may increase tension over access to water in this basin. Dlamini (2007: personal interview) likens the issue of socio-economic development in Mozambique in the face of previously established allocation of water to the tension between the developing and the developed worlds. In his view the developing world feels that the developed world achieved their development – at the expense of the *'Third World'*. As a result there is a perception from the developing world that developed countries must help them catch up in terms of development even though this may have a particular economic impact. This also applies to water and especially to economic investments that were made to obtain access to water:

> *"South Africa that is upstream developed [and therefore] they had a need for the water. For them to actually give up that water, it means that they sort of forgo that development and get nothing for it. I'm sure they are willing to give it up for a price. They are not going to say to Mozambique, because you were not able to develop then, now that you are capable of developing, here it is, free of charge, because they (South Africa) secured that investment at a cost."*

Mozambique, being both the downstream state, and also having less political power in the regional political system, is thus in a precarious position with regard to supplying water for their socio-economic development needs based on current agreements. The emphasis

however is not laid on the greater socio-economic good for the region, but rather on national self-interest in securing water through investment in infrastructure. The continued growth of the world population and continued improvements in standards of living, coupled with a lack of incentives for water conservation and demand management, would lead Hunt (2004: 99) to believe that most communities will continuously seek to expand their supply of water[81]. This is a challenge for future institutional arrangements, one that has definite implications for cooperation and conflict in the international arena.

Given the expected increased water scarcity in the region and the increased demand being placed on water resources for socio-economic development, the potential for future conflict is evident. In the past, there was, in the case of the Piggs Peak Agreement, been tension over the inability of South Africa and Swaziland to maintain the agreed flow over the border into Mozambique during times of drought (Keevy 2006: personal interview). If water scarcity increases, these tensions may become more frequent and more pronounced, particularly since the current agreement does not necessarily take Mozambique's future needs into consideration.

❑ Group-state interface

Where water is treated as an economic asset, access to water is seldom effectively distributed with the poor and vulnerable in mind. This creates tension at least at the group-state level, as Chiuta (2007: personal interview) explains:

> *"I think when the GWP were formed, the issue was that they were treating water as an economic good. But when you look at the advocacy and proponent of that principal, if it is implemented, you understand your own local situation within your own country or within your own river basin. ... I think when I look at Zimbabwe, Zambia, Mozambique and Malawi, they went way out in terms of implementing the GWP principles [of] water as an economic good. And when you pressure, they say, no, they are considering the poor. [However] the institutional structures they established are being managed according to economic principles. They have to be viable. So, if I'm Rand Water and supplying water to the communities and urban centres, I have to generate revenue out of that. And if I factor in social considerations, it will affect my pocket ... And at the end of the day, balancing those two aspects becomes a challenge. Especially when you consider the sizable amount of population do not have money to pay and you go on the principle of water is an economic good, you commoditise water, you end up having*

[81] For a more detailed discussion of socio-economic and demographic factors see Chapter 4.

problems and you [are] affecting different groups - if it's on women, if it's on children, all those come into perspective and then you get tension, because of these disadvantaged groups. And there are those who rise up and create conflict. It may not be conflict outside the country, but internal."

The tension between economic goals and socio-economic good in justifying allocation of water is also illustrated in the case of the LHWP. This project was constructed to incorporate three development components: a water transfer component, a hydro-electrical power generation component, and, lastly, a socio-economic and environmental sustainability component that should benefit the people of Lesotho. The socio-economic development component included providing schools, clinics, doctors, teachers, etc., while there were also infrastructural developments such as roads that were the direct spin-offs from the agreement between South Africa and Lesotho. Tromp (2007: personal interview) explains that:

"... to get the water in place, there had to be lots of infrastructure and other projects that we had to establish, and you have to do this in any case if you look at the modern way of project implementation. It is not only about building a dam. You build the dam, but you also look after the people in the region. You maybe consider their immediate environment and also a little wider for that region. As I see it, and as I saw in Swaziland as well, there are other spin-offs from the project. Take phase 1A. We invested almost R *600 million in infrastructure, of which I would say only a small part Lesotho won't get in the end. What will you do with a road for example?* Roll *it up and sell it in Johannesburg? You can't. Those things we provide for them with the agreement that they must maintain it because we still need it. And if they have problems with maintenance, we will help. Not only financial, but also with other resources."*

However, although the Lesotho Highlands Project set out to consider socio-economic development as one component of the scheme, on the ground level most of these socio-economic benefits were not felt by the people. Van der Merwe (2007: personal interview) echoes this opinion:

"... at first sight, it was extremely beneficial for Lesotho because it brought hospitals, houses, etc. ... but the ordinary people did not know it was going to happen. They were very poorly informed. There were signs of underlying dissatisfaction that comes from a perspective that South Africa is taking our water and we are not getting anything in return. ... I do not think that the ordinary men and ordinary women's lives were made easier by the project. Because there were lovely promises made to the people and those promises were poorly fulfilled in some cases. I am reminded of how I once prepared for a visit from a group of journalists to the project and when I said I want to take them to a specific resettlement area,

I was told, no, do not go there. ... because the water tanks were not installed yet. Those people are going to throw stones at us. And when I asked: 'what water tanks?' those tanks were standing in the yard at Katse [Dam] for longer than a year. They should have just been installed but they never did it. ... I think that the fact that the project generates electrical power is a great benefit and I think that every project that uses water to generate electricity has the potential to benefit the local population. When they inaugurated the power plant at 'Muela, I suggested that they supply the town of 'Muela with streetlights, as a sign that the project is benefiting the local people, Nothing came of it. It is still ironic that you can live next to a hydropower station and not have power. It is unspeakable that a modern society allows something like this. That a country such as South Africa, that played a role in the project could just stand and watch and say nothing when their neighbouring country does this. It is absolutely nothing to supply ten lights in a project of this [magnitude] and there you go, those people's lives are changed and it is a sign of hope for the rest of things that are going to happen."

The above reveals that, although there are, in principle, provisions for considering socio-economic development in the face of an agreement based on the trading of water between South Africa and Lesotho, in practice, people on the ground did not necessarily benefit, which led to tension being felt at the ground level between the local people, their advocates and authoritative structures such as the project implementing agent, the TCTA in this case. When asked whether the perception that South Africa were benefiting from the transaction at the expense of the people in Lesotho was widespread and whether this was a potential source of conflict, Van der Merwe (2007: personal interview) stated that the perception is *"widespread"* but that it would not necessarily spill over to institutional structures in the Lesotho Highlands Scheme as a source of conflict and therefore result in interstate conflict between the two countries. He reasoned that:

"... there is too much power in the state in Lesotho with the police and the army and with South Africa's army. … the resentment is very deep with the people because they don't understand that that water is in any case not going to the people in Lesotho. There is an enormous gap in the knowledge that people have about the project as is also the case in South Africa. Will they rise up? No, because they are being strongly suppressed by their own people. But what will they do? Passive revolt. Very little of it really, but if they get the chance, they will do something negative. There is a perception that we [South Africa] are not doing enough for them … and this is very strongly present in the project. Then there is a degree of anti-project sentiment that has maybe become more of an anti-South African sentiment. Not because of the perception that you are taking our water, but because of the perception that you are taking our things, our lifeblood. That type of thing, that type of perception."

In the face of the profit objective, the people at the ground level are often left dissatisfied and without the promised benefits resulting from interstate agreements over the sharing of water. Kotelo-Molaoa (2007: 234), in a study on the socio-economic impacts of LHWP, found that the LHDA did not fulfil some of the promises made to those affected on the ground, such as promised compensation for the loss of natural resources. This led to severe dissatisfaction and diminished trust between the people affected by the project and the implementing agencies. Since these agreements are often built on economic goals, tension builds up from the ground level and the created institutional structures may in future have to deal with these tensions through appropriate mechanisms. Van Zuydam (2006: personal interview) gives some indication of the significance of tensions at lower institutional levels explains:

> *"In South Africa, you will always have the conflict between your large-scale commercial white farmers or estate farmers and your small-scale black farmers – emerging farmers. It's either they feel they were robbed of water ... Swaziland must have taken all the water. ... [A]nd that is where I pick up there is still that hostility. Even this one will one day eventually spill over in South Africa to a national conflict between your large-scale and your small-scale farmers [over access to water]."*

Institutional structures that are established to deal with the sharing of transboundary water resources have within them existing mechanisms to take the views of people on the ground to higher institutional levels where the decisions are being made (Dlamini 2006: personal interview; Tromp 2007: personal interview). However, although these mechanisms do exist to deal with the needs and demands of people at the ground level, the drawn-out bureaucratic process through which communication takes place between different levels of institutions may leave groups at the ground level dissatisfied that their voices are not being heard, and the resulting tensions can ultimately spill over into the larger institutional structures. Lower institutional structures also have limited power to act on the issues being addressed there and the message is sometimes lost en route through the bureaucratic structures and ultimately it fails to reach the level where decisions can be made.

❑ Regional and international policy responses

These tensions that gradually build up from the ground level can eventually lead to an eruption of conflict at higher institutional levels (Van Zuydam 2006: personal interview). Such conflicts results from the limitations of provisions provided for in instruments such as

the UN Convention and the SADC Protocol, these being unable to deal with such tensions. Ashton (2000: 86) is of the opinion that *"... almost all future disputes or conflicts involving water, or concerned with some aspect of water, will tend to be local in scale"*. Furthermore, many of these localised conflicts now also include and will include an economic dimension.

The UN Convention draws together the emphasis on water as economic good by stating in Article 5 that "international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilisation thereof and benefits therefrom, taking into account the interests of the Watercourse States concerned" and "Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner..." (UNCIW 1997: 4). The use of wording such as 'optimal' can, according to Beaumont (2000: 481), be interpreted as the most economically beneficial or productive use and this does not necessarily mean the most equitable use. The SADC Protocol (Revised) is equally vague on these points and also refers to the "participation in the use, development and protection of a shared watercourse in an equitable and reasonable manner". This participation includes "both the right to utilise the watercourse and the duty to cooperate in the protection and development thereof ..." (SADC Revised Protocol 2000: 5). The UN Convention, Article 10 states that no use of an international watercourse enjoys inherent priority over other uses; Articles 5 and 8 call for optimal utilisation of watercourses, while Article 10 further expresses the obligation that in the event of a disagreement between users of a watercourse, requirements of vital human needs take precedence (UNCIW 1997: 4-6). However, the concept of 'vital human needs' is also not clearly defined and could therefore be interpreted as applying only to water for drinking, sanitation and cooking, yet excluding water for food production – such as for irrigation (Beaumont 2000: 483). Thus, in a situation of conflict over the allocation of water for economic pursuits in the face of vital human needs, the Convention is clearly unsatisfactory in its definition of these concepts and therefore would most likely not be adequate to address conflicts over the allocation of water towards different sectors. Thus, this entails a contradiction between the economic value of the resource and the equitable utilisation for the greater social good that includes vital human needs. Any negotiations over water allocation towards different sectors may become extremely problematic owing to the vagueness with which the issue of allocation is addressed in instruments such as the UN

Convention (Beaumont 2000: 484). The equitable distribution becomes even more problematic in the face of allocating water to ecosystem preservation.

To overcome the issue of competing interests from different sectors, there has in recent years been great emphasis on benefit-sharing. Philips *et al.* (2006: 29) note that benefit-sharing was debated widely at Bonn 2001, the Third World Water Forum and more recently at the Stockholm World Water Symposium in 2005, yet the concept is at present not developed to the point of being useful in the debate on transboundary water resources management. Benefit-sharing operates from the assumption of equitable use of shared water resource, assuming that the imbalance between benefits and costs will be corrected over time. Dlamini (2006: personal interview) explains benefit-sharing by using the example of Mozambique, South Africa and Swaziland:

> *"If you take, for example, Mozambique, they have [a] huge industry of prawns that requires perennial river flow into the ocean. Now if you have perennial river flow into the ocean, where are you going to get water for irrigation? People who have land upstream, would not want to see that water go into the ocean, they want the water to be dammed and used for irrigation, but if you do that, the other one suffers. So it's a give and take. This is where they talk now of benefit-sharing. And it's a contract that is pretty tough, but it goes along the lines of simply saying, rather than the upstream people saying they want the water to irrigate, is there any way that they can get subsidised for the loss of production by the booming fisheries and prawn industries?"*

Thus, benefit-sharing entails that where water is allocated to a specific use, other sectors that could have benefited from utilising the water are compensated accordingly. The challenge of benefit-sharing is especially manifested in relations over water between states, where one state shoulders much of the responsibility for preserving the vital water recharge zones, while the other nations (often those farther downstream) benefit from the protection of the ecosystem by an upstream state. Thus, tensions mount between states that perceive their share of the costs to be in inverse proportion to the benefits they accrue, while another state, being burdened with no costs in terms of ecosystem protection, benefits greatly in terms not only of water provision, but also in terms of ecosystem services. Referring to the Zambezi, Chiuta (2007: personal interview) explains:

> *"Zambia has most of the tributaries that contribute maybe 70% of the water in the Zambezi. [They] are managing it for someone who are benefiting from it downstream and the responsibility of managing that ecosystem [where the river originates] falls to Zambia because it is within Zambian territory ... If*

we do not look at the risks, costs and benefits and factor that into the equation, we are shooting ourselves in the foot."

In this regard, Green Cross (2000a: 43) points out that for cooperation between sectors to be effective, all stakeholders have to know that their partners are playing their part and therefore no State or sector should have to bear a disproportionate burden in conserving shared resources, while no party should also gain a disproportionate benefit from the conservation of the shared water source. Tensions arising from the perceived cost-benefit contribution by states are further exacerbated by the inherent tensions associated with sovereignty and the economic cost or benefit that may advantage one nation more than another. These tensions do, in certain cases, prevent agreements from being operationalised and they thus strain institutional developments and cooperation between countries. Chiuta (2007: personal interview) illustrates this in referring to institutional developments in the Okavango Basin:

"There is subtle tension[s] and we could term them as competing. Subtle tension[s] which maybe have some political dimensions to them. Generally what we could say, what we observe in the region, it's competing demands that have the potential of escalating into political tension which would maybe not have erupted. ... When you look at OKACOM there is conflict there, but not, when you talk about conflicts in the Okavango, the governments, the countries will say: Conflicts, what conflicts? The type of conflict you are talking about is there, but the reason why the [agreements are not] progressive is because Angola is not happy with the current arrangement. [Because Angola wants to develop, they need more water], while Botswana is saying, no, we are sitting on a bigger stand and the side here if you do anything upstream there, you are going to affect our ecosystem. We have been working with those three countries on a project trying to say you have to look at the costs and benefits. If there is a mechanism, because for me what is critical because you are talking about the developing policy guidelines to deal with conflict, I see that we have a protocol and a revised protocol, to me that instrument is there. What are lacking are the mechanisms of operationalising that policy and mechanisms of sharing the costs and the benefits, because we talk mostly about benefits. We do not look at costs. Because if I am bearing the cost and I don't see my interest being [protected] by whatever instrument that's been developed, I will not participate. I will stifle the progress of whatever is [being] initiated. When you talk about benefit-sharing and costs, they are always referred to [in] the Protocol, but when you look at the Protocol the Protocol doesn't have that. It's just generic and the mechanisms are sort of [generic]. Yes, you can have generic mechanisms, but the particulars depend on the situation at hand within a given river basin. So

to me for the SADC the potential issue that will cause conflicts flaring is the continued absence of mechanisms for sharing the benefits as well as sharing the costs."

Privatisation and establishing water markets are advanced as being solutions towards allocating water more efficiently, also where it concerns the poor and the vulnerable, as well in respect of as ecosystem protection. Through water markets water, services or produce derived from freshwater ecosystems are traded through established import/export markets (Charrier & Curtin 2000: 15). This may alleviate immediate pressure on water resources and create capacity to channel water to other more beneficial uses. When economic markets play the role of allocating water, this may, however, increase water insecurity for the most vulnerable groups who are unable to pay for water. Based on three of the four Dublin Principles, the socio-economic importance of water needs to be recognised by countries and, therefore, the needs of people – particularly those without access to water who are thus subjected to insecurity – should essentially be prioritised in allocating water. At Bonn (2001), the potential of virtual water in channelling water more efficiently was pertinently raised. Countries often use freshwater resources to produce cheap exportable agricultural produce for markets in water-rich countries in the North, although this does not constitute the most productive use of scarce water resources (Brauer 2002: 17). In this regard, the behaviour of both the producing countries and the purchasing countries are unsustainable in terms of water use, increasing the scarcity of water and, moreover, in terms of contributing to tension over the most beneficial use of scarce water resources. Essentially, to conserve water for ecosystems and to channel it towards the most efficient and beneficial uses, one part of a region cannot over-exploit resources to grow water-intensive crops to export while in other parts people do not have access to clean water (Charrier & Curtin 2000: 12). This in itself is a potential cause of conflict over the most beneficial uses of shared water resources.

Beneficial and equitable use of water also links back to socio-economic development, as Philips et al. (2006: 6) explain: "The potential for an improved allocation of benefits between populations sharing trans-boundary watercourses also speaks directly to the alleviation of poverty in many cases, especially as one of the most important benefits in the developing world involves the ability to increase food production through the use of irrigated agricultural techniques." For many nations, self-sufficiency in food production is linked to sovereignty, and states often equate this with security and independence. States may

therefore regard it as political suicide to admit to not being able to provide for the food needs of their populations because of a lack of water. It may therefore point out vulnerabilities in terms of water and food security that could be used as leverage by neighbouring or rival nations. Access to water also determines the ability of a nation to meet the needs of its population for adequate water, sanitation and a secure food supply. The quality and quantity of water determines the level of self-sufficiency in food supply; the distribution of water determines where development can take place; and, the quantity of water determines the extent to which development can take place within a nation (Turton 1999: 24).

The water legislation of many Southern African countries makes provision for prioritising the needs of people and ecosystems over and above the needs of industry and agriculture in line with the Dublin Principles and with IWRM practice (Beukman 2007: personal interview). In practice, the onus is on the state to provide the poor and insecure with access to water, but if water services and infrastructure are privatised, the emphasis often shifts away from water as a right, to water as a commodity and herein lies an underlying tension, whereby subjecting water to market forces often happens at the expense of those who are most disadvantaged in terms of access to clean water. In this regard, Postel (2004: 1) distinguishes between the priorities of governments and of private corporations in having control over water. She asserts that water is a public trust that needs to be managed accordingly and that governments as the custodians of water should be responsible for ensuring that human and ecosystem needs are met. Consequently, while governments are regarded as the custodians of water, even governments fail to varying extents, in ensuring that human and ecosystem needs are met when water is being treated as an economic good. In the regional context, Thompson (2002: 236) emphasises that the state cannot be the guarantor of water security, although the state as a service provider is very important, since the state is the builder of dams, charger of rates, allocator of quotas, etc. Therefore, water security has much to do with how water is allocated by governments, both within and across national boundaries, and with how this is justified (Thompson 2002: 237).

In the light of the above, regional harmonisation and integration of resource management is one scenario proposed by Chonguiqa (2000: 84), as opposed to the business-as-usual scenario that perpetuates current patterns of unequal resource use and of access within the

international political system. Managing joint resources in a 'business-as-usual' manner leads to marginalisation and reduced access to resources for specific sectors of society whereas regional harmonisation would require that the approach to resource management be changed within each sector and state. However, international, regional and national enforcement capacity, backed by political will, is required to effect such change, and at present this capacity is still not well developed. In this regard, Takawira (2007: personal interview) opines that:

> *"[C]apacity being built and maintaining common goal(s), I think, should help in that area. I think that when you look at the 3 E's, I think basically for us, IWRM is balancing social equity, environmental sustainability and the economic issues. ...and that is what we are promoting as GWP in the region. So when you are talking about building capacity in the region, or developing capacity institutions [to help them] plan in a way that they can see how they can balance the 3Es in whatever they are doing, be that local level, be that national level, coming right up [to] the regional, I mean transboundary level."*

Thus, although attaching economic value to water and the services delivered by water through, for example benefit-sharing, is in principle, a mechanism for alleviating scarcity and could potentially free up water for ecosystem protection, the dilemma of determining equitable use in a context where national self-interests and socio-economic challenges play an important role decidedly strains the development and functioning of institutions whose aim it is to promote equitability and the better allocation of scarce water resources. The long-term benefit of allocating water towards vital ecosystem preservation is undeniable in the context of sustainable development. However, there is, in the short term, a subtle tension underlying the allocation of water towards ecosystem sustainability and the needs of society – one which impacts on relations over water, also at the transboundary level.

Furthermore, current systems of intended cooperation are not necessarily directed towards the sustainable use of water resources, but are more likely geared towards obtaining optimal benefits from water use for economic developments and short-term gains that are derived at the expense of the natural environment. As pointed out by Beukman (2007: personal interview), there is a gap in the understanding of people in the other sectors, such as the economic sphere, over the importance of water issues. Among the problems in terms of policy and institutional development therefore are *"how[to] communicate with other sectors. How [to] reach those responsible for development. Because IWRM is a means for improving socio-economic*

development and improved livelihoods ... Those other the sectors [-] the commercial and private sectors [involvement]... [is] critical in IWRM..." (Beukman 2007: personal interview).

4. Conclusion

This chapter has highlighted the crucial socio-political and socio-economic dilemmas that may in future hamper cooperation over freshwater resources. In the current policy and implementation framework, emphasis is placed on cooperation between, and involvement of stakeholders as well as the governing of water resources with regard to the transboundary nature thereof. This policy ideal of integration and cooperation at an international and regional level however clashes with the political ideals of sovereignty and the emphasis placed in national politics on the protection of sovereignty and national self-interests. This dilemma raises important issues with regard to sovereignty *vs* the degree of cooperation possible between stakeholders in the international political system. Particularly in Southern Africa, where sovereignty was won through bitter struggle, cooperation may be clouded by inherent mistrust and the wish to protect sovereign interests over regional interests. Sovereign states therefore find it difficult to transcend political self-interests in dealing with shared water resources – even when forums for cooperation are established and functioning. Related to the dilemma of cooperation and political sovereignty is the issue of the strategic nature of water in the face of the growing scarcity of water. In the Southern African political context, the strategic nature of water corresponds to strategic political decisions taken in this large political context.

It can be concluded that cooperation over water is possibly influenced more by events in the political context than those in the water sector. Consequently, the dynamics that drive cooperation at a political level also play an important role in the water sector. When sovereignty and a low degree of trust between political entities exist, it becomes more likely that subtle tensions will surface in structures designed to that facilitate cooperation over fresh water. This dilemma of protecting national interests over the greater regional benefit is not addressed satisfactorily in existing policy or in institutional frameworks. In the long term this could lead to both diminished trust and cooperation between nations in the face of the growing scarcity of water. Therefore, in the political context, greater emphasis will need to

be laid on regional and international integration, while trust between stakeholders needs to be developed if current agreements are to withstand the reality of increased water scarcity.

The dilemma of equitable distribution of water resources between the competing demands of water as an economic entity, water as a source of socio-economic good and water for ecosystem protection is moreover apparent in current policy and institutional frameworks. The Cornucopian paradigm of managing existing problems of scarcity surfaces strongly when water is approached as having economic value, and therefore emphasis is laid on greater management and on the economic control of resources as opposed to more ecocentric approaches that take ecosystem protection and socio-economic good into consideration. The current approach implies that since water is a tradable resource, equitable sharing of the resource becomes questionable in that this could be done to the detriment fo the poor and the vulnerable, and the ecosystem. Tension is noticeable on the ground where groups and communities feel that they are not benefiting from current economically motivated agreements over water.

Benefit-sharing has in recent years been proposed as a mechanism for the more equitable distribution of water resources. However, even where benefits are shared, states are often in such agreements at odds with regard to who bears the financial burdens and reaps the benefits. This leads to tension between states.

Although the existing policy framework does take note of the importance of equitable sharing – with emphasis on vital human needs – socio-economic good is still not adequately addressed when water is treated as an economic asset, which leads to tension that spills over into regional and international institutions. With the increased demand for water from different sectors and the resultant growing water scarcity, the potential for conflict resulting from vague policy guidelines drives the potential for conflict over water resources between these different users and sectors. In the face of the profit objective, the people at the ground level are often left dissatisfied and without the promised benefits as a result of interstate agreements over the sharing of water. Since these agreements are often built on economic goals with an evident profit objective, tension builds up from the ground level and created institutional structures may in future have to deal with these tensions by means of clear and appropriate mechanisms.

In the following chapter more in-depth attention will be devoted to the implications of the above dilemmas and issues for future policy formulation and institutional development.

Chapter 7
Conclusion and recommendations

1. Introduction

Much attention is currently being devoted to the issue of water scarcity and to the resulting socio-economic and socio-political impacts thereof. Furthermore, a policy and institutional framework for dealing with water scarcity and for facilitating cooperation between states is certainly emerging at both the regional and the international levels. There is also increasingly better information, assessment and monitoring of water resources and related issues. Yet, the challenges remain, and full international cooperation in which the needs of different stakeholders are balanced perfectly with the available water resources is still both an idealistic and unattainable goal. Therefore, the question why the world is not closer to solving the water problems with which it is faced – despite there being widespread political and academic interest in the issue, numerous regional and local conferences on the matter, very significant policy developments, legislative reforms and institutional developments – needs to be answered. In this regard, Petrella (2001: 12) succinctly notes that there is no rationale for allowing water to become a rising source of conflict, disease, death, environmental destruction, urban degradation and social friction, especially in the light of evidence that water *"can transform the quest for economic welfare and increased satisfaction into an opportunity for cooperation and joint development within a system of regulation that treats water as a common asset"*.

The issue of water scarcity and conflict has, in the preceding chapters, been analysed by (i) focusing on the wider social and political context in which water scarcity is imbedded; (ii) focusing more closely on the implications of the particular socio-political and socio-economic realities for relations over shared water resources; (iii) analysing the extensive international policy developments with regard to water; and, (iv) identifying and analysing dilemmas and issues that could decrease future cooperation over water and also lead to conflict. This chapter draws conclusions with regard to the above while also providing recommendations for future policy and institutional development.

2. Main conclusions of the study

The following conclusions are drawn from the study:

Conclusion 1

The dominant social paradigm underlying decision making with regard to natural resources does not support closer cooperation over fresh water

The current social worldview underlying decision making support a *'business-as-usual-with-a-few-minor-changes'* approach to dealing both with the issue of water scarcity and with cooperation over freshwater resources. While this approach may still be practical in the short term, it may not be conducive to long-term prevention of and intervention in conflicts over fresh water.

The technocratic Cornucopian worldview[82] that emerged during the 19th and 20th centuries still influences thinking on how to deal with current environmental crises. Resulting from this worldview, the overall policy framework epitomises a future in which water scarcity can, firstly, be overcome by technological advancement, and which, secondly, assumes cooperation over the distribution of water. The resultant policy framework also presupposes the use of technological solutions to deal with distribution of available water resources – based on economic, market-driven principles.

Thus, in spite of the emergence of a more ecocentric approach to environmental issues[83], the technocratic worldview still influences current policy and institutional developments. The policy options emanating from this worldview are focused on managing the socio-economic and socio-political problems arising from the issue of water scarcity, rather than on a radical transformation of policy as suggested by proponents of the ecocentric approach. A radical change in policy will ensure that increased water scarcity is effectively prevented and that equitable access to water is moreover guaranteed. Current policy is, however, influenced by a managerial mindset that does not adequately take into account a future social and environmental context – one characterised by increasingly stressed environmental and social dynamics. Even sustainable development, as a strategy for marrying ecocentric ideals to a

[82] See Chapter 2, paragraph 4.1.
[83] See Chapter 2, paragraph 4.2.

technocentric desire for continued economic growth and societal progress, is burdened by a managerial approach in dealing with environmental issues. Its shortcomings are thus similar to those of a technocentric approach to policy development[84].

Water-sharing agreements in Southern Africa are decidedly characterised by an underlying worldview where scarcity in one part of the region is dealt with through technological and managerial solutions, such as water-transfer schemes and economic transactions, in order to secure water in other parts of the region. Within this existing social context, role players (nation states) align themselves strategically with a view to obtaining the largest benefit for themselves, often without much regard for the impacts that this could have on other stakeholders. This results in varying degrees of tension over the distribution of water, and also in diminished trust between stakeholders, between groups, between sectors, and between political states.

One of the most unfortunate outcomes of current relations over water under this worldview is that cooperation can only with difficulty progress to a higher level – where all water needs are truly balanced with the available supply of water. The long-term implication of this is that human society will continue to manage water in a business-as-usual fashion, while having continuously to make provision for negative environmental feedbacks until water scarcity overtakes the capacity of current technocentric-orientated policy and institutional arrangements to manage the issue. For example, it was pointed out that in water-stressed catchments, once all the water has been allocated, the only option is to take water from one user and give it to another[85]. This encapsulates the managerial stance of coping with water scarcity within a technocentric worldview, but eventually a limit will be reached, where water can no longer be managed in such a way, and where tensions arising from current technocentric-orientated policy frameworks exacerbate political conflict between stakeholders.

The current social worldview leaves no room for true equitable distribution – where the needs of society and the natural environment are perfectly balanced – nor for sustained cooperation over freshwater resources. The implication thus is that society will continue to battle the socio-economic impacts of water scarcity and will have to contend with the fact

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[84] See Chapter 2, paragraph 4.
[85] See Chapter 6, paragraph 2.2.

that current technocentric and managerialist approaches to water scarcity may not be able to prevent heightened and more frequent tension over scarce water resources.

Conclusion 2

The emphasis on political sovereignty in policy is inconsistent with the international commitment to cooperation over freshwater resources

At the political level, environmental issues, such as water, scarcity have certainly gained prominence as elements that may, in future, decrease international political security. With this in mind, cooperation over water has, since the 1970s, been emphasised extensively in the international arena. Thus, ideas such as transboundary cooperation and stakeholder participation have been imbedded in the current international policy framework. However, the current international political system continues to function within a realist political mindset, one that emphasises sovereignty, the protection of national self-interests, and the positioning of oneself strategically in relation to other sovereign entities[86]. This mindset is epitomised by the safeguarding of sovereignty in international and regional policy documents with regard to shared water resources. Key-informant interviews further revealed that nations in Southern Africa regard the protection of self-interests as paramount, which often forms an important point of departure in agreements with neighbours over shared water resources. Even in forums where larger basin-wide issues should take precedence in decision making, representatives tend to revert to protecting sovereign self-interests where water is concerned. This was pointed out with regard to, among others, the Zambezi River, the Incomati River and the Jordan River[87]. The emphasis on sovereignty may thus be counterproductive to the implementation of more integrated cooperative political relations over fresh water in both the global and the regional socio-political systems. Countries are not, within the underlying realist paradigm, able to steer clear of political self-interests – even where the forums for closer cooperation are established and functioning[88].

Water, within this realist technocentric socio-political paradigm, is moreover viewed as a strategic resource and therefore, within this mindset, controlling it creates a context of water security for sovereign states. Consequently, at present cooperation can only take place to the

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[86] See Chapter 3, paragraph 3.2 and Chapter 6, paragraph 2.
[87] See Chapter 6, paragraph 2.1.
[88] These forums for cooperation are, for example river basin commissions and joint water commissions.

extent that the strategic value of the resource for a particular nation, in terms of political and socio-economic development, is not affected. Where nations are offered the opportunity for cooperation, their ability to do so is hampered by their desire to protect national interest – thus representatives from sovereign states will, as was pointed out, not discuss certain issues while in an official discussion, but may later state that they were constrained from doing so[89]. The emphasis placed on strategic position is therefore not conducive to long-term cooperation over freshwater resources, and may even lead to tension in the international arena.

Nations in Southern Africa assign much importance to sovereignty because of the struggle for independence from colonial powers that these nations experienced. In addition, nations have an inherent sense of mistrust towards other nations. Therefore, the political context has fostered a mindset in which sovereignty is perceived to be very important and where trust between states is somewhat fragile. This context, where sovereignty is valued, and where there is a subtle degree of mistrust of neighbours, creates an optimal environment for subtle tensions to surface in the structures that facilitate cooperation over fresh water.

Political events have a strong influence on cooperation in the water sector. Hence, dynamics similar to those that drive political cooperation will also drive cooperation over water resources. In this regard, especially the dominant position of South Africa within overall regional politics creates a Big Brother mindset that also influences relations over water, as was pointed out specifically in the cases of South Africa's relationship with Lesotho, Swaziland and Mozambique[90]. However, the existing power balance in Southern Africa is not likely to change in the near future, and relations over water will inevitably have to evolve within this realist-orientated political context.

Thus, in spite of current international and regional instruments designed to foster a greater sense of unity and integration among sovereign states, it would appear that sovereign political and economic self-interests continue to determine the extent to which cooperation between states over fresh water is and can be sustained in the long term. If water scarcity increases, as it most likely will[91], there is a great danger that states will consider their own

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[89] See Chapter 6, paragraph 2.2.
[90] See Chapter 6, paragraph 2.2
[91] See Chapter 1, paragraph 2.

self-interests above those of other stakeholders in both the regional and the international political systems. Therefore, while there seems to be serious commitment to the idea of transboundary cooperation in policy, this commitment is, in practice, difficult to fulfil, given the underlying realist paradigm that constrains greater cooperation and integration between states.

Conclusion 3

The policy obligation of equitable distribution of water between sectors and states is hampered by unresolved tensions in policy and institutional frameworks

A technocentric/ Cornucopian approach to water issues views the problems with the equitable distribution of water as a problem of mismanagement – thus equitability can be restored if water is managed better and if better economic control is applied to the distribution of water resources[92]. However, in practice this approach does not seem conducive to long-term cooperative relationships over water.

As was discussed in Chapter 4, low levels of socio-economic development and vulnerability to water scarcity often converge[93]. Furthermore, countries ranking low on the HDI are disproportionately found in areas that suffer from hydrological water scarcity and these nations experience subsequent challenges in achieving higher levels of socio-economic development. As a result, a context characterised by socio-economic insecurity is created, which is conducive to the spread of tension and intergroup competition over scarce water resources.

Furthermore, the realities of growing water scarcity in the face of the combined effects of climate change, demographic challenges, increased economic development and increasing improvements in standards of living will continue to place pressure on countries to deliver on the concomitant demands in Southern Africa. Demographic and socio-economic trends therefore not only have implications for human security, developmental prospects and overall social stability, but also for water resource availability and utilisation. These challenges, combined with a lack of incentives for water conservation and demand

[92] See Chapter 6, paragraph 3.1.
[93] See Chapter 4, paragraph 7.

management, will prompt countries to continuously to seek to expand their supply of water, possibly at the expense of other nations, as the situation between Mozambique, South Africa and Swaziland indicates. As was also pointed out, water availability is a potentially limiting factor to future economic growth. As a result, nations may rather protect their own socio-economic interests than to yield to the water demands of their less developed neighbours. From key-informant interviews it would appear that nations revert to protecting their own economic self-interests when the issue of water sharing has to be weighed against national socio-economic challenges. Thus, existing policy and institutional mechanisms may be inadequate to resolve regional tension emanating from national socio-economic development challenges[94]. Thus, existing policy and institutional mechanisms may be inadequate to resolve regional tension emanating from national socio-economic development challenges. Future international and regional policy developments may be constrained by a lack of participation from nations with vested interests in placing their own needs above those of larger regional and international concerns[95].

In Southern Africa, all nations have at least ratified the SADC (Revised) Protocol. There is thus a platform for greater cooperation over freshwater resources. Yet, issues over equitable distribution do surface in Southern Africa, despite provisions being laid out in the Protocol. Key-informant interviews revealed issues such as, for example, how to get South Africa who need water for her own socio-economic development needs, to forego such needs in favour of the greater regional benefit and to do so without some degree of conflict[96]. Thus, while equitable distribution is entrenched in international policy, this is, for the foreseeable future at least, possibly going to remain an unenforceable ideal in practice.

At the regional level this transpires with the more developed countries benefiting greatly from existing water-sharing agreements and moreover succeeding in securing water for further socio-economic advancement, yet with limited regard for the needs of their economically less advanced neighbours. A case in point: South Africa's dominant political and economic position in the regional political system does not necessarily translate into equitable sharing of water resources with neighbours. This unbalanced political power relationship is also evident in the agreement between South Africa and Lesotho, where

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[94] See Chapter 6, paragraphs 3.2.1 and 3.2.3.
[95] See Chapter 6, paragraph 3.2.3.
[96] See Chapter 6, paragraph 3.2.3.

informants pointed out that Lesotho did not have much choice in whether to enter into an agreement or not. South Africa, Namibia, Botswana and, until recently, Zimbabwe have all managed to secure access to water from less developed neighbours through water-sharing agreements. Mozambique, for instance, does not have much bargaining power for better water allocation, while a country like South Africa is able to secure access to a large volume of water through different economically structured agreements.

At ground level the poor and the vulnerable are often disadvantaged in terms of access to water: urban dwellers have to pay for water and must therefore compete for the resources in an open economic market that does not protect their interests[97]. Since water is a tradable resource in Southern Africa, some people and communities are not receiving equitable access or benefits that supposedly emanate from agreements – contrary to the provisions in international and regional policy that safeguard access to the poor and the vulnerable. In light of the emphasis on economic principles to guide water resource distribution, profit often takes precedence in the allocation of water and in the quest to secure equitable distribution while the poor and the vulnerable are often left without access as a result of an inability to pay for water.

While international and regional policy frameworks attempt to dissolve tension between sectors by emphasising that vital human needs should have priority in the allocation of water resources, this is not the case in practice. As a result, people on the ground, particularly the poor and vulnerable, are left without the benefits of water-sharing agreements and with a sense of dissatisfaction that leads to underlying tension between these people and those who control access to this scarce resource.

Furthermore, as already pointed out, there is a gap in the understanding of people in different sectors – such as the economic – concerning the importance and underlying dynamics of water issues[98]. One of the problems in terms of policy and institutional development therefore is to bring different sectors to a place of joint decision making where everybody understands how water can more effectively be distributed to the benefit of the poor and the vulnerable, while also at the same time serving the need for ecosystem preservation.

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[97] See Chapter 6, paragraph 3.2.3.
[98] See Chapter 6, paragraph 3.2.3.

Benefit-sharing was discussed as a mechanism for alleviating scarcity and could potentially free up water for ecosystem protection while also securing the more equitable distribution of water resources. However, in a context where national self-interests and socio-economic challenges strain the development and functioning of institutions aiming to promote equitability and the better allocation of scarce water resources, benefit-sharing could also become a point of contention between states. Tensions arise particularly over the perceived cost-benefit contribution by states in managing shared water resources, where the economic costs of ecosystem preservation may fall disproportionately on one or more nations. On the other hand, benefits are disproportionately reaped by nations who do not contribute to the sharing of costs towards ecosystem preservation. This tension is further exacerbated by the inherent tensions associated with sovereignty and the protection of national self-interests in dealing with water. These tensions do, in certain cases, prevent agreements from being operationalised and thus strain institutional developments and cooperation between countries. Subsequently, coordination – between the different demands from these institutions and between sectors – often leads to tensions that spill over into larger structures dealing with water resources. Ultimately, if these tensions remain unresolved, this situation could spill over into more widespread and serious conflicts between states in the international arena.

Conclusion 4:

As a result of the vagueness with which contentious issues are addressed in international policy, current policy options may neither be able to adequately intervene in nor to prevent conflicts over fresh water

Current international and regional conventions are characterised by vague statements with regard to obligations and rights to the extent that these become difficult to enforce when a scenario of conflict requires their enforcement. It is unfortunate that policy has to be agreed upon based on the lowest common denominators or on vague and unspecific terms in order to attract more signatories[99]. This results in policy that often misses its projected outcomes. Vague policy statements also contribute to the problem of a lack of enforcement of international treaties.

Marrying the *rights* of states to utilise and develop resources with the *obligation* to not cause harm to other states – as set out in policy – in such a way that it takes the needs of other states into consideration, is hampered by the current vague and ambiguous way in which international policy frameworks are formulated. The UN Convention states that cooperation over fresh water between states must take place in good faith, with regard to mutual benefits, and to obtain optimal benefits from the use of the resource, while also providing adequate protection of the shared watercourse[100]. These and other rights and obligations are also set out in customary international law and in the SADC (Revised) Protocol, but, in practice, states can easily revert to protecting their own interests without regard for the obligations set out, since these obligations leave ample room for interpretation. For example, the UN Convention does not adequately address issues such as the allocation of water for economic pursuits in the face of vital human needs, since the concept *'vital human need'* is not adequately demarcated, while other concepts – such as *'optimal use'* of water resources – are equally poorly defined[101]. Therefore, this Convention may neither be able to intervene adequately in nor to prevent international conflicts over freshwater resources because there is too much in this instrument that is not clearly defined and thus open to interpretation by states involved

[99] See Chapter 5, paragraph 5.
[100] See Chapter 5, paragraph 5.2
[101] See Chapter 6, paragraph 3.2.3.

in a dispute. There are also inherent contradictions in the view of water as a resource with economic value and in the equitable use of the resource for greater social good, which also includes vital human needs. Ultimately, this does not benefit the poor and the vulnerable since economic interests still carry more weight. Future negotiations over the allocation of water towards different sectors may become problematic as a result of the vagueness with which issues are addressed in the international policy framework. Furthermore, the international policy framework forms the basis for any agreements over water between states and, these contradictions and vague formulation are transferred to bilateral and multilateral agreements over water. This complicates enforcement of international policy, legislation and treaties.

Conclusion 5:

The lack of both ratification and enforcement of the existing international policy framework renders these instruments powerless in preventing or intervening in future conflicts over fresh water

While a legal and policy framework for cooperation, conflict prevention and intervention between states has emerged, notwithstanding some issues with regard to interpretation as discussed in Conclusion 4, the lack of ratification has rendered these instruments ineffective in preventing and intervening in potential conflicts over fresh water. Furthermore, existing capacity problems complicate the enforcement of current international conventions and bi- and multilateral agreements over water.

In the case of water, it is those nations who perceive that they are disadvantaged by signing and ratifying international conventions who thus do not become signatories. This indicates that these conventions will remain effectively powerless to intervene in international conflicts over fresh water. Here, protecting national self-interests is again proven to be the main factor in influencing decisions on whether to cooperate over water or not to cooperate in the international arena. Those states who voted against the UN Convention were all significant actors in three of the world's major water basins (Nile Mekong, Tigris/Euphrates) and were all planning some major developments within their borders that could affect states downstream. There is thus no enforcement of agreements or conventions on countries that have in principle agreed, but have not actually formally ratified such agreements.

The current legislative framework has, furthermore, failed to yield the desired outcome in a number of cases where there were conflicts over water. It is therefore uncertain whether these legislative provisions in the international arena will be successful in future. If the principles of international law could be enforced more effectively this would serve to prevent and intervene in conflicts over water. However, since the adherence to international law is largely voluntary, there is very little enforcement capacity.

Secondly, these instruments have not succeeded in resolving some of the more contentious issues with regard to shared water resources, such as securing the rights of less powerful countries to have equitable access to water. This is because these instruments are not legally binding on states. The SADC (Revised) Protocol at least provides a mechanism that is mutually sustainable and acceptable for negotiating the peaceful use of shared water. The situation in Southern Africa does indicate an overall commitment to cooperation by states, since the Revised Protocol has been ratified by all the SADC states. Therefore, in the Southern African region, at least, there is a ratified mechanism to guide and intervene in relationships over water. However, this Protocol and mechanisms for conflict resolution were not able to mediate effectively between Botswana and Namibia with regard to their water dispute and this dispute had subsequently to be mediated at a higher level. Crisis situations such as these, and others such as severe droughts, will ultimately test the ability of the SADC (Revised) Protocol to intervene effectively and prevent conflict over fresh water resources. Many agreements over the sharing of freshwater resources exist within the bounds of the SADC Protocol, although it is uncertain whether these agreements will hold in the face of high levels of human insecurity and rising tensions over access to scarce water resources. Moreover, as a result of capacity constraints within the SADC, as pointed out earlier there are still internal institutional issues that need to be resolved before these institutions can effectively facilitate cooperation over fresh water in the regional sector[102].

In some countries capacity constraints resulting from weak political structures make it more difficult to maintain institutional linkages. As will be discussed in Conclusion 6, countries are not necessarily all functioning equally with regard to the implementation of institutional mandates and roles. Furthermore, joint management structures are complicated by the fact that different countries are at different levels of economic development, infrastructural

[102] See Chapter 5, paragraph 6.2.

capacity, and political orientation. For example, as a result of the current political constraints in Zimbabwe, their institutions are not able to function effectively, thereby also constraining linkages between institutions in the water sector. However, integration of management across sectors is important because addressing water scarcity demands intersectoral and multidisciplinary approaches to water-resource management. Some water-resource institutions that have been created within the bounds of recent international and regional policy developments are young and are still dealing with challenges. This decreases their capacity to deal effectively with current and future challenges.

Conclusion 6

Effective cooperation between water-resource institutions is hampered by significant shortcomings in vertical and horizontal communication linkages between such institutions

The emphasis on the transboundary management of freshwater resources in the policy arena has facilitated the development and transition of various institutional arrangements from the regional to the local level. At the international level, the development of institutions – such as UNWater – as vehicles through which cooperation over freshwater resources can be facilitated and, more importantly, a legislative framework can be further developed, is particularly significant in dealing with relationships over water. Regional developments such as the SADC Protocol, and the subsequent establishment of the SADC Water Sector in line with this Protocol, are instrumental in providing a regional vehicle through which cooperation over shared water resources can take place. However, the development of these institutions is often accompanied by subtle tensions between the institutions involved and the goals that such institutions aspire to achieve. In this regard, Meinzen-Dick & Bruns (2000: 24) succinctly point out that *"conflicting claims challenge the social institutions which mediate access to water"*. Furthermore, poorly developed institutional linkages prevent these conflicting claims from being communicated and dealt with, thereby causing tension and conflict in institutional structures.

The IWRM framework has gained considerable recognition as a vehicle through which water resources can be managed more effectively between not only sectors, but also between states. IWRM is an integral component in averting potential tension over fresh water, since it

increases security over water and also overall human security (Right to Water 2003: 3). However, for closer regional integration to materialise, a high degree of political stability and a commitment to negotiating outcomes that are beneficial to all stakeholders is required. However, issues of particularly sovereignty interfere with the achievement of this goal. Sovereignty of states in decision making is recognised by the SADC, but this becomes inconsistent with the premium placed on closer regional integration. To overcome this dilemma, and to facilitate closer regional integration in the water sector decentralisation has begun to be implemented through the framework provided by IWRM.

Undoubtedly, embracing this approach has implications for policy formulation as well as the formation and transformation of institutions managing water resources at all levels of management. IWRM assumes that there is integration in the management of water resources through appropriate institutional structures that link stakeholders vertically in a regional and international context, but also horizontally between decentralised transboundary institutions, such as catchment management agencies.

Though for decentralisation to function effectively, there need to be well-functioning institutional linkages – vertically and horizontally – within the institutional framework. The water sector in Southern Africa has developed and evolved to the extent that there are now appropriate institutional structures at all tiers of governance, through which effective communication can take place. However, an important issue is to determine how integration will progress in the light of the fact that institutions have been created and stakeholders, at least theoretically, have established their roles and mandates.

With regard to vertical institutional linkages there appear to be effective institutional arrangements to facilitate vertical communication. Key-informant interviews revealed that clear hierarchical institutional structures exist through which communication can take place from, for example, the lowest institutional levels – such as WUAs to JWCs. Linking institutions with regard to mandates, roles and capacity at the lower institutional levels, for example between local authorities and CMAs was, however, pointed out to be challenging. When communication at these levels fails, tension may filter through to higher institutional levels, as in, for example, tension between commercial and emerging farmers, which has the potential to spill over into higher institutional structures. Institutional linkages also have a political dimension, particularly in respect of communicating across sectors.

As was pointed out in Chapter 6, what has been agreed to at the political level has to be implemented in institutional structures created specifically for this purpose. However, there is often a significant gap between expectations with regard to policy and the feasibility of this at the implementation level. Furthermore, a lack of effective communication from the water sector to, for example, the political sector can potentially contribute to conflict. As was pointed out, politicians are often optimistic and expect a rapid progression from planning to the implementation of agreements, even though this is not really feasible at the ground level. This latter reality leaves those on the ground with a sense of dissatisfaction and mistrust towards the implementing authorities[103].

Horizontal communication appears to be less well developed, with a major limitation being that similar institutions in different countries do not have similar mandates, roles, or capacities. The need was therefore expressed by key informants that horizontal communication linkages between similar institutions in different countries should be developed and that these would link up vertically with existing institutions[104]. Thus, communication through the horizontal and vertical governance avenues present a significant challenge, and it contributes to subtle tensions that filter through from one level of governance to the next.

In short: although there is a policy framework on paper to facilitate cooperation, a gap still exists between the intended purposes and outcomes of this framework.

3. Recommendations

With regard to recommendations, it must be stated that there have, to the present, been major developments to deal with the issue of water scarcity. At the international level, numerous policy developments have taken place in the past 40 years, all of these indicating that society is, firstly, aware of and, secondly, adequately concerned about the issue to deal with it through a policy and institutional framework. These recommendations therefore take into consideration the progress that has been made with regard to cooperation over freshwater resources. However, as was pointed out in the above conclusions, there are currently some important challenges that need to be addressed if the current progress is to

[103] See Chapter 6, paragraph 2.1
[104] See Chapter 5, paragraph 4.3 and Chapter 6, paragraph 2.3.

be maintained and if a socio-political crisis with regard to future cooperation is to be averted. The above conclusions, therefore, inform the following recommendations.

Recommendation 1

A transition needs to be made *from* a technocentric approach focused on managing the issues arising from water scarcity, *to* an ecocentric approach focused on radical changes in policy formulation

Policy needs to be steered from focusing on the **mere management** of problems arising from the issue of water scarcity, and should thus focus more clearly on **providing long-term solutions** to dealing with the issue. Technological solutions may extend the available water for the near future, while current policy provision may likewise be adequate to deal with water issues arising from the existing environmental and socio-political landscape. Yet, these solutions and policy provisions may not suffice in a future context of increased scarcity and the associated social dynamics. To prevent a scenario of water scarcity and resultant conflict, a radical, socio-environmental approach to policy is called for. From a current societal perspective it is sensible to continue to promote management-orientated strategies that reduce the demand for water and increase water-use efficiency, while continuously working toward more fundamental policy changes.

While this shift in policy is to a certain extent based on a shift in societal paradigm, those in decision-making positions have a responsibility to formulate policy in a way that promotes and supports a new societal direction. In this regard, there have been calls for a radical, new approach to policy, which is able to meet the needs of society while simultaneously protecting the ecosystem (Postel 2002; Rosegrant 1995). This radical policy direction is, however, impossible if the underlying social paradigm does not support concomitant policy changes. Therefore, an overall shift in policy – away from technocentric managerial options to an ecocentric approach – needs to be considered to deal with the future water issues that society may have to face.

Recommendation 2

Conceptualise current vague statements and terms in the international policy framework more clearly

International instruments such as the UN Convention and the SADC (Revised) Protocol can only effectively prevent and intervene in conflicts over fresh water if there is a well-demarcated conceptualisation of terms and statements in these policy documents. This does not imply that the current international policy instruments should in their entirety be changed. It would, however, aid in the enforcement of these instruments if there were a clear, well-demarcated conceptualisation of vague statements and terms. This needs to be achieved through a process of sufficient and comprehensive participation within existing multi-stakeholder platforms.

Recommendation 3

Policy makers at the regional and national levels should specifically work toward diffusing subtle tensions in current policy and institutional arrangements through the closer integration of sectoral policies

It is imperative that policy should incorporate the integration of management across different water-user sectors. Although progress has been made in this regard, water needs, to an even greater extent, be managed by taking into account integration at various sectoral levels. Ultimately, if a closer integration of policy does not materialise, it reduces access to water for the vulnerable sectors of society, which, in turn, leads to conflict over access to water.

In this regard there currently is intellectual appreciation and comprehension of the importance of vital human needs, firstly, to achieve higher levels of human security and, secondly, to prevent conflict over access to fresh water. However, the importance of providing water for vital human needs seems to be lost in the quest to apply economic market-driven principles to water. Therefore, it is necessary to particularly align policies on socio-economic development with the environmental realities of water scarcity and also to align the preservation of aquatic ecosystems with policies to increase economic development

at the regional level. Ultimately, the answer to dealing with water scarcity in Southern Africa lies in an integrated approach to policy and practice, one that addresses not only the managerial side of water, but also the demographic, socio-developmental and socio-political challenges that form part of the Southern African context.

Recommendation 4

Strengthen a regional perspective on the issues of water scarcity, conflict and cooperation over fresh water

To maintain cooperative relationships over water, the regional perspective on the issues of water scarcity, conflict and cooperation needs to be strengthened. Therefore, there has to be progress at the regional level towards closer regional harmonisation with regard to water – resource policy and management, and increased commitment from sovereign states with regard to putting regional security above their own interests. In this regard, decision making in terms of the sharing of water resources needs to adopt a framework where attention is diverted from purely national interests to regional interests. Therefore, in view of the more sophisticated international order proposed by Woods (2000: 388), regional and international concerns are to be prioritised over and above national concerns, so that water-policy reform can transcend national boundaries as proposed by Rosegrant (1995:4).

An important step in this direction is to persuade countries to adhere formally to international principles of law, and international policy frameworks. Regional integration is strengthened when there is a large-scale formal ratification of existing policy instruments. In this regard, SADC has an important role to play in actively holding states accountable to their commitment with regard to the SADC (Revised) Protocol. Charrier & Curtin (2000: 14) believe that, by formally adhering to international principles, feelings of insecurity are removed and therefore closer cooperation between states is made possible.

It is wise to guard against the domination, in the regional context, of the institutional environment by powerful states. To achieve the equal participation of stakeholders at all levels and to build greater institutional capacity at the regional level, it is essential to ensure that all role players and stakeholders' voices are heard and that no country dominates the institutional environment within a regional setting. This is essential in preventing tensions between institutions from developing into situations of conflict.

A further issue with regard to regional integration is to find means to expand current bilateral agreements over water to become multilateral agreements that include all nations. Working towards greater participation of stakeholders is, in this sense, a major challenge to be confronted with regard to greater cooperation and integration within the current institutional context. Pursuing wider collaboration through water-sharing agreements will truly reflect the commitment of countries to IWRM, and it will further serve to remove feelings of mistrust and tension over shared water resources, both globally and in Southern Africa.

Recommendation 5

Find appropriate mechanisms to link institutions horizontally, so as to bring them in line with the IWRM strategy's emphasis on decentralisation

With regard to vertical linkages, effective, open and non-bureaucratic communication procedures need to be established between different levels of decision making[105]. These communication procedures should be structured in such a way that they communicate contentious issues from the ground to higher structures, without diluting or misrepresenting the issues. This removes feelings of dissatisfaction from those on the ground because their voices are being heard and their faith in the ability of the system to deal with identified issues is strengthened. Thus, strengthening vertical institutional linkages may prevent tension from spilling over into higher international institutional structures.

In respect of horizontal linkages, it is necessary that the mandates and capacity of regional institutions to fulfil a larger and more integrative role in terms of policy development and implementation be strengthened. As has been pointed out, there is currently a reasonably solid institutional environment for effecting cooperative relationships over water can take place. However, especially at the regional level – and specifically within the SADC – but also with regard to regional partnerships such as the GWP-SA, there needs to be a mandate to fulfil an expanded role to implement cooperation practically in the regional sense. However, international, regional and national enforcement capacity backed by political will is necessary to achieve this change. At present this capacity unfortunately still needs to be developed.

[105] See Chapter 6, paragraph 2.1

Recommendation 6

Strengthen the capacity and functioning of multistakeholder platforms in the water sector

As part of the integration of policy, the current gaps between expectations and implementation need to be closed by aligning the expectations of various sectors with the practical feasibility of these expectations in the water-management sector. Providing suitable forums, where people from different sectors are able to converse in an environment founded on the principles of equal participation, is important in closing these gaps in understanding between sectors. Therefore, multistakeholder platforms need to be developed and must actively work to attract stakeholders from all sectors – economic, political, development, private enterprise, agriculture, environment, etc. The GWP is currently leading the way in providing just such a platform; however, it has been pointed out that a limitation to the success of these forums is the fact that these forums largely attract sectors with a direct stake in water, while other sectors however also need to be brought on board.

4. Summary

In summary, the results of this study lead to the conclusion that, while there are currently no indications of overt armed political conflict over freshwater resources globally and more specifically in the Southern African region, some subtle tensions arising from the policy and institutional framework exist that may in future well lead to more serious conflict, among which may be more aggressive forms of political conflict.

In terms of the objectives of the study it is concluded with respect to objective 4.1[106] that the dominant socio-political paradigms underlying decision making over shared resources, such as water, do not support closer cooperation over fresh water, with main issues being that the current political emphasis on sovereignty is inconsistent with the international commitment to closer cooperation over freshwater resources, while the emphasis on management and technological advancement are not conducive to long-term solutions. Furthermore, with regard to objective 4.2 it was also concluded firstly that some unresolved tensions in the policy and institutional framework are hampering the fulfilment of the international policy

[106] With regard to this and other objectives discussed in the Summary, refer to Chapter 1, paragraph 3.

obligation of equitable distribution and, secondly the vagueness with which contentious issues are addressed in the current policy framework renders this framework powerless in dealing with conflicts over water, the problem being compounded by a lack of ratification and enforcement of the existing international policy framework. Lastly, with regard to objective 4.3 it is concluded that significant shortcomings exist in the vertical and horizontal communication linkages between institutions that are not conducive to effective cooperation.

In meeting objective 4.4 of the study, the first recommendation arising from these conclusions is that a transition from technocentric, management-orientated policy options be made to adopt a more radical overhaul of existing policy. Secondly, it is recommended that attention be devoted to a clearer conceptualisation of current vague statements and terms in the international policy framework. The third recommendation emanating from the study is that subtle tensions in the existing policy framework be dealt with by means of the closer integration of sectoral policies. Fourthly it is recommended that a regional perspective on water scarcity, water conflict and cooperation over fresh water be strengthened. As a fifth recommendation it is proposed that – in line with the emphasis on decentralisation – appropriate mechanisms to link institutions horizontally be found. A final recommendation is that the capacity and functioning of multistakeholder platforms, as a vehicle to facilitate cooperation across sectors, be strengthened.

5. Directions of future research

From the study the following needs in terms of research are identified:

- Research that contributes to laying a solid theoretical foundation from which the relationship between population dynamics, environmental issues and development issues with regard to water can be pursued
- Research into the practical implementation of decentralisation as a policy option in the water sector, with specific attention being devoted to the Southern African context
- Research into the detailed dynamics of horizontal linkages between the various institutions in the water sector

- Research on the demarcation and practical application and implementation of benefit-sharing as a means to facilitate cooperation over freshwater resources.

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Annexure A

Interview schedule

- Population issues (demographics) as feature of water resource management decisions?
- Challenges with regard to access, distribution among different users of water?
- Development pressures impacting on water resources in the future?
- Are there any large scale development projects (in this river basin/ in the region) that will require further negotiation or changes in institutions?
- Where are the potential challenges with regard to water resource management that you foresee in future?
- How do you believe these challenges will be addressed within the current institutional and policy framework?
- What changes will need to be undertaken in the institutional structures and policy framework to accommodate changes
- Catchment management approaches require the formation of institutional structures to promote empowerment of participants and participation of stakeholders - elaboration.
- Goldin (2002: 387) states that the most pressing need in the water sector in many developing countries is to increase capacity and extend networks. I want to discuss this with reference to the South African situation
- Explain the institutional structure with regard to specific organisation/ institution being interviewed. Determine level at which decision making takes place.
- Discuss stakeholders with regard to water from the perspective of the particular institution

Functioning of institutions and agreements

- Explanation of current agreements in terms of the way in which they are operationalised and functioning.
- Discuss challenges with drafting and implementing these agreements?
- Limitations to agreements: What should have been included in them; What aspects that were not addressed should be incorporated in future agreements?

- How do these agreements link with national, regional and international policy frameworks regarding environmental sustainability, population, development and resource management?
- Nature of the institutions – implementing agencies, government dept etc involved
- Are the particular institutions dealing with water resources private companies?
- How do they get their funding?
- How do they link with national water resource agencies/ departments?

Conflict intervention and prevention

- Measures to deal with potential sources of conflict – policy and institutions?
- Diplomatic relations, formal or informal agreements?
- What is the institutional capacity in SA and neighbours to deal with water scarcity? (Skill levels, policy frameworks, capacity to implement policy)?
- How does the differences in capacity between nations influence relations over water in the region
- How do the different needs of countries in the region affect relations over water?

- **International cooperation**
- Discuss nature and extent of the international community as a roleplayer in dealing with conflict and cooperation in Southern Africa?
- Mandates and functions of coordinating bodies with regard to fresh water in Southern Africa as a whole and in different countries apart from the SADC.

- **SADC**
- What is the extent of participation among major groups in decision making in Southern African countries with regard to water?
- There is a definite need for transboundary institutional cooperation to deal with the management of transboundary water resources. This is particularly crucial in preventing and dealing with conflict over shared water resources. For this to happen, it is important that institutions and countries have a mutually agreed framework of

criteria and agreements as a basis for decisions regarding shared water resources. Is the current framework adequate in terms of rights, obligations and enforcement?

- Discuss SADC as roleplayer in the water sector
- Discuss extend and nature of cooperation over water among SADC countries
- There is an issue in international politics over states feeling their sovereignty is threatened by stronger regional cooperation. How does this transpire in regional politics with regard to water?
- What are the challenges with regard to regional cooperation over water in Southern Africa?
- What potential sources of conflict/ instability exist in the region and
- Which factors drive this conflict/ instability (environmental, developmental, economic, socio-cultural)?
- One threat identified is the lack of long term planning in current arrangements such as the SADC Protocol. What is your views on this?