# Environmental Conflicts: The case of the Nile River Basin


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# ABSTRACT AND KEY WORDS

## KEY WORDS

Africa

African Union

Conflict

Downstream Riparian Countries

Environmental scarcity

Nile Basin Initiative

Nile River Basin

Upstream Riparian Countries

## ABSTRACT

By the end of the 20th century and the beginning of the 21st century, the realm of IR was characterised by resource geopolitics (i.e. the potential of conflict as a result of the scarcity of vital resources that cross political boundaries). There is a growing significant threat posed by environmental conflicts. Disputes and tensions over shared renewable resources such as water have become prominent in the realm of IR. Shared water resources (i.e. basins, rivers and lakes) have become hotspots for conflict. The fact that basins and rivers move across rather than along borders have made conflict inevitable and solutions to water sharing complex.

The idea laid by early scholars in explaining the link between the environment and conflict was speculative and imprecise, hence the need for a theory that addresses this linkage. The study borrows extensively from Homer-Dixon's environmental scarcities theory to address the inevitability of conflict over the Nile waters. The hypothesis behind the environmental scarcity theory is that "resource scarcity, through the three causal forms of scarcity (i.e. demand-induced, supply-induced, and structural-induced scarcity), have the potential to cause conflict." The study argues that, given the reduced outputs due to population growth, degradation and depletion of the Nile and its uneven distribution, the fierce competition over the already finite water resources increases the potential for an inter-riparian conflict in the Nile basin.

Recommendations include the need for institutional support structures for the possible management, sustainability and use of the Nile. The study places emphasis on the AU and the NBI as possible mechanisms to address these issues. Alongside pursuing a sustainable inter-riparian solution to resolve the Nile water dispute, both the AU and the NBI should consider addressing the Nile water agreements in conjunction with rising population growth and the degradation and depletion of the Nile.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| ADB | African Development Bank |
| AU | African Union |
| BBC | British Broadcasting Corporation |
| BCM | billion cubic meters |
| BCM/yr | billion cubic meters per year |
| CBM | cubic meters |
| CBM/pp | cubic meters per person |
| CBM/yr | cubic meters per year |
| CFA | Cooperative Framework Agreement |
| CIDA | Canadian International Development Agency |
| COIS | Country of Origin Information Service |
| DRC | Democratic Republic of Congo |
| EAC | East African Community |
| EEPCO | Ethiopian Electric Power Corporation |
| EIB | European Investment Bank |
| FDI | foreign direct investment |
| GDP | gross domestic product |
| GERD | Grand Ethiopian Renaissance Dam |
| ha | Hectares |
| ICBC | The Industrial and Commercial Bank of China |
| ICJ | International Court of Justice |
| IMF | International Monetary Fund |
| IR | international relations |
| LVBC | Lake Victoria Basin Commission |
| LVEMP | Lake Victoria Environmental Management Project |

| | |
|---|---|
| MM/yr | millimetres per year |
| MWe | megawatts of electricity |
| NBI | Nile Basin Initiative |
| NEPAD | New Partnership for Africa's Development |
| Nile-COM | The Council of Ministers of Water Affairs of the Nile Basin States |
| Nile-TAC | Nile Technical Advisory Committee |
| NRB | Nile River Basin |
| NRBAP | Nile River Basin Action Plan |
| NRBC or NBC | Nile River Basin Commission |
| OAU | Organisation of African Unity |
| PSC | Peace and Security Council |
| SPLA | Sudanese People's Liberation Army |
| TECCONILE | Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile Basin |
| UK | United Kingdom |
| UN | United Nations |
| UNDESA | United Nations Department of Economic and Social Affairs |
| UNDP | United Nations Development Program |
| UNECA | United Nations Economic Commission for Africa |
| UNEP | United Nations Environmental Program |
| UNPD | United Nations Population Division |
| USA OR US | United States of America |
| WB | World Bank |

# CHAPTER 1: INTRODUCTION

## 1.1 Orientation and background

The 21st century is confronted by the challenge of resource scarcity. Valuable resources exist, but in relatively small amounts (Klare, 2002:142), and their degradation is commonly believed to be a significant cause of environmental conflicts (Libiszewski, 1992:14). According to Libiszewski (1992:14), environmental conflicts are traditional conflicts induced by environmental degradation, and are often manifest as conflicts over resources. These resources include water and agricultural land, and an ever-widening list of categories ranging from minerals to oil.

The contention that resource scarcity will lead to violent conflict has been, and remains, central to environmental security both domestically and internationally (Barnett, 2000:271). Many social scientists argue that world conflicts have been characterised by resources of one kind or the other (Bujra, 2002:14). Resources as the cause of conflict, therefore, came under the scrutiny of academics, conflict analysts and media outlets for their influence in many contemporary wars (Le Billion, 2008:345).

Mathews (1989:162) asserts that resource-based conflicts have become a major concern to international peace and security when the concept of security is expanded to include environmental security. According to Le Billion (2000:22), a resource war is "… *an armed conflict waged to control valuable natural resources.*" The causes, implications and results of these conflicts are traditional concerns of international relations (IR) (Barnett, 2000:272).

IR is experiencing a new landscape of global conflict as far as resources are concerned, with water scarcity contributing to the intensity of competition over resources (Bujra, 2002:11). As the demand for this fundamental and essential natural resource increases (Ashton, 2002:1), water has come to be treated like oil and its protection is being insured through a militaristic defence (WalesOnline, 2012). At the heart of global environmental politics lies the issue of water wars, which has

become part of the political rhetoric (Toset *et al*, 2000:972). According to Turton (2000a:36), a water war is"… *a war caused by the desire for access to water, in which the scarcity of water determines the means to go to war.*"

Tulloch (2009) asserts that, "… *the term itself refers to conflict between countries, states, or groups over access to water resources, and such conflicts come as a result of opposing interests of water users, public or private.*" As unlikely as it seems for water to be the source of conflict, however, it bears many similarities to oil. It is essential for a wide range of human activities and it exists in relatively small amounts (Klare, 2002:142).

According to Toset *et al* (2000:972), the scarcity of water, especially in Africa, makes it an important subject for study as it threatens every aspect of human life. Therefore, any threat pertaining to accessing water may lead to people and/or countries preserving and even fighting for water. Such behaviour will result mostly from a country heavily dependent on river water for its economic development.

The Nile River Basin (NRB) plays a central role in the conflict over water. This study focuses on the NRB due to its volatility and proximity. The Nile is an international river shared by eleven riparian countries. These are Burundi, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, the Democratic Republic of the Congo (DRC), Sudan and the newly founded South Sudan. This makes it the world's longest river at about 6,700km or 4,100 miles (Kameri-Mbote, 2007:1) (see map 1).

The Nile flows across and around all eleven riparian countries, making them highly dependent on its water (Alcamo *et al*, 1996:336). These riparian countries can be divided into upstream (i.e. Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Tanzania, Uganda and the DRC) and downstream countries (i.e. Egypt and Sudan) (Marterns, 2011:1).

***Map 1: Map of the Nile River Basin (NRB) (Zaki, 2014)***


According to Kieyah (2007:2), *"The Nile Basin faces considerable challenges. These challenges include water scarcity, poverty, environmental degradation and insecurity.*" The NRB is also challenged by disputes over the unequal use of water between upstream and downstream riparian countries (Jacobs, 2006:13; Solomon, 1996:3). Shinn (2006) argues that the most important of these eleven riparian countries are Egypt and Sudan. The remaining nine riparian countries do not benefit equally from the Nile water. This is the result of two separate agreements: the 1929 Agreements concluded between the Great Britain, Northern Ireland and Egypt, and the 1959 Agreement concluded between Egypt and Sudan.

The 1929 Nile agreements were entitled "*Exchange of notes between His Majesty's government in the United Kingdom and the Egyptian government in regard to the use of the waters of the River Nile for irrigation purposes.*" They were signed on 7 May between Egypt and the United Kingdom, which was the then colonial power of Kenya, Sudan, Tanzania and Uganda. These agreements were a means for both countries to engage in comprehensive large scale control of the Nile water (Kieyah, 2007:7-8). According to Dunoff and Trachtmann (1999:24), the agreements grant

Egypt extensive and monopolistic use of the Nile. They stipulate Egypt's right to use the Nile and a property rule to protect this right. This gave Egypt exclusive propriety rights to the Nile water without obligation, consent or even voluntary transfer of property rights from Egypt to other riparian countries (Kieyah, 2007:19).

The 1959 Nile agreement was entitled "*Agreement between the Republic of the Sudan and the United Arab Republic[1] for the Full Utilization of the Nile Waters".* The 1959 Agreement did not differ much from the 1929 Agreements in that Egypt remained in full control of the Nile water with huge economic benefits and the bonus of hydropower (Allan, 1999:4-5).

In short, both agreements grant Egypt and Sudan the absolute right to use 90 percent of the river's water, leaving the upstream countries to share 10 per cent, which created an unsustainable situation. Upstream countries' developments were impaired as they were forced to either abandon certain projects due to their limited access to water, or to gain approval from Egypt to use the Nile to construct water-related projects (Kameri-Mbote, 2007:3).

Reyskens (2011) asserts that countries become susceptible to conflict if the resource they are dependent on is either threatened or removed. Such inequalities regarding a shared resource makes disputes increasingly heated (Klare, 2002:139). According to Lowi (1995:124), this has created a situation that could lead to an outbreak of war.

Homer-Dixon (1999:139) argues that, for a possible conflict to arise in a shared river basin, the following aspects must hold in a narrow set of circumstances:

- First, the downstream country's national security or survival must depend heavily on the constant flow of river in its direction.
- Second, the attitude of upstream countries must be threatening to the flow of the river.
- Third, the relations between upstream countries and downstream countries must be that of unpleasantness.
- Fourth, the downstream country must be militarily stronger than the upstream countries.

[1]The United Arab Republic (UAR) was founded in 1958 as a political union between Syria and Egypt. It collapsed in 1961.

- Finally, fearing that upstream countries may limit water flow or use water as leverage, the downstream country may use intimidation or direct force.

The NRB, among other shared river basins, provides the best example in which all these conditions hold. Firstly, Egypt is heavily dependent on the water of the Nile; so much so that it has regarded the free flow of the river as a matter of national security (Hadebe, 2013). Secondly, Egypt perceives the construction of dams in Ethiopia, for instance, as a hindrance or threat to the flow of the Nile water (al-Labbad, 2013).

Thirdly, tensions exist between downstream Sudan and Egypt, and upstream Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, the DRC and the recently founded South Sudan, and battle lines have been drawn (Hadebe, 2013). According to Starrs (1991:8), Egypt and Ethiopia share a long history of verbal attacks against one another over the Nile.

Fourthly, Egypt holds absolute control over the running of the NRB and is militarily stronger than the other states, allowing it to dictate the terms and conditions of the basins' use. Egypt controls the region's most powerful military. Finally, fearing that its upstream neighbours will reduce its water supply by constructing dams, Egypt has warned that it is ready to use force to protect its access to the Nile (Simpkins, 2010).

Homer-Dixon's (1999:136-7) environmental scarcity theoretical perspective can be used to identify a possible contemporary conflict in the NRB. The environmental scarcity theory argues that interstate resource wars may ensue where there is a fixed or shrinking pie of natural resources.

## 1.2 Problem statement and research question

River basins and aquifers are shared among several countries with markedly different levels of social, economic and political development and with different levels of need for water. Such disparities make conflict inevitable, and the search for equitable and sustainable solutions to water sharing complex. The Nile is one of Africa's most complex cross-border rivers basins (Ashton, 2002:1). The Nile River's water is limited while the needs of the riparian countries continue to grow, making the potential for conflict very real.

A delicate conflict over the equitable allocation of the Nile's water represents one of the most crucial issues on the African continent. In parts of North-East Africa, politics have been shaped and affected by the Nile, creating a new landscape of global conflict (El-Fadel *et al*, 2003:113). The potential for such a predicted conflict goes beyond ideological, religious and ethnic tensions. Riparian countries' use, or rather the restriction of their use of Nile, has direct implications for their national interests (Adar, 2007:63). For instance, most upstream countries have a limited ability to develop economically and socially, which has resulted in political instability, famine and chronic malnutrition (El-Fadel *et al*, 2003:113).

Confrontations regarding the equitable share of Nile water have unfolded. In April 2010, negotiations between the eleven Nile countries broke down after Egypt and Sudan refused to restructure the 1929 and 1959 Agreements (Cambanis, 2010; Laylin, 2011). The negotiations were an attempt to rewrite historical wrongs (Pottinger, 2013). Officials and policy-makers in the upstream countries, including East African countries such as Kenya, Uganda and Tanzania, have expressed concern over Egypt's dominant attitude towards the Nile (Deng, 2007:4).

South Sudan has taken major steps in its outreach to provide a solution to the Nile dispute, which include its intention of joining the Nile Basin Initiative (NBI) or upstream countries in resolving the dispute over the region's water (Thurston, 2011). The NBI is a permanent commission founded in 1999 among the Nile riparian states that seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security. According to the upstream countries, *"… the treaties are an unfair vestige of colonialism"* (Cambanis, 2010).

A major problem surrounding the NRB is the lack of a binding agreement that ensures that all eleven riparian countries share common benefits from the Nile River (Turton, 2000b:2). In a 2005 BBC interview, the former United Nations Secretary-General, Boutros Boutros-Ghali, argued that *"… the real problem is that we need an additional quantity of water and we will not have an additional quantity of water unless we find an agreement with the upstream countries which also need water and have not used the Nile water until now"* (Thompson, 2005). Considering the long-anticipated or predicted conflicts in the NRB, binding agreements should be put in

place. This requires a more serious interventionist role by the African Union (AU) and the NBI.

Another important issue to the Nile dispute is China's presence as a new actor and a major exporter of hydropower projects in the NRB (Erdal, 2013). China has become a source of funding to upstream countries' hydropower projects and development, and has subsequently changed the 1929 and 1959 hydropolitical landscape and/or status quo (Cascão, 2009:249). China has projected its hydropower influence in the NRB, especially in upstream countries, through funding the construction of dams and the expansion of irrigation systems (Verhoeven, 2013). And this is evident through the increase of Chinese sponsored hydropower projects in the Nile (i.e. in Burundi, Ethiopia, Kenya, Tanzania, the DRC, Uganda, and Sudan).

On the one hand, the presence of China in the Nile region has presented positive power shifts in favour of upstream countries. For upstream countries, China has enabled their capabilities to utilise the Nile and develop unilateral hydropower projects. And on the other hand, China's presence poses threats both to downstream countries (i.e. Egypt) and to the entire Nile region. The development of these unilateral hydropower projects upstream mean reduced water flow for Egypt thus threatening its national security (as a country totally dependent on the Nile as a source of life) and its hydro hegemonic position over the Nile. And also, given China's lack of proper environmental and social studies for the construction of hydropower projects, its financial and technical support for these unilateral projects presents more environmental and social uncertainties (Scudder, 2003:1).

This study considers two research questions. The first question is: what are the possibilities for an outbreak of war between upstream and downstream riparian countries over the use of the Nile as a scarce resource in the basin? The second question emanates from the first: what binding measures are taken by the AU and NBI to enforce cooperation in the NRB and ensure equitable use of the Nile as a resource?

## 1.3 Aims and objectives of the study

The aim of this study is to examine the possibility of a water war in the NRB, with a specific focus on the rising implications of unequal water use between upstream and downstream countries. Secondly, the study aims to critically analyse the role of the AU, and the NBI as a regional legal entity and a basin-wide cooperative framework, in mediating the tensions between upstream and downstream riparian countries over the issue of Nile.

In terms of specific objectives the study will:

- Conceptualise the relation between the scarcity of resources and the likelihood for conflict by focusing on water as the new role player in both political disputes and violent conflicts. This is in line with the scarcity and lack of access to water.
- Discuss the disputes and tensions between upstream and downstream riparian countries in the NRB and the possibility of these tensions ultimately leading to an outbreak of war.
- Critically discuss Homer-Dixon's environmental scarcity theory in an attempt to explain and to better understand the environmental scarcity-conflict linkages in the NRB.
- Discuss a critique and defence of Homer-Dixon environmental scarcity theory.
- Examine and discuss the role, responses and impact of the AU and the NBI in providing binding measures to the Nile disputes.
- Discuss the role of China as an alternative source of funding to upstream countries' hydropower infrastructure and their impact to the Nile environment thereof.

## 1.4 Research methodology

This section will describe how the study was conducted and data obtained. This study is rooted in the discipline of IR and is based on a case study research design.

The importance of selecting and applying a case study research design is two-fold. Firstly, to adequately address the research question and test the hypothesis posed by the study. And secondly, to provide for detailed information about the Nile dispute and a better understanding of the causal processes involved.

The NRB is a descriptive case study which uses qualitative data and available information. It is descriptive in that the study has collected much information as possible in an attempt to explore and explain the nature and cause of the Nile dispute, subsequently providing new information about the NRB. In describing *"what is happening"* in the Nile, the study further attempts to expand knowledge and understanding into the Nile dispute. As such, the analysis of the study will be explanatory.

The Qualitative nature of the study enables it to explain the situation in the Nile and conceptualise *"how and why this situation has come about and what impact it has had or might have on the region".* Although water wars and the NRB is not a new topic of research, however, given its width and complexity as the world's longest river covering 11 countries, the need to specifically focus on the NRB as a case is that it presents a new landscape of global conflict.

The study is also a literature study that follows a deductive theoretical approach. The study adopts a deductive approach to test the environment-conflict linkages. Given that a deductive approach can only be explained by means of a hypothesis which can be derived from the proposition of a theory, the study has developed a hypothesis based on existing theory and has designed a research strategy to test this hypothesis.

The literature of the study is based on official documentation, policy documents, theoretical literature, critiques and discussion papers from the media, reputable newspapers, academic journals, working papers, conferences, lectures, internet sources, theses, books and various collaborative works such as monographs.

The research is based on a second-order research (i.e. an analysis of texts and statistics). Some of the findings are presented in tables and maps. This is meant to enable the reader to contextualise and clarify distinctions of various locations and to analyse data in a visual manner.

## 1.5 Literature review

When undertaking the NRB as a topic of investigation, the study noted the importance of what has been written about the Nile. This helps the study to identify the strengths and weaknesses of previous work. By undertaking this literature review, the study will be able to:

- Identify data sources.
- Critically summarise the historical and contemporary knowledge of the NRB.
- Understand important aspects of the research problem
- Identify concepts and their relationship with each other in order to create a reading and critiquing strategy.
- Know what research questions need to be asked and how to answer these questions.

In conceptualising environmental conflicts, this study draws its analysis for a theoretical foundation from Homer-Dixon's 1999 work *Environment, Scarcity and Violence*, which argues that violence in many parts of the world is a result of the scarcities of critical environmental resources such as freshwater.

In the broader context of disputes over water in the NRB, Ashton (2000:65-71) argues that the situation in the NRB is a result of treaties that subordinate the interest of other riparian countries sharing the same water course. In *Avoiding conflict over Africa's water resources,* Ashton (2002) argues that the bone of contention or competition between upstream and downstream countries for the same water resource poses the greatest potential threat for conflict over water in Africa. What may exacerbate the dispute is slow economic and social development, famine, chronic malnutrition, and the internal and border disputes found in most upstream countries as a result of water scarcity (Klare, 2002:142).

Among the secondary sources consulted, this study draws its analysis from Romm (1993), Gleick (1993) and Wolf's 1999 publication, *Water wars and water reality: conflict and cooperation along international water ways.* This literature discusses the transformative nature of resources to include water as the new threat to the security discourse.

Homer-Dixon (1994), Hudson (1996), Solomon (1996), Meissner (2000), du Plessis (2000), Solomon (2000), and Turton (2000c) form part of the collaborative works consulted with regards to environmental conflicts. This study reviews these scholars as specialist in the field of environmental studies whose contributions have helped to define a new feature of environmental conflicts and the discourse on water within the realm international relations theory.

## 1.6 Outline of the study

This study is divided into five chapters. Chapter one provides the framework of analysis of the topic; that is, the problem statement, aims and objectives and methods that will apply to the study. Chapter two provides the theoretical foundation of the study, which rests on Homer-Dixon's environmental scarcity theory. The hypothesis is that environmental scarcity causes conflicts through three causal forms of scarcity

1. Supply-induced scarcity
2. Demand-induced scarcity
3. Structural scarcity.

The study uses this theoretical approach to environmental conflicts in an attempt to provide an understanding of the disputes in the NRB and to establish the link between environmental scarcities and violent conflict. In this respect, the study will analyse certain outstanding issues such as the rising population growth, water depletion and degradation, and the uneven distribution of the Nile.

Chapter three focuses on the regional legal aspect of the NRB. It examines the roles, responses and impact of the AU and the NBI in providing binding measures to alleviate the disputes regarding the sustainability, management and equitable use of water in the NRB. Chapter four will discuss the power shifts along the Nile and its implications for the status quo, peace and security in the basin. Since these shifts do not guarantee peace through a win-win scenario – on the basis that an agreement to sustain, manage and use the Nile has not surfaced – the study will argue that the lack of cooperation will lead to further inefficient use of water, which will threaten the

security of the NRB. Chapter five provides a summary, recommendations and concluding remarks of the study. It discusses research findings by evaluating the nature of the disputes and their implications for the riparian countries.

# CHAPTER 2: THEORETICAL FRAMEWORK: HOMER-DIXON'S ENVIRONMENTAL SCARCITY THEORY

## 2.1 Introduction

By the end of the 20th century and the beginning of the 21st century, the discipline of IR had been characterised by resource geopolitics, i.e. the potential of conflict as a result of the scarcity of vital resources that cross political boundaries (Diehl, 1991:11). According to Gleditsch *et al* (2006:362), conflict takes place over a resource if that resource is shared and perceived to be scarce. A resource is viewed as scarce if its supply is not sufficient to meet the local demand.

In shared river basins, when the demand for water outstrips available supply, a nation is able to justify military action (whether offensive or defensive) in the name of economic preservation and national security. Scarcity-induced interstate conflicts over water have become probable (Homer-Dixon, 1999:5). Supporting this is Homer-Dixon's (1999:8) environmental scarcity theory, which argues that the scarcity of renewable resources such as cropland, fish, forests, and most importantly water, could lead to violent conflict.

This chapter focuses on the environmental scarcity theory to illustrate the potential for conflict in the NRB over water. Although Homer-Dixon's environmental scarcity theory focuses mainly on civil violence, including ethnic clashes and insurgencies, this study expands the environmental scarcity theory to include disputes and tensions between states over shared renewable resources.

The aim of the chapter is to critically discuss Homer-Dixon's environmental scarcity theory in an attempt to explain and to better understand the environmental scarcity-conflict linkages in the NRB. The chapter will also discuss a critique and defence of Homer-Dixon environmental scarcity theory.

## 2.2 Environmental scarcity theory

Since the early 1990s, both academic and policy debates have argued for the idea that increasing environmental scarcity is one of the root causes of violent conflicts in poor countries. By definition, environmental scarcity refers to "… *the declining availability of renewable natural resources such as freshwater or soil,*" (Bingham, 2001). This means that the supply of renewable resources such as water is not sufficient to meet the local demand (UNEP, 2012:29).

According to Homer-Dixon's environmental scarcity theory, environmental scarcity is caused by the degradation and depletion of renewable resources, the increased demand for these resources and/or their unequal distribution (Homer-Dixon, 1999:48). Scarcity, driven both by ongoing processes of environmental degradation and escalating population growth, is believed to be rapidly increasing in many marginal environments[2].

The environmental scarcity theory illustrates the contribution of the scarcity of renewable resources to social breakdown and violence by providing environment-conflict linkages. Homer-Dixon (1999:4) claims that the idea established by early scholars in explaining the link between the environment and conflict was speculative and imprecise, hence the need for a theory that addresses this linkage.

The hypothesis behind the environmental scarcity approach is that "… *resource scarcity, through the three causal forms of scarcity (i.e. demand-induced, supply-induced, and structural-induced scarcity), have the potential to cause conflict.*" While it is unfortunate that most analysts often study resource depletion and population growth in isolation from resource distribution, the concept of environmental scarcity encompasses all three causal forms of scarcity.

As a result, this theory argues that the Nile disputes should be analysed not only on the basis of uneven distribution, but concurrently with water demand and supply (Homer-Dixon, 1994:8-11). Empirical evidence suggests that demand- and supply-induced scarcities are most dangerous when they interact with unequal resource

[2] This is where the environment is confronted with soil terrain and climatic constraints such as low fertility, poor drainage, shallowness and salinity (Winkelmann, 1999:5).

distribution (Homer-Dixon, 1994:8; Urdal, 2008:593). A resource scarcity perspective argues that population growth and density may lead to the scarcity of renewable natural resources such as productive land, freshwater and forests (Weiner & Russell,2001:3).

The emergence of environmental conflicts is exacerbated in areas where resources were once plentiful (Homer-Dixon, 1999:48). With the demise of ethnic and ideological tensions that characterised interstate conflicts, Klare (2001:57) argues that the competition for access to vital resources has become one of the drivers for conflict in IR.

In recent literature, scholars have focused on the role that water plays in international affairs and international conflicts, and have supported the notion that water will be the future cause of interstate conflict (Yoffe and Wolf, 2002). Gleditsch *et al* (2006:362) argues that shared water resources have become a contributing factor to interstate disputes, and have existed in different forms over the years. From 1950-2000 there have been 1,831 water conflicts over transboundary basins.

Shared water resources constitute a source of conflict if the river is shared "*across*" rather than "*along*" a border (Toset *et al*, 2000:980-1). Predictions of global water wars have become an important focal point of IR and are firmly embedded in global diplomatic discourse (du Plessis, 2000:9). Despite contending beliefs regarding the occurrence of water wars, current river water shortages, the fierce competition over shared rivers and the uneven distribution of international shared rivers constitute conditions for water conflicts (Postel and Wolf, 2001:60).

William (1996:3) argues that the scarcity of renewable resources remains the most detrimental environmental problem. According to Schwartz and Singh (1999:8), the demand for scarce resources has increased the likelihood of international competition over existing supplies of natural resources, which could ultimately lead to escalating tensions. Those that believe in the likelihood of direct international conflicts contend that water, especially river water, like oil or other monetarily lucrative and non-renewable resources, can constitute a significant source of economic and military strength for a nation.

### *2.2.1 Demand-induced scarcity*

Demand-induced scarcity posits that population growth or an increase in consumption levels decreases the amount of limited natural resources available to each individual (Bingham, 2001). Demand-induced scarcity is primarily caused by population growth. If a resource base is constant, the availability of resources per person will diminish with the increasing number of people that have to share it. Such scarcity can also arise from an increase in demand per capita (Urdal, 2008:592-3). Homer-Dixon (1999:48) indicates that an increase in demand assumes that the growth in population divides the pie into smaller slices for each individual, group or state. Demand-induced scarcities arise only with resources that are "*rivalrous*", e.g. fisheries, cropland, forests and water.

A resource is deemed to be subject to rivalry when its use by one economic actor reduces its availability for others (Homer-Dixon, 1999:48; Percival and Homer-Dixon, 1998:280). A demand-induced scarcity resulting from the water needs of an increasing population justifies demands for increased welfare (van der Molen and Hildering, 2005:134-5). Weiner and Russell (2001:3) argue that resource scarcity is assumed to lead to increased intergroup competition and, under unfavourable economic and political conditions, such competition can take the form of violent conflict.

Poor countries are particularly susceptible to resource conflicts as they often lack the capacity to adapt to environmental change. Societies have very different political, financial and administrative capacities to respond adequately to increasing resource demands. Such strains can threaten stability and security (Homer-Dixon, 1991; 1994; 1999 and, Homer-Dixon and Blitt, 1998).

In recent years the global pressure on limited freshwater resources has been mounting, driven by an increasing population growth. In October 2011, the global human population surpassed 7 billion and is projected to rise to 8 billion by the year 2025. This increase, coupled with rising rates of consumption, places further demands on the supply of renewable resources. As demand increases, some countries are already reaching the limits of their water resources. Among 37 countries reaching the limits of their water resources, 13 of these countries are from

Africa and 3 of these African countries form part of the NRB[3]. It is therefore evident that this is a global issue where countries are facing the same problem and it has regional consequences (FAO, 2003:21). As a result, competition for water intensifies between countries. This therefore makes water an increasingly politicised issue (UNEP, 2012:17-18).

Population growth becomes a drive for scarcity in that it boosts the demand for a specific resource (Homer-Dixon, 1999:15). According to Kennedy (2001), population growth engenders resource scarcity by creating a demand-induced scarcity, which forces states to adopt greedy measures in an equation where a resource is shared among more than one state. A comprehensive argument is that population growth will outstrip the natural resources of the immediate environment leading to deprivation, which will ultimately lead to conflict and instability either directly through competition for scarce resources, or indirectly through the generation of environmental refugees (Barnett, 2000:278).

Because water has been regarded as a finite and fixed resource, threats pertaining to its accessibility have often been attributed to such rapid population growth (Roudi-Fahimi *et al*, 2002:4; UNEP, 2006:1). This is because water is not only needed for the basic human consumption. The real challenge lies in the availability of water for large-scale irrigation and food production to feed the people or to obtain revenues from agricultural exports. Therefore, population growth in a country not only increases demand for domestic water consumption but also for large quantities of food, which requires considerable amounts of water (Hernandez, 2002:2-3).

The continuation of the downward spiral of increasing population and declining environmental quality is inevitable (Urdal, 2005:418). The dangers that come with international competition for adequate water resources will inevitably increase (Klare, 2001:57).

### *2.2.2 Supply-induced scarcity*

Supply-induced scarcity results from the degradation or depletion of natural resources (Urdal, 2008:593). According to supply-induced scarcity, a drop in the

[3] Botsawan, Chad, Congo, Djibouti, Egypt, Eritrea, Gambia, Mozambique, Namibia, Niger, Senegal and Somalia (FAO, 2003:21).

supply of a key resource assumes that the resource pie shrinks because there has been a reduction in quantity and quality (Homer-Dixon, 1999:48). This scarcity refers to an environmental degradation that decreases the overall available amount of a limited natural resource, therefore decreasing the amount available to each individual (Bingham, 2001).

By environmental degradation this chapter relates much of its arguments to the negative impact of human beings and society. This refers to the human-made environmental changes that have a negative impact on human society (Libiszewski, 1992:4).On the other hand, Homer-Dixon argues that natural resources may also be degraded and depleted from causes that are not human-induced, such as natural disasters or less dramatic natural variation (Urdal, 2008:593). Of the major environmental changes facing humankind, degradation and depletion of agricultural land, forests, water and fish will contribute more to social turmoil in coming decades.

The environmental security literature stipulates that supply-induced scarcity in the form of environmental degradation is a key driver of civil violence around the world (Homer-Dixon, 1999:63-77). The main idea proposed by Homer-Dixon is that through environmental degradation, resources become scarce and people begin to fight over them.

According to Benjaminsen (2008:819-21), African dry lands are allegedly among the areas most seriously affected by degradation. "*Supply-induced scarcity results from rivers running dry, lowered water-tables and polluted groundwater and surface water courses,*" (van der Molen and Hildering, 2005:135).It simply becomes less of a resource as a result of non-sustainable use that does not allow the resource to regenerate. For instance, pastoralism, agriculture and irrigated farming ultimately lead to erosion of the landscape (Bächler, 1998:69).

Toset *et al* (2000:274) argue that only three per cent of the world's water supply is available for human consumption. In basins, rivers, lakes and water aquifers shared by more than two countries, competition for limited supplies can lead countries to see access to water as a matter of national interest. Water will therefore increasingly become a salient element of interstate politics, in many cases even leading to violent conflict (Gleick, 1993:79-80).

In 1996, a United Nations Environmental Program (UNEP) analysis pointed out that "… *disputes over water supplies would be the future cause of conflict among nations,*" (Chesire, 2010:15). The belief that water scarcity is an obstacle to economic development ,and that the social stresses caused lead to conflict, is almost conventional wisdom in IR among scholars of international security (Homer-Dixon, 1999:138). Hence, water scarcity is closely linked to both intra and interstate conflict.

The scarcity of water as a vital natural resource guarantees future social unrest, geopolitical frictions and war (Klare, 2013). According to Ohlsson (1999:211), the driving force for conflict over water between countries is the desire to increase supply and manage demand.

### *2.2.3 Structural-induced scarcity*

Structural scarcity refers to the unequal access or distribution of natural resources (Bingham, 2001). This is a form of scarcity that applies only to certain groups that, relative to other groups, are excluded from equal access to particular resources. Such unequal social distribution of a resource does not presuppose actual scarcity if the resource was distributed evenly (Urdal, 2008:593). Van der Molen and Hildering (2005:135) argue that structural scarcities emerge when more powerful segments of water users confiscate a larger part of the scarce resource.

This assumes that some individuals, groups or states get disproportionately large slices of the pie while other groups get slices that are too small (Homer-Dixon, 1999:48). It implies a concentration of a resource in the hands of relatively few people while the remaining population suffers from serious shortages, i.e. unequal social distribution (Percival and Homer-Dixon, 1998:280). According to Homer-Dixon, this may cause violent conflicts (Homer-Dixon, 1999:48; Homer-Dixon and Blitt, 1998:6).

Homer-Dixon (1999:48) asserts that structural scarcities arise from resources that are "*excludable*", which means that property rights or other institutions can be used to prevent access to the resource by some actors. Renewable resources such as rivers have characteristics that permit the assignment of clear property rights. Conflicts over natural resources arise when parties disagree about the ownership, allocation and use of natural resources. The environmental scarcity theory denotes

that the increasing scarcity of renewable resources, or grievances over their governance and/or transboundary nature, can reinforce existing stress factors and play a contributing role in the decision to resort to violence (UNEP, 2012:14).

### *2.2.4 The interaction and effect of demand, supply and structural-induced scarcity*

The environmental scarcity theory stipulates that these types of scarcity (i.e. demand, supply and structural-induced scarcity) are not mutually exclusive; they often occur simultaneously and interact with one another (Homer-Dixon, 1994:8-11). "*Uneven distribution never acts on its own, its impact is always a function of its interaction with resource demand and supply,*" (Schwartz *et al*, 2000:80).

There are four principal social effects of these types of scarcity:

- decreased agricultural potential
- regional economic decline
- population displacement
- the disruption of legitimised and authoritative institutions and social relations (Homer-Dixon, 1991:91).

First, environmental Change (i.e. in a form of supply-induced scarcity and/or the depletion and degradation of environmental resources such as water) negatively reduces or constrains agricultural productivity. Worsening deforestation and scarcity of water have huge effects on agricultural production thus affecting food outputs. For instance, on the one hand, deforestation changes hydrological cycles by affecting transpiration rates, soil moisture and precipitation patterns which will result in erosion and silting and ultimately leading to incidences of droughts and floods thus constraining irrigation capacity and regional productivity.

Deforestation results in degraded and eroded soils because of affected rooting depth, making plants vulnerable to drought therefore eventually affecting agricultural productivity. And on the other hand, overuse and pollution of water supplies can also result into constrained irrigation capacity and regional productivity (Homer-Dixon, 1999:81). Homer-Dixon (1999:87) suggests that institutions are largely helpful in assisting countries and their agricultural systems to respond and/or adapt effectively to rising land and water scarcities. However, if these institutions fail, then the

availability of water usage will decrease and agricultural systems will remain inefficient.

Second, regional economic decline results from supply-induced scarcity such as environmental degradation and depletion. This form of environmental scarcity might the negatively affect economic of a region directly or indirectly through other social effects such as changes in agricultural productivity. Consequently, deforestation can depress the economy's long-term productivity and this may have a large effect on a country's overall economic development (Homer-Dixon, 1999:89).

Deforestation leads to water shortages as a result of erosion and silting. This erosion and silting may disrupt hydropower production and river volumes thus simultaneously reducing or constraining both regional agricultural productivity and economic productivity. The resulting overuse and pollution of water supplies mentioned in the above social effect can also affect and constrain economic productivity by giving rise to waterborne human and animal disease such as cholera (Homer-Dixon, 1999:89). This is an indication that a variety of environmental stresses could affect wealth production (Homer-Dixon, 1999:88).

Third, Homer-Dixon (1999:93) argues that environmental scarcity can also lead to massive population displacements and/or migrations to neighbouring regions. This is evident in the effects of the three sources of scarcity (Homer-Dixon, 1999:93). Demand-induced scarcity brought about by population growth poses a direct and major cause to population displacement in that population growth critically reduces per capita access to water in a specific area thus forcing people to move (Homer-Dixon, 1999:95).

Supply-induced scarcity brought about by water degradation and depletion cause population movements in that the reduced water outputs combined with population growth also places immense pressure on already limited per capita access to water also forcing people to move. And, structural-induced scarcity brought about by unequal distribution of water produces a wide gap between areas with and without water, eventually creating gaps between people's current satisfaction and potential satisfaction elsewhere. As a result, this may also lead to people moving to these perceived potential areas of satisfaction (Homer-Dixon, 1999:95-6).

Lastly, on the one hand, the failure of authoritative institutions to help societies adapt to scarcities also raise probability of violence. This is due to the fact that the weakening of state institutions reduces the ability of societies to generate and deliver the social and technical ingenuity it needs to respond to environmental scarcity (Homer-Dixon, 1999:98). This failure of institutions is witnessed by their inability to improve and/or build infrastructure such as wells, dams, canals, pipelines, irrigation systems and large facilities to control industrial and municipal pollution. Institutions are required to do this in response to the increasing financial and political demands on the state in order to deal with severe water scarcity (Homer-Dixon, 1999:101).

On the other hand, severe environmental scarcity can exacerbate divisions among groups sharing a particular resource. Scarcity increases the gap between winners and losers, that is, between groups that gains from scarcity and those that suffer from it. As a result, this gap encourages competition among groups for control of resources critical for survival. In addition, the first two social effects of environmental scarcity discussed above can also aggravate social relations, which can consecutively disrupt institutions (Homer-Dixon, 1999:96). These four social effects, either individually or in combination, produce or exacerbate conflict (Homer-Dixon, 1994:6).

These three salient features of scarcity have a special political significance: they interact and reinforce each other in extraordinary ways, making conflict inevitable. The first aspect of this interaction deals with resource capture, which is very significant in the case of a shared resource. Resource captures take place when powerful groups or states recognise that a key resource is becoming scarcer (due to both supply and demand pressures) and use their power to shift the laws and institutions governing resource access in their favour. This shift ultimately imposes severe structural scarcities on weaker groups (Homer-Dixon, 1999:15).

The second aspect of this interaction is called ecological marginalisation. Unequal resource access can combine with population growth to cause migration to regions that are ecologically fragile, such as steep upland slopes, areas at risk of desertification and tropical rain forests. High population densities in these areas, combined with a lack of knowledge and capital to protect local resources, causes severe environmental damage, chronic poverty and violent disputes (Homer-Dixon, 1999:15).

### *2.2.5 Simple scarcity conflict*

While much research is needed on the idea that the scarcity of water is likely to provoke interstate wars in contrast to internal conflict, the argument about interstate resource wars is supported by the simple scarcity conflict perspective. Simple scarcity conflicts are "… *conflicts over scarce renewable resources between states. They are particularly likely to break out over resources that are essential for human survival and can be physically seized or controlled like river water, fisheries and agricultural productive land,*" (Homer-Dixon, 1991:87).

Rivers are likely to cause interstate resource wars. As river water flows from one area to another, one country's access can be affected by another's actions. The argument that the scarcities of renewable resources like water will lead to violent conflict suggests that the decreasing supplies of resources that can be controlled physically will provoke interstate simple scarcity conflicts over these resources (Homer-Dixon, 1999:228).

According to Homer-Dixon (1999:228), the word "*simple*" is used to distinguish this type of conflict from others that include psychological and social processes. Conflicts that include psychological and social processes are those embedded in a context of long-standing religious, cultural or worldview differences and inequalities and occur mostly within countries rather than between countries. These may include ethnic clashes arising from social cleavages. For instance, leaders may engage in conflicts to preserve their identity as a leader (i.e. fear of losing face) and to encourage group cohesiveness (Libiszewski, 1992:12).

Environmental scarcity causes simple scarcity conflicts and increases society's demands on the state while decreasing its ability to meet those demands (Percival &Homer-Dixon, 1998:281).The simple scarcity conflict argument posits that political disputes and violent conflicts between states occur when "… *states rationally calculate their interests in a situation where there is a fixed or shrinking pie of natural resources,*" (Homer-Dixon, 1999:137). This forces states to seize or claim ownership over a shared renewable resource (Lipschutz, 1989:46).

Understanding the link between the two variables, i.e. environmental scarcity (independent variable) and violence (dependent variable) requires an analysis of the

effects and nature of environmental scarcity. Homer-Dixon (1999:6) suggests that this analysis should be questioned in the following manner:

1. Can environmental scarcity contribute to violent conflict?
2. If yes, how can it contribute to violent conflict?
3. Is this contribution important?

Homer-Dixon's (1999:177) environmental scarcity theory acknowledges the idea that environmental scarcity alone, also known as the scarcity of renewable resources, is neither a necessary nor sufficient cause of conflicts. Rather a number of contextual such as political, economic and social factors play a major role in inciting these types of conflict between states. However, the theory also considers that environmental scarcity is a cause of conflict and its influence is typically mediated by these contextual factors. Although many sceptics would conclude that environmental scarcity is not the primary cause of conflict, that there are other contextual political, economic and social factors involved, the effects and impact of environmental scarcity should not be regarded as unimportant.

Homer-Dixon (1999:17) makes it very clear that environmental scarcity is not influenced by these factors (e.g. social factors such as failed institutions and policies) but can in itself influence and affect these factors. For instance, when environmental scarcity becomes irreversible (as for example, water degradation and depletion in the NRB), the scarcity becomes an influence on society and its actions.

Homer-Dixon (1999:4-5) argues that the effects and impact of environmental scarcity will be felt in developing countries more than in developed countries. Developing countries' well-being is dependent on environmental goods and services, and they therefore have less, if any, financial, material and human capital resources to prevent or adapt to environmental scarcities. This will leave their economic and political institutions fragile. The severe stress caused by environmental scarcity can constrain relations between states if the renewable resource in question is a shared resource.

These environmental scarcities usually do not cause wars among nations, but they can generate severe social stresses within countries, helping to stimulate sub-national insurgencies, ethnic clashes and urban unrest (Homer-Dixon, 1999:12). However, in the context of the NRB, disputes between states are probable. The

chapter argues that, given the reduced outputs due to population growth, the degradation and depletion of the Nile and its uneven distribution, the fierce competition over the already finite water resources increases the potential for an inter-riparian conflict in the NRB.

However, not all scholars are in support of the arguments and ideas of Homer-Dixon's environmental scarcity theory. According to Friedrich (2014:80), the connection between environmental pressure and violent conflict has become subject to empirical criticism. Friedrich goes on to argue that there is countervailing arguments that undermine the belief that a strong and significant causal relationship exists between environmental pressure and violent conflict.

According to Martin (2005:329), an attempt to establish a link between the environment and conflict has become subject to intense debate. Despite advances made by scholarly research, there has been an emergence of a scholarship whose attention is aimed at criticising the environment-conflict discourse (Martin, 2005:329). Among these critics is Deudney (1990), Levy (1995a: 1995b), Gleditsch (1998), and Martin (2005), to name but a few, who in their work criticise the Toronto Groups' research[4] on environment-conflict linkages.

Several critics of the environmental conflict linkages have argued against the notion that environmental change can affect and/or dictate human behaviour (Coetzee, 2012:2). Furthermore, Levy (1995a:57) asserts that Homer-Dixon's environment-conflict research is *"banal advice"* which does not provide for ways in which to intervene, mitigate and/or redress environmental problems. He maintains that policy makers can draw few lessons for preventing or mitigating conflict.

Gleditsch (1998) identifies empirical and theoretical shortcomings of the environment-conflict research and Homer-Dixon's environmental scarcity theory. Despite assertions that a link exists between the environment and conflict, however, Gleditsch (1998:383) argues that scholars fail to agree on the causes of environmental scarcity and its outcomes.

Gleditsch (1998) has argued that a problem exists with regards to the *"theory"*, *"conceptualisation"* and *"methodology"* of Homer-Dixon's environmental scarcity approach. He goes on to argue that there are many problems within the

[4] The Toronto Group is led by Homer-Dixon.

environment-conflict literature due to a lack of systematic research on the effects or resource or environmental factors on armed conflict (Gleditsch, 1998:387).

He uses this criticism as his point of departure arguing that the environment-conflict research fails to qualify as systematic research (i.e. both quantitative and comparative research) since it provides insufficient evidence of this linkage (Gleditsch, 1998:381-5). Gleditsch (1998: 384-7) further asserts that little systematic research on the link between environmental scarcity and armed conflict has been conducted.

Gledistch (1998:384) argues that population density and population growth are not measures of either resource scarcity or environmental degradation. He makes reference to Tir and Diehl's (1998) empirical study, which suggests that there is a significant but fairly weak relationship between population growth and interstate militarized conflict and war (Gleditsch, 1998:384). Gleditsch (1998:384) states that despite the existence of a literature suggesting that a link between population variables and international conflict subsists, there is little theoretical or empirical consensus beyond that. Similarly, Barnet (2000:278-9) argues that despite the fact that it is commonplace that population growth leads to environmental degradation, however, the manner in which it is presented lacks proof. As a result, this tends to lead to negative argumentation and assertions.

Gleditsch (1998:381) states his argument on the grounds of a nine-point critique. However, among this nine-point critique, the chapter will address the first seven points of critique which relates best to the scope of the study. He claims that (1) it is unclear as to what causes environmental conflicts; (2) there is a problematic attempt to link environmental concerns and security; (3) researchers overlook the importance of political and economic factors as strong influences on conflict; (4) models cannot be tested due their complexity; (5) there is a bias case selection; (6) the causality of the relationship between environment and conflict is reversed; (7) researchers engage in controversial future predictions when arguing for the environment-conflict linkage (Gleditsch, 1998:381).

First, according to Gleditsch (1998:387), it is unclear which environmental factors are capable of triggering an environmental conflict. He asserts that a lack of clarity and distinction is made regarding absolute resource scarcity and/or environmental

degradation as capable environmental factors for stimulating environmental conflicts. Gleditsch therefore adopts Stephen Libiszewski's (1992) definition of environmental conflicts and his distinction between conflicts that results from *"simple resource scarcity"* and those that result from *"environmental degradation"*.

Libiszewski (1992:2-6) distinguishes these two concepts by arguing that *"simple resource conflicts are very common, but that the concept of environmental conflicts requires a more restricted use"*. He defines an environmental conflict as *"a conflict caused by a human-made disturbance of the normal regeneration rate of a renewal resource"*. Gleditsch (1998:387) argues that Homer-Dixon's environmental scarcity terminology fails to distinguish between conflicts that result from "*simple resource scarcity"* and those that result from environmental degradation.

Gleditsch (1998:387) further criticizes Homer-Dixon's environmental scarcity theory suggesting that the terminology of "*environmental scarcity*" which incorporates demand, supply and structural scarcities *"muddies the waters".* Critics argue that by including distributional issues in defining environmental scarcity makes the concept broad to a point that it becomes useless, because conflict becomes categorized solely over resource distribution as environmental conflicts (Schwartz *et al,* 200:80).

Second, Gleditsch (1998) questions the usage of "environmental security" to highlight environmental concerns on the agenda of national security and international security concerns. He asserts that this does not make environment-conflict research a workable research tool. Similarly, Levy (1995a:55) argues that the entire environment and security literature fails to offer new insight into environmental studies.

According to Gleditsch (1998:388), an attempt to combine environmental concerns and security to form a single entity is misleading in that it does not provide clear theoretical or empirical insight as to whether the two objectives are mutually supportive or in competition. This merger is motivated by political rather than research analysis. He further argues that including environmental problems in the concept of environmental security poses conceptual challenges in that the literature engages itself in *"conceptual slippage"* in order to prove the futility of the concept of environmental security. As a result, the environment-conflict literature shows

theoretical and empirical problems in arguing for environment and security (Gleditsch, 1998:389).

Other critics against linking environmental concerns and national security argue that security is a broad definition, which is conceptually weak to the extent that it is almost vacuous (Gleditsch, 1998:388; Deligiannis, 2010:1). According to Levy (1995b:44), by including diverse threats and problems such as global warming, environmental damage, deforestation, water scarcity and nuclear waste under the environmental security term distorts its meaning since it is not precise of what is included and what is not.

Third, Gleditsch (1998:389) argues that Homer-Dixon's environment scarcity model overlooks important variables such as *"democracy"* and *"regime type"*. He asserts that in arguing for the potential for conflict in shared river systems, Homer-Dixon (1991, 1994) rarely distinguishes between rivers which run through poor, undemocratic, politically unstable countries ridden by ethnic tensions, and rivers running through stable and affluent countries. Lowi (1996:5) has argued against water as a cause for conflict claiming that mere political differences among nations as likely and sufficient cause of disputes. According to Gleditsch (1998:389), Homer-Dixon ignores how regime types may influence the occurrence of environmental conflicts.

Gleditsch's (1998:389) argument is twofold. Firstly, he argues that democracies rarely if ever fight one another and rarely experience civil war therefore there are no reasons to assume that they will suddenly start fighting over resource issues between themselves. Secondly, democracies generally display a more gentle environmental behaviour than non-democracies. As a result, democracies are less likely to generate the kind of extreme environmental degradation, which may be assumed to generate violent conflict. Hence he argues that *"democracy"* should have been included in Homer-Dixon's model.

According to Gleditsch (1998:390), highly developed countries have very strong economic motives for not fighting over scarce water resources; instead, they use technology to expand the resources or find cooperative solutions in exploiting them (Gleditsch, 1998:390). Other arguments for the adaptability of states through the use of technology posit that technological substitutes make up for any resource scarcities

or depletion that could lead to conflict thus making environmental conflict less likely (Deudney, 1990:462-3).

As far as Gleditsch (1998:396) is concerned, conflict in developing countries is a result of social causes such as poverty in contrast to physical causes such as environmental scarcity. He further asserts that physical circumstances of human society are secondary causes of social behaviour and that when it comes to violent conflict they are merely aggravators of already existing social stresses. Gleditsch claims that environmental problems are a consequence of and endogenous to, the broader social system and that any conflict caused by environmental problems is ultimately caused by social factors.

According to Gleditsch (1998:390), poor countries generate more local environmental problems (i.e. environmental degradation like deforestation, lack of water and sanitation and soil erosion) which in turn may exacerbate their poverty and which is conducive to conflict. Lonergan (1999:23) asserts that critics argue against the significance of environmentally induced conflicts charging that they pose less concern to international security since only the poorest countries are likely to experience it. As such, environmental threats to international security are perceived minimal.

Fourth, according to Gleditsch (1998:390), Homer-Dixon's (1991, 1994, 1999) environment-conflict models are large and complex to a point where they become virtually untestable. He asserts that *"Homer-Dixon (1991; 1994) employs an overly complex theoretical scheme and models that are not testable....instead of employing complex models, models must be built gradually, with more limited modules beings put to the test first"* (Gleditsch, 1998:390-1).

Fifth, critics argue that cases as selected on values of a dependent variable (i.e. violent conflicts) (Gleditsch, 1998:385). Much of existing environmental security literature examines the causal linkages between environmental security and violent conflict. However, there has been growing concerns regarding conflicts linked to environmental issues. Since evidence of this linkage comes from case studies, however, this evidence has been criticised for sample bias. There are claims that cases are selected on values of the dependent and independent variable in that they were characterised by both armed conflict and environmental degradation (Martin,

2005:329). According to Levy (1995a:56), *"Homer-Dixon's case studies offer more anecdotes, but not more understanding".*

On the one hand, Gleditsch (1998:385) asserts that environment-conflict research conducted by Homer-Dixon presents itself as a *"quasi experimental methodology"* in contrast to a "*true experimental method"*. Gleditsch further assert that Homer-Dixon's (1992, 1994, 1999) research lacks key components of a true experimental method such as randomly selecting cases, instead, case studies are selected on the basis of certain variables (i.e. either an independent and/or a dependent variable), thus making it less viable for social scientific inquiries. And on the other hand, Lonergan (1999:24) argues that cases are selected on a *"developing country sample"* thus making the research biased since a majority of these developing countries are susceptible to conflict.

Gleditsch (1998:391) asserts that this allegation that *"case studies are anecdotal"* cannot be easily dismissed because if cases are only selected on the basis of a certain variable, then the results are likely to favour a desired hypothesis. As such, He claims that this practice produces nothing more than more false evidence to support its hypotheses (Gleditsch (1998:392).

According to Schwartz *et al* (2000:86), other related objections to selecting cases are that researchers may overlook other confounding variables. For instance, environmental scarcity might appear to be a cause of conflict, but in reality, not be a cause if poverty is actually a cause of changes in both the independent and dependent variable. For instance, Levy (1995a:55) argues that Homer-Dixon's (1991: 1994) selection of case studies is influenced by the occurrence of violence in order to make the conclusion that environmental degradation may induce conflict. He suggests that if Homer-Dixon could have compared cases with different violent outcomes in a similar manner, then his conclusions would have been accepted as appropriate.

Sixth, Gleditsch (1998:392-3) raises concerns on the cause and effect relationship asserting that *"the war-environment relationship is sometimes confused with possibility that environmental degradation causes armed conflict and war"*. He argues that researchers often ignore the probability that violent conflict (the dependent variable in most research) contributes to environmental issues (the

independent variable) (i.e. reverse causality). He claims that environment-conflict researchers have neglected this possibility of reverse causation and have failed to consider the possibility that environmental scarcity and violent conflict are related to each other in this manner or direction. Gleditsch's (1998:393) reverse causation asserts that *"war"* leads to an *"environmental destruction"* which subsequently leads to *"resource conflict"* thus *"exacerbating armed conflict".*

And lastly, Empirical research on environmental degradation or resource depletion and violent conflict has been criticised for its lack of historical evidence to support the hypothesis regarding simple scarcity conflict between states over water (Deudney, 1990:462). Furthermore, Gleditsch (1998:393) claims that the Toronto Group's theory about the links between environmental scarcity and conflict is unfounded in that it is based on future environmental conflicts. He asserts that Homer-Dixon's (1991, 1994, 1999) assumption of events have stressed the potential for violent conflict in the future as empirical evidence.

Similarly, Smil (1997:107) asserts that the environment-conflict literature lacks a historical account which leads up to contemporary environmental insecurities. He goes on to argue that cases lack historical contextualisation where environmental degradation has been argued to induce violent conflict. Gleditsch's (1998:394) conclusion is based on the assumption that the theories hypotheses are *"based on controversial theory and debatable extrapolations, rather than data which may confirm the predictions".* He finds these future predictions troubling in that in principle, the future may always differ from the past (Gleditsch, 1998:393-4). Below the chapter has also provided countervailing arguments to these criticisms in an attempt to support Homer-Dixon's environmental scarcity theory.

Disputes among scholars about how to conceptualize environmental stress have long hindered research on the environment-conflict linkages. The criticisms laid against Homer-Dixon's environmental scarcity theory can itself be criticised for failing to take into account the ongoing geophysical turmoil as a result of climate change and the lack of human adaptation to these changes. In view of the widespread nature of human conflict and prevailing pessimism about population growth and environmental destruction, the linkage between environmental scarcity and violent conflict is important and policy relevant.

As discussed earlier in the chapter, Homer-Dixon addressed question of *"can environmental scarcity contribute to violent conflict, and if the answer is yes, how can it contribute to violent conflict, and is this contribution important?"* These questions focused on the hypothesized causal role stated earlier in the chapter of a specific independent variable.

Homer-Dixon's environmental scarcity theory adequately guides future research into the relationship between environmental scarcity and conflict through its tripartite definition of environmental scarcity. And from this, it can therefore be noted that population growth, in combination with consumption levels makes environmental degradation and depletion worse (Homer-Dixon, 1999:55). In response to the above-mentioned criticisms, the chapter will provide a seven-point defence of the environmental scarcity theory in the same particular order.

First, Gleditsch's (1998:387) criticisms focuses exclusively on the role that environmental degradation and population growth plays in inciting environmental conflicts and ignore other environmental factors such as resource distribution. It is true that that environmental degradation as an environmental factor may exacerbate resource conflicts because it reduces the quality and/or quantity of a resource in question (Gleditsch, 1998:387). Homer-Dixon environmental scarcity theory found that problems of declining resource supply and rising resource demand were always intimately entangled with uneven resource distribution, and are environmental factors capable of triggering environmental conflicts (Schwartz *et al,* 2000:80).

According to Schwartz *et al* (2000:79) degradation of an environmental resource is only one of two possible sources of a decrease in a resource's supply. "*Degradation refers to a drop in the quality of the resource, but freshwater for instance can also be depleted, which means the resources' quantity is reduced*". If the study would limit its scope only to the degradation of environmental resources as a source of conflict, then its analysis of environmental conflicts would be restricted to only environmental degradation as the sole source of environmental scarcity.

However, Libiszewski's (1992) distinction of conflicts that results from simple resource scarcity and environmental degradation that is adopted by Gleditsch (1998) is inadequate because the two categories are not causally separate. Given that linking environmental degradation to violence is linking, essentially, the reduction in

the resource's supply to violence, it is therefore pointless to omit other sources of resource scarcity from the causality model (Schwartz *et al,* 2000:79).

Homer-Dixon's environmental scarcity theory argues that environmental scarcity is triggered by a combination of population growth and excessive strain on some dwindling renewable resources, exacerbated by unequal access to that resource. The environmental scarcity theory clearly states that population pressure, environmental degradation or unequal access to a resource alone cannot lead to violent outcomes. However, the theory emphasised the interaction of these factors in the generation of violent conflicts.

The reason why the study supports Homer-Dixon's environmental scarcity theory is its inclusion of demand, supply and distributional aspect is in its analysis and definition of environmental scarcity. Demand on a resource should be analysed relative to resource's supply and distribution of a resource. It is important to note that the relationships between demand and supply and between demand and distribution determine people's actual experience of scarcity and under any practical hypothesis; it is these relationships that influence the probability of violence (Schwartz *et al,* 2000:79)

Gleditsch's (1998) emphasis on environmental degradation alone misguides his understanding of the effects of environmental scarcity. His approach tends to neglect key interaction such as resource capture and ecological marginalisation[5] among demand, supply and distributional pressures. As such, his insistence to exclusively focus on environmental degradation in the environment-conflict research unreasonably restricts and distorts the scope of the research and misses crucial aspects of the environmental challenges. Hence it is important to treat environment-conflict analysis through Homer-Dixon's and the Toronto Group's incorporation of the three facets of scarcity in the definition of environmental scarcity (Schwartz *et al,* 2000:80).

Second, the question of whether human-induced environmental change should be considered a security threat has been an important part of the post-Cold War debate about redefining security (Deligiannis, 2010.1) According to Hagmann (2005:6), the conceptual development of environmental security as a theme in IR marked the

[5] Mentioned earlier in the chapter (see. page 18-19)

beginning of the environment-conflict school. This symbolised the extension of a conventional security thinking to include issues such as environmental change and resources depletion. As discussed in the first chapter, due to the fact that resource-based conflicts pose major threats *to "international peace and security"*, it is essential to expand the concept of *"security"* to include environmental concern or protection (Mathews, 1989:162).

Third, Homer-Dixon does integrate regime-type variables in his model and recognises *"state capacity"* as an integral aspect of regime type (Schwartz, 2000:82). According to Deligiannis (2010:3), Homer-Dixon hypothesised that environmental scarcities influence the incidence of violent conflict through a series of intermediate social effects discussed earlier in the chapter.

However, even Gleditsch (1998:395) acknowledges the fact that *"under a plausible set of assumption or until a certain degree of democracy is achieved, an increase in the number of democracies is more likely to lead initially to an increase in the frequency of war in the system"*. A more explicit focus on democracy could be beneficial to the study and can advance the environment-conflict research. However, given the difficult issues surrounding the precise definition of *"democracy"*, its usage might complicate the research (Schwartz *et al,* 2000:82). Nonetheless, it is important to note that NRB countries don't qualify as true democracies in that others are either hybrid regimes[6] or authoritative regimes[7], while some are characterised by armed conflict[8] and/or lack data[9] to really quantify their system of governance. And these forms of governance tend to be unstable or unpredictable, which undoubtedly, have poor environmental standards that may influence environmental conflicts (The Economist, 2015).

Gleditsch's (1998) critique seems to be guided by the assumption that the links between environmental scarcity and violence are overstated, because humanity shows astonishing capacity to adapt to scarcities (i.e. through technology) (Gleditsch, 1998: 383-384 and 395). It is true that technologies can allow for a

[6] Egypt, Kenya, South Sudan and Tanzania

[7] Eritrea, Ethiopia, Sudan, and the DRC

[8] Rwanda

[9] Burundi

substitution of relatively abundant resources for scarce ones (Homer-Dixon, 1999: 31-5 and 107-32). But Gleditsch does not acknowledge that societies often fail to adequately adjust to scarcity, with poverty, migrations, and institutional failure the result. Environmental scarcities unquestionably have profoundly debilitating effects on some economies, societies, and social groups. Just because humans are remarkably adaptive in some cases does not mean that they are always adaptive (Schwartz *et al,* 2000:80)

By arguing that environmental conflict is primarily an underdevelopment problem because *"environmental degradation correlates with poverty",* Gleditsch (1998:396) seems to argue that conflict in developing countries is best explained by social causes not by physical influences of the natural environment. It is true that issues of environmental mismanagement are prevalent in politically unstable countries. Needless to say, resource conflicts have a high potential for violence, regardless of the countries' political system or economic orientation (Gleditsch, 1998:389). Gleditsch seems to argue that physical influences of the environment are simply aggravators of already existing social stress to violent conflict.

It is adequately true to acknowledge that social variables play a crucial role in human conflict whether in rich or poor countries. Homer-Dixon and his Toronto team discussed at length the political, economic and cultural factors that interact with environmental scarcity to cause violence. Societies most vulnerable to environmentally-induced violence are those simultaneously experiencing severe environmental scarcity and various forms of institutional failure such as failure of states and markets that ultimately hinder social adaptation to the scarcity.

It is therefore essential to acknowledge both social and physical variables in environment-conflict research but it is most important to note the influence of environmental scarcity to social variables. Homer-Dixon (1999:17-18) provides three reasons to support this notion. Firstly, as discussed earlier in the chapter, environmental scarcity is not only influenced by social variables but it can in itself affect social variables. Secondly, the degree of environmental scarcity a society experiences is not wholly a result of social variables like failed institutions and policies but it is partly a function of particular physical characteristics of the society's surrounding environment. Lastly, once environmental scarcity becomes irreversible,

then the scarcity is almost by definition an external influence on society (Homer-Dixon, 1999:17-18).

In response to Lowi's (1996) critic, Homer-Dixon's environmental scarcity theory has shown that water resources, just as any other economic resource, have the potential of being subject to pressure from population growth, depletion and degradation, and uneven distribution. And this causes tension and conflict among users.

Fourth, Gleditsch's (1998:390-1) assertions regarding *"untestable models and complex theoretical schemes"* face contradictions in that he would contend that the environment-conflict literature to date is overly simplistic and simultaneously demand for a simplistic model, claiming that Homer-Dixon's models are not testable (Gleditsch, 1998:391). Given the fact that the link between environmental scarcity and conflict is indirect, this forbids the model from omitting variables that correlates with the key independent variable of environmental scarcity (Schwartz *et al*, 2000:86).

According to Martin (2005:330) *"environmental scarcity acts as an indirect cause of conflict by triggering traditional causes of conflicts such as ethnic differences. Such amplification of existing social fault-lines is associated with institutional failure that is linked to scarcity and poverty"*.

Omitting variables from the model in the name of *"testable models"* will only weaken the environment-conflict linkages and research. If environmental scarcity were either a necessary or a sufficient cause of conflict, it would be possible to reduce what Gledistch claims to be a *"model complexity"* (Gleditsch, 1998:391). Many critics should acknowledge the fact that in order to understand and deal with complex systems (i.e. similar to that of the NRB), requires powerful and complex theories. The complexity of Homer-Dixon's model captures a number of variables that play a pivotal role in the environmental-conflict linkages.

Fifth, however, in response to the argued biasness associated with selecting case-studies, it is necessary to select cases based on observed changes in both the independent variable (environmental scarcity) and the dependent variable (violent conflict) in order to understand whether a causal link exists or not between environmental scarcity and violent conflict. And to do so, Homer-Dixon and the

Toronto Group opted for the adoption of a case study approach in which cases are selected on the basis of observed change in both variables.

Barnett (2000:283) argues that Levy's (1995s) suggestion of comparing different case studies seems problematic in that similar cases cannot be found given the different ecological, cultural and political background of regions and states. Also, due to Homer-Dixon's (1991:116) area of investigation of *"how environmentally induced conflicts occur"* instead of *"where they occur"*, a method of case selection is used focusing on developing countries where environmental conflicts are prone to occur. It is because in these areas, institutional capacity to adapt to environmental stress is weak.

Although case studies may be intentionally selected on the basis that environmental scarcity and violent conflict are known "*a priori"* to exist, however, a process-tracing[10] to determine whether environmental scarcity and violent conflict are causally linked is employed.

According to Schwartz *et al* (2000:86), the concern that researchers may overlook other variables is misplaced because case-study researchers should detect such situations by using theories that are cautious of other likely causes of changes in the value of the dependent variable. And as such, the environmental scarcity theory is one such theory that through its tripartite definition of environmental scarcity is able to anticipate potential false causal mechanisms.

Sixth, it is undeniably true that such reverse causation where conflict may exacerbate environmental scarcity exists; however, the environmental scarcity theory was not focused on this possibility. This is evident in the questions and hypotheses raised earlier by the chapter regarding this cause and effect relationship. Also, the process-tracing applied by the theory with regards to the Nile's disputes has offered the best way of discovering this causality. Homer-Dixon relies on process-tracing to in order to identify general patterns of environment-conflict linkages across multiple cases (Homer-Dixon, 1999:9).

[10] Process tracing is a tool of qualitative analysis used to examine and analyze selected evidence by evaluating causal claims in light of research questions and hypotheses posed (Collier, 2011:823).

Lastly, Gleditsch's (1998:393) assertions that the Toronto Group uses *"future as evidence"* to substantiate its claims that there is a link between environmental scarcities and conflict is unfounded. In developing their model and substantiating their theoretical claims, the Group undertook a number of detailed historical case studies (Homer-Dixon's, 1991; 1994; 1999). Given the recent nature of the Nile's disputes, however, the theory included historical accounts informed by literature on the population growth in the NRB, degradation and depletion of the Nile, and verbal disputes and agreements between riparian countries, which helped support claims of a potential future conflict. And this will be evident in the theoretical application that will follow.

It is important for Levy (1995a) to note that Homer-Dixon's environmental scarcity theory for most of its part focuses on violence in contrast to security *per se.* It is also important for him to note that Homer-Dixon's (1991, 1994, 1999) work places no emphasis on interventionist strategies and/or methods of redressing environmental and developmental problems (Barnett, 2000:283).

Despite a wide variety of criticisms ranging from a deterministic perspective of Homer-Dixon's causality model, the quality of case studies and untestable models among others levelled at his work, nevertheless, his research presents a practical empirical attempt to better understand the environment-conflict linkages. Furthermore, His work provides an outstanding platform for further environment-conflict studies.

Only by understanding water wars and the disparities that exists between riparian countries in basins do we capture the possibility of an inter-riparian conflict. None of the hypotheses in the model and in the theoretical underpinnings of the Nile depend on events yet to come but rather is informed by events that have already and/or are already taking place.

The Toronto Group also made notable assumptions worth testing. As discussed in Chapter 1, Homer-Dixon's (1999:139) assertion of "*the surge of water wars between upstream and downstream neighbours"* is likely only in a *"narrow set of circumstances"* which include: firstly, the downstream country's national security or survival must depend heavily on the constant flow of a river in its direction. Secondly, the attitude of upstream countries must be threatening to the flow of the river.

Thirdly, the relations between upstream countries and downstream countries must be that of unpleasantness. Fourthly, the downstream country must be militarily stronger than the upstream countries. And finally, fearing that upstream countries may limit water flow or use water as leverage, the downstream country may use intimidation or direct force (Homer-Dixon, 1999:139). The NRB is the best example where all these conditions hold now or might hold in the future.

Homer-Dixon's (1991;1994;1999) analysis of over a dozen case studies to better understand the causal mechanisms that might connect environmental scarcity and conflict has enabled the study to analyse the NRB within the environment-conflict context. Although Homer-Dixon's case studies were single case studies, the study focused on a multiple case study approach and believes that the Nile forms part of the Toronto Group's theoretical model about the linkages between environmental scarcity and violent conflict.

Homer-Dixon's (1991, 1994, 1999) research on the prospects of environmental stress and conflict both within and among states focuses on three types of environmentally induced conflict. Firstly, interstate conflict as a result of resource scarcity . Secondly, subnational or intrastate conflict as a result of population movements. And lastly, subnational or intrastate conflict resulting from environmental stress that exacerbates economic deprivation and disrupts key social institutions.

The study upholds its support for Homer-Dixon's environmental scarcity theory on the grounds that it maintains a dual understanding of the human-environment relationship. It does this by showing how humans are threatened by the environment vis-a-vis. (Barnett, 2000:285). In furtherance of its support for Homer-Dixon's environmental scarcity theory, the chapter will provide a theoretical application to illustrate a practical competence of environmental scarcity as a tripartite concept. And to also better the environmental scarcity model and variables involved in the model.

Below the chapter provides for a theoretical application to the Nile as a case study as evidence to support its environmental scarcity approach and the hypothesis regarding simple scarcity conflict between states over water. Also, this theoretical application serves to indicate a practical link between environmental scarcity (i.e. demand-induced, supply-induced, and structural-induced scarcities), the NRB and a potential for violent conflict in the NRB.

## 2.3 Theoretical application: environmental scarcity theory in the Nile River Basin

### *2.3.1 Demand-induced scarcity: Population growth in the Nile River Basin*

According to Savanije and van der Zaag (2000:14), water scarce countries which often have high rates of population growth frequently find themselves involved in intra and interstate conflicts over scarce water resource. This increase in the demand for water resources generates a number of problems facing many international rivers (Marty, 2001:14).

According to Baecher *et al* (2000:11), the countries along the Nile are confronted with population growth. They argue that continued population increases will certainly add to the future water demands in the basin. The use of the Nile for a growing population can therefore become a source of conflict. The *Nile Basin Initiative* (2012a) points out that population growth in the NRB is increasing at an unprecedented rate. In 2010, the total population of the basin countries was 424 million, of which 232 million lived in the basin. The initiative also estimated that by 2025, in the inland parts of the basin countries' the population will grow to 600 million people and more than 300 million people living along the Nile basin.

The United Nations Population Division (UNPD) estimates that the total population in the NRB will reach 647 million by 2030, which represents an increase of 7.8 per cent from the population in 2025 and 52 per cent from the population in 2010. It also estimates that just over half of these people will be living within the basin boundaries (*Nile Basin Initiative*, 2012b:228). According to the World Water Council report (2006), the population growth concentrated in the river basin and the migration to the

NRB has exacerbated population activity. This rapid population growth increases pressure on the natural resource base (UNEP, 2006:1).

As the population in the basin is expected to continue growing in the coming years, societies living close to the world's longest river are confronted by pressing social, environmental and economic challenges (UNEP, 2006:1-5). Baecher *et al* (2000:12) indicates that urbanisation will also pose special challenges as most NRB countries are expected to increase their urban populations dramatically. Challenges posed by urbanisation are related to the demand for water supply such as water delivery, drinking water, sanitation and wastewater treatment.

Demand-induced scarcity caused by population growth is worsening. This is exacerbated by the fact that per capita water availability in the NRB countries is expected to fall dramatically (Okbazaghi, 2008:5). With the predicted fall in per capita water availability, disputes over water supplies will become a serious cause of conflict among these riparian countries. For instance, it is predicted that by 2025, Egypt, Ethiopia, Kenya, Rwanda and Burundi will experience water scarcity, while Uganda, Tanzania and Eritrea will be under water stress (Karyabwite, 2000:6-7).

Xercavins (1999:158) asserts that water scarcity is a condition in which the annual availability of internal, renewable fresh water is 1,000 cubic meters or less per person (CBM/p.p). Water stress is a condition in which the annual availability of internal, renewable fresh water is less than 1,667 and greater than 1,000 CBM/p.p in the population.

> Water scarcity is the point in which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be fully satisfied. Water scarcity is a relative concept and can occur at any level of supply or demand. Scarcity may be a social construct (a product of affluence, expectations and customary behaviours) or the consequence of altered supply patterns stemming from climate change for example (UNDESA, 2013).

According to the UNEP (2012:18), the concept of water stress applies to situations where there is not enough water for all uses, whether that be agricultural, industrial or domestic use. Based on these criteria, the United Nations (UN) estimates that by

2025, 1.8 billion people will be living in countries or regions with absolute water scarcity and two-thirds of the world's population could be under conditions of water stress.

A fall in per capita water availability coupled with rapid population growth leaves most of the riparian countries with internal and interstate conflicts, immense droughts and famine. Ethiopia, despite it being the source of the Blue Nile, has been faced with worsening drought conditions and famine between 1965 and 2006, making it highly dependent on international food aid (Okbazaghi, 2008:5). Adding to the fall in per capita water availability are the agricultural activities that feed the growing population, which increases nonpoint pollution, siltation and erosion (Baecher, 2000:11). The extent of water scarcity in the region has pushed the Nile water from being a low policy priority to a top national policy priority (Okbazaghi, 2008:5). The estimated growth in the population of the basin countries will place immense pressure on the Nile and its resources leading to severe degradation and negatively affecting and/or reducing outputs (Okascha, 2012:15).

### *2.3.2 Supply-induced scarcity: Water scarcity in the Nile River Basin*

Parts North-Eastern of Africa represents one of the most water scarce areas in the world. The NRB remains the region's only reliable source for renewable water supplies. However, the Nile water does not flow in sufficient quantities to satisfy the future water demands of all these riparian countries (Ohlsson, 1999:211).

The NRB is facing challenges of water scarcity as NRB countries are known for their arid and semi-arid conditions. According to Ashton (2002:5), the southern and the northern portions get less rainfall than their equatorial neighbouring countries. For instance, 98 per cent of Egyptian territory is desert, with Ethiopia, Sudan and Kenya receiving between 200 and 800 mm/year of variable rainfall (Chesire, 2010:15). Karyabwite (2000:6-7) argues that rainfall in the Nile region varies from zero in the Horn of Africa to more than 400 mm/year in Sudan's Western Equatorial region. This discrepancy in rainfall negatively influences the annual flow of the Nile. The estimated decrease of water available to the Nile countries is largely due to the population increase in the basin.

Water scarcity along the Nile has intensified the potential for conflict between upstream and downstream riparian countries. This scarcity is a result of factors such

as degradation, distribution and population growth, among others. The effects of Nile scarcity are substantial factors that lead to internal strife and conflict between nations (Wiebe, 2001:736). As scarcity of water increases in the NRB, so does the dependency of the riparian countries on the Nile for their development (Kassa, 2010:472).

The water security situation in the North-Eastern region of Africa is worsening. The region faces challenges from climate change and the resulting continual threat of drought. The already precarious water situation is also threatened by pollution from sprawling riverbank communities. This is the biggest problem with transboundary basins where pollution from one area flows into another area (Di Nunzio, 2013:2).

The high dependence of all eleven riparian countries on the NRB and the rapid population growth depletes the region's already scarce water supplies as demands from agriculture, industry and domestic use rise (Di Nunzio, 2013:2). For instance, population size affects agricultural productivity. Agricultural activity is affected by resource degradation, which is affected by the land-use decisions people make based on population size (Baecher *et al*, 2000:11). Inappropriate land-use practices and farming techniques such as overgrazing by domestic livestock, agricultural practices in irrigated and large scale farms in rain-fed areas and poor cultivation practices have the greatest impact on land degradation. These practices are the most common land-use practices in the NRB.

Egypt is a major contributor to the environmental degradation of the Nile. Cairo's contribution to degradation comes as a result of rapid urbanisation, inefficient irrigation, pollution and regional upheavals (Dakkak, 2013; Ayad, 2013). According to Dakkak (2013), the rapid population growth in Egypt, which is projected to grow from its current total of 80 million to 98.7 million by 2025, poses a threat to Egypt's water supply. This increase in population growth will require more water for domestic consumption and irrigation purposes.

Environmental degradation and depletion in Cairo poses an alarming threat for conflict in the region. In the near future, high levels of water degradation assume that Cairo will consume approximately 20 per cent more water than it already does. This supposes that other riparian countries will be left with little if any water to consume for developmental purposes. This minimal consumption by other riparian countries at

the hands of their downstream neighbour, who has maintained dominance over the use of the Nile for decades, makes the potential for disputes and conflict more likely. The water issue in Egypt is rapidly assuming alarming proportions. With the lack of effective and efficient water conservation techniques, other riparian countries' water supply are being highly affected (Dakkak, 2013).

Without a cooperative framework, countries along the Nile such as Burundi and Ethiopia are taking advantage of the Arab spring and the political strife that has engulfed Egypt and are gaining more control over the Nile. With the Nile supplying 95 per cent of Egypt's freshwater, losing some of the water supply can cause additional problems for Egypt (Dakkak, 2013).

Another cause of NRB depletion is global greenhouse emissions. This argument is consistent with the effects of climate change in Ethiopia. Climate change in Ethiopia has led to both a more variable climate and more extreme weather events such as the drought that has engulfed the entire country as witnessed between the periods of 1970-1980 (Rahman, 2011). Kim and Kalaurachchi (2009:1363) argue that global warming as a result of climate change and greenhouse emissions is one of the leading contributors to the current decline in the NRB water resource. This severe impact of global warming is also significant to the reduction of underground water in the Blue Nile in Egypt and Sudan.

Development along the Nile has led to water resource pollution by many riparian countries. This water resource pollution dates back to the Ethiopian and Eritrean wars in the late 1990s. Military accoutrements and missile deposits were thrown into the Nile River, polluting a substantial part of the river basin (Rahman, 2011).

The manner in which the land, water and watershed[11] have been degraded in the NRB has produced and sustained poverty. These resources fail to provide a sustainable or desired flow of water to neighbouring communities and countries, and therefore exert even greater pressure on the available water resources for agricultural and industrial purposes. Another problem related to degraded watersheds is that they often lead to erosion and therefore export water of poor quality that affects downstream countries (Baecher *et al*, 2000:39). Factors such as

[11] Also referred to as a drainage basin or catchment area, a watershed is an area or ridge of land that separates water flowing to different rivers, basins or seas (Wani and Garg, 2009:3).

land degradation, agriculture, industry and domestic use are paramount to depletion and degradation of the Nile.

#### 2.3.2.1. Land Degradation

Land degradation is inextricably linked to the quality, volumes and timing of water flow in the basin (Baecher *et al*, 2000:73).Land degradation has become a huge challenge within and between the Nile countries (Di Nunzio, 2013:6). For instance, the Rwandan genocide led to massive displacements that left 60 per cent of its forest damaged and 70 per cent of its land severely degraded (Bigagaza *et al*, 2002:51-2). Burundi on the other hand, has lost 30 per cent of its land to degradation (Kigomo, 2003).

In 2002, 30 per cent of Kenya's land faced severe degradation. By 2008, one-third of its population was dependent on this degraded land. This is similar to Sudan, where 76 per cent of its population resides in degraded areas. The highlands of Ethiopia, Uganda and Tanzania are also subject to degradation. Egypt's north-western delta faces the highest degradation due to contamination and increased salinity. This could be, in many cases, because Egypt lies downstream and receives water flow after it has been polluted downstream (Desta, 2012:10-13).Practices such as poor cultivation, especially evidenced in parts of the Ethiopian highlands and the Egyptian delta, are severe and have contributed greatly to soil erosion.

#### 2.3.2.2. Agriculture

Agricultural practices on the other hand have the potential to contribute to nonpoint pollution from the use of chemical fertilisers and pesticides (Somboek and Sene, 1993; Baecher *et al*, 2000:73).Agriculture is the largest consumer of water in Egypt using about 85 per cent of available water. Drainage water from agricultural fields contains pollutants such as pesticide residues, toxic organic and inorganic pollutants, salts and treated and untreated domestic wastewater (Water Policy Program, 2002:6). There are over 90 agricultural drains discharging into the Nile that also include industrial wastewater. This drainage has led to a high salinization (i.e. a build-up of salts in the soil) and saline intrusion (i.e. when the ground is saturated with saltwater) in the delta. This build-up of salts in the soil means the soil cannot retain water, which prevents anything from growing (NBI, 2005). Such effects on the

soil, which then cause a decline in precipitation, tend to favour soil erosion (Libiszewski, 1992:3).

Given that domestic agricultural demand to sustain a growing population has exacerbated the scarcity of water, this growing demand is not only limited to the basin countries. For instance, India and Saudi Arabia have turned to large-scale land and agricultural investments in upstream countries (i.e. Ethiopia, South Sudan and other East African countries) to help feed their own growing populations (Lamere, 2012). Half of Egypt is desert and only 6 per cent of the country is arable agricultural land. Egypt receives less than 80 mm of rainfall a year, forcing the country to depend on inefficient methods of irrigation such as excessive watering and the use of wasteful irrigation (e.g. where gallons of water is pumped over the crops).

Agricultural runoffs, industrial effluents and municipal sewage are being recklessly dumped into the Nile, leaving its water unfit for human consumption. Agricultural runoffs contain pollutants such as pesticides and herbicides, which have negative effects on the river and the people using it. Industrial effluents containing heavy metals are highly toxic (Dakkak, 2013).

#### 2.3.2.3. Industry

Mining, although not widespread in the basin, is another source of both erosion and runoff pollution. It has been noted that mines in Kilembe, Uganda, release large quantities of copper and cobalt into streams and rivers on surrounding lakes (Kwetegyeka*et al*, 2014:482). There are also 36 industries that discharge their pollutants directly into the Nile, and into the irrigation canals. These types of industries include chemical, electrical, engineering, fertiliser, food, metal, mining, oil and soap, pulp and paper, refractory, textile and wood (*Nile Basin Initiatives*, 2005). Most of the residents in the region depend on irrigated agriculture for their livelihood, and 29 billion cubic metres (BCM) of drainage water loaded with fertilizers, pesticides, and organic material is returned to the Nile annually upstream from Cairo. More than 50 major factories discharge approximately 250BCM per year (BCM/yr) of industrial wastewater (Ayad, 2013).

#### 2.3.2.4. Domestic use

Upstream of Cairo (i.e. to the south of the city), the Nile receives large flows of mostly untreated domestic, agricultural, and industrial wastewater. For instance, between the Aswan High Dam and Cairo, 43 towns with a population exceeding 20 million and approximately 2,500 villages discharge their waste into the river. In villages, where the only available water is from irrigation canals, women use the water for domestic purposes and dump the used water back into the drainages. Poverty on the other hand has forced people to use unsustainable means to survive (World Bank, 2008: 1-2). Communities concentrated along the NRB depend heavily on farming, but the ensuing drought, famine, population growth and land degradation have affected the NRB water resources. This is due to excessive burning for land cultivation along many parts of the Nile River, which has virtually eroded the land, making cultivation and water conservation extremely tough (Rahman, 2011).As argued by Kofi Anan:

> … unsustainable practices are woven deeply in to the fabric of modern life. Land degradation threatens food security. Forest destruction threatens biodiversity. Water pollution threatens public health and fierce competition for fresh water may well become a source of conflict and wars in the future. (UN Press Release, 2001).

### *2.3.3 Structural-induced scarcity: Water distributions in the Nile River Basin*

International river basins have become tense are as due to competitive exploitation. Consequently, disputes have become inevitable (Kliot*et al*, 2001:230). However, the argument that water scarcity will lead to conflict in the NRB is contested by an opposing view that water scarcity is likely to force cooperation between riparian countries. This would be true only if the underlying cause of water scarcity in the NRB was not the politics of distribution (Pakes, 2013:434).

One of the most contentious issues related to the Nile River is the use of available water resources (UNEP, 2006:2-4). Water scarcity is not only a result of the amount or scale of rainfall, but also of the agreements that govern the Nile. These agreements have rendered the use of water between the upstream and downstream riparian countries unequal.

The use of the Nile has always been and remains a controversial issue. Water is already scarce in some parts of the basin and the current distribution of water in the area has serious global political consequences and is fundamental to the developmental processes of the respective countries (Oestigaard, 2012:25).This uneven distribution also bears many local political, economic and social implications.

According to Haftendorn (1999:10), the impact of resource distribution, specifically water, carries many political implications in local, state, regional and international spheres. In shared basins, the lower or upper-lying riparian country can control the quantity and quality of water flow by means of its military might and hydrological situation. Political actors may often also use resources as objects of military and political action in an effort to extend their influence in such regions (Conca *et al,* 2000:1).

An example of this is the defining influence of Egyptian foreign policy towards states in the basin. Egypt, being the stronger party, provokes, initiates or prevails with military action against its weaker adversaries, thereby increasing the potential for conflict. The issue of controlling the Nile has been central to political decision-makings in Cairo (Hassan and Rasheedy, 2011:149).

The Nile, as an internationally shared river that extends across political borders, has created political, social and economic tensions and disputes between upstream and downstream countries concerning the distribution and use of the water. These include misunderstandings or lack of beneficial agreements about the allocation of water (Conca *et al*, 2000:1).

Egypt's close relationship with a succession of major powers has also helped it to exert its influence over the Nile. The United Kingdom (UK) until the 1950s, the Soviet Union until the mid-1970s and the United States (US) ever since, have provided the political and financial support to cement Egypt's position in the basin, through legal treaties if possible, and simultaneously influence the construction of infrastructure for power generation, storage and irrigation (Verhoeven, 2013b).

The Nile therefore became subject to numerous agreements. Many bilateral treaties were concluded between Egypt, Britain and other foreign or European powers to regulate the use of the water of the Nile (Okoth-Owiro, 2004:1). Egypt became important to the British for the following reasons:

- Firstly, Egypt, through its control of the Suez Canal, became the easiest and quickest way to India as opposed to the Cape of Good Hope.
- Secondly, Egypt is strategically located between the UK and India. This strategic position became important to the British for them to maintain communication with India.
- Thirdly, during the American Civil war, Britain shifted attention to Egypt for its cotton.
- And finally, the Nile River presented itself as a source of water and flood control when it was required to move from the traditional flood-fed methods of irrigation to an increased reliance upon perennial irrigation (Luscombe, 2012). It was in this instance that the UK, which had become reliant on the agricultural exports of the Nile region, saw allocation between Egypt, British East Africa and Sudan as the means for irrigation purposes (Knobelsdorf, 2006:5).

Godana (1985:176) also argues that for the regulation of the European colonial rule over most of the Nile region, it became necessary to establish treaties and instruments that would attach the water rights and obligations to Europe within the basin. However, it is important to consider prior treaties regarding the use of the Nile which culminated in the current nature and context of both the 1929 and 1959 Agreements.

A series of agreements deemed responsible for structurally denying upstream riparian countries access to, and use of the Nile include:

- the 1891 Protocol between the UK and Italy for the demarcation of their respective spheres of influence in Eastern Africa
- the 1902 Anglo-Ethiopian Treaty for the delimitation of the frontier between Ethiopia and the Sudan
- the 1906 Treaty between the UK and the Independent State of Congo to re-define their respective spheres of influence in Eastern and Central Africa
- the 1906 Tripartite Agreement and Set of Declarations between the UK, France and Italy
- the 1925 Exchange of Notes between Italy and UK

- the 1929 Agreements: Exchange of note between His Majesty's government in the United Kingdom and the Egyptian government on the use of the Nile for irrigation
- the 1959 Agreement: Agreement between the Republic of the Sudan and the United Arab Republic for the Full Utilization of the Nile.

These series of agreements shared the principle of protecting Egyptian interest in the Nile region. They stipulated that countries would not construct or cause to be constructed irrigation or any work that might negatively affect the flow of the Nile to Egypt. The UK, France and Italy argued that they were acting on behalf of upstream riparian countries. For instance, with the fear that the Italians, acting on behalf of Eritrea, may construct on the upper Nile, the British warned Italy to avoid any access or construction on the Nile in exchange for the recognition of an Italian sphere of influence in the Ethiopian Highlands (Yacob, 2014).

Article 3 of the 1891 protocol sought to protect Egyptian interest in the Nile's Atbara River, the upper reaches that were within the newly acquired Italian possessions of Eritrea (Okoth-Owiro, 2004:6). Provisions of the Article stated:

> The Italian Government engages not to construct on the Atbara, in view of irrigation, or any work which sensibly modify its flow into the Nile, (Degefu, 2003:95).

It was through this demarcation process that Britain, to assure the Italians' acquiescence, agreed to recognise Ethiopia as an Italian sphere of influence, thus formally denying Ethiopia its independence (Degefu, 2003:95).

Article 3 of the 1902 Anglo-Ethiopian Treaty stated:

> His Majesty the Emperor, Menelik II, King of Kings of Ethiopia, engages himself towards the Government of His Britannic Majesty not to construct or allow to be constructed, any works across the Blue Nile, Lake Tana or the Sobat, which would arrest the flow of their waters into the Nile except in agreement with his Britannic Majesty's Government and the Government of the Sudan, (Rubenson, 1991:302; Okoth-Owiro, 2004:7; Yihdego, 2013:1).

Article 3 of the 1906 Treaty between the UK and the Independent State of Congo stipulated:

> The Government of the Independent State of Congo undertakes not to construct or allow to be constructed any work over or near the Semliki or Isango Rivers, which

> would diminish the volume of water entering Lake Albert, except in agreement with the Sudanese Government, (Treaty Series no.4, 1906:c36; Okoth-Owiro, 2004:7).

The 1906 Tripartite Agreement, on the other hand, acted as a confirmation of the terms of the protocol between the UK and Italy, and the Anglo-Ethiopian treaty. The three parties recognised the principle of non-interference with the flow of the Blue Nile. Article 4 (a) of the tripartite treaty stated:

> France, Great Britain and Italy shall make every effort to preserve the integrity of Ethiopia, in an effort to safe guard the interests of Great Britain and Egypt in the Nile Basin, more especially as regards the regulation of the waters of that river and its tributaries, (Yihdego, 2013:1).

Under the 1925 Exchange of Notes between Italy and the UK, Italy recognised the rights of Egypt and Sudan in the Blue Nile and the White Nile and their tributaries, and agreed that it would not construct any work which might modify their flow into the main river (Okoth-Owiro, 2004:7). The British interest was not limited to the river alone, but included the control of the source, i.e. Lake Tana in Ethiopia, which is the largest lake. Italy stated:

> … we have noted Britain's determination to control the Blue Nile for the Benefit of Egypt and the Sudan, (Degefu, 2003:111).

According to Knobelsdorf (2006:5), these series of negotiations and understandings became what are known as the 1929 Nile Water Agreements.

#### *2.3.3.1 The 1929 Agreements: Exchange of note between His Majesty's government in the United Kingdom and the Egyptian government on the use of Waters of the Nile for irrigation.*

The sole purpose of the 1929 Agreements was to guarantee the 1920 estimates made by the Nile Project Commission, with representatives from India, the UK and the United States of America (USA) (Lumumba, 2007:22).With the Nile Rivers' average flow of 84 billion BCM/yr, these estimates suggested that Egypt would need 48 BCM/yr and that Sudan's irrigation would survive on the Blue Nile alone which

accounted for approximately 4 BCM/yr. This left 32 BCM/yr unallocated (Wolf and Newton, 2008). Due to the fluctuation of the river, it was agreed that during any change in the flow, gain or shortfall, the Nile water will be divided evenly between Egypt and Sudan (McCaffrey, 2003:265; Okoth-Owiro, 2004:8; Lumumba, 2007:12-13).

These estimates led to the Nile Waters Agreements on the allocation of water between Egypt and Sudan, also known as the Anglo-Egyptian Sudan. The 1929 Nile Agreements was therefore signed on 7 May between Egypt and the United Kingdom (the then colonial master of Sudan) for the purpose of sharing the Nile water. These Agreements were signed as a means for both countries to engage in comprehensive large scale control of the Nile (Kieyah, 2007:7-8).

According to Dunoff and Trachtmann (1999:24), the Agreements grant Egypt extensive use of the Nile. The Agreements stipulate that Egypt has a right to use the Nile and a property rule to protect this right. This was done with Egypt's exclusive propriety right to the Nile without obligation, consent or even voluntary transfer of property rights from Egypt to other riparian countries (Kieyah, 2007:19).

Through these Agreements, Egypt was guaranteed a claim to the entire timely flow (from January to July); rights to on-site inspectors at the Sennar Dam built in Sudan; and that no works would be developed along the river or on any of its territory which would threaten Egyptian interest (Wolf and Newton, 2008). It is in these Agreements that Egypt was granted power over any upstream countries' projects in the southern Nile that concerned the Nile, and Sudan was bound to Egypt's approval before undertaking any irrigation project.

To further Egypt's hegemony over the Nile, the Agreements also required prior consent of the Egyptian Government by Sudan or countries under the British administration for undertaking any irrigation works or installing electric generators. Note No.1, para.4 (b) of the Agreements argued this concerning the quantity of water flowing into Egypt from the branches and lakes of the Nile (International Water Law Project, 2014a). This was another clear symbol of the UK's lack of representation and its compromise of its upstream colonies. According to Oloo (2007:101), in the process, Egypt carried out a series of major water projects that enabled it to acquire

extensive control over the Nile by appropriating large portions of the Nile water and bringing the flow within its sovereign jurisdiction.

The enactment of the 1929 Agreements enabled Egypt to use note No.2, para.4 of the Agreements to argue the following on the basis of natural and historical rights (Knobelsdorf, 2006:6):

> Her Majesty's Government in the United Kingdom has already recognized the natural and historical right of Egypt to the waters of the Nile....Her Majesty's Government in the United Kingdom considers the observance of these rights as a fundamental principle of the policy of Great Britain... (International Water Law Project, 2014a).

Although the 1929 Agreements served as the basis for principles of Nile water allocation, it did not guarantee the full use or exploitation of the Nile water; hence, the need for a revised agreement. The1929 Agreements were revised on 8 November 1959 through the 1959 Agreement (UN, 1974:65).

#### *2.3.3.2 The 1959 Agreement: Agreement between the Republic of the Sudan and the United Arab Republic for the Full Utilization of the Nile Waters.*

In 1959, Egypt and Sudan concluded an Agreement. This bilateral agreement was entirely exclusive in that it allocated the entire flow of the Nile water at Aswan to Egypt and Sudan thus effectively excluding other Nile riparians (Knobelsdorf, 2006:8; Lino, 2013:12).

Abseno (2013:146) argues that the Nile is recognised by the two countries as their respective historic and acquired rights. According to Caponera (1993:661) a nation enjoys the right to water that has been currently or historically used by that nation. Acquired rights according to Sinclair (1996:87), means a right acquired under law to impound, divert, or use water.

Contrary to the 1929 Agreements, the 1959 Agreement made reference to other riparian countries. Article 5, para.2 (a) states:

> As the riparian states, other than the two Republics, claim a share in the Nile waters, the two Republics have agreed that they shall jointly consider and reach one unified view regarding the said claims, (International Water Law Project, 2014b).

Ethiopia for instance, reserved its rights to the Nile in 1956, 1977 and 1980. Kenya, Uganda and Tanzania also reserved their rights in the *Nyerere Doctrine of Treaty*

*Succession*, refusing to be bound by colonial-era agreements (Kliot, 1994:86). However, the agreed *"unified view"* by both Egypt and Sudan was to reject all these claims.

The adoption of the 1959 Agreement replaced allocations set forth in the 1929 Agreements and established a "*joint*" bilateral full use of the Nile water between Egypt and Sudan (Demeke 2013). The two purposes mentioned in the introductory stipulations of the 1959 Agreement specify both Egypt and Sudan's intentions to claim full control over the Nile water and to make solid future claims of the Nile.

According to these introductory stipulations:

> The Nile River projects require for their execution and administration, full agreement and cooperation between the two Republics in order to regulate their benefits and utilize the Nile waters in a manner which secures the present and future requirements of the two countries; and, as the Nile waters Agreement concluded in 1929 provided only for the partial use of the Nile waters and did not extend to include a complete control of the River waters, the two Republics have agreed on the complete control of the River waters, (International Water Law Project, 2014b).

Nonetheless, the 1929 Agreements remained the yardstick for the 1959 Agreement. As such, the 1959 Agreement did not differ much from the 1929 Agreements in that it continues to render full control over the Nile to Egypt. The establishment of the 1959 Agreement also evidenced the same behaviour as the 1929 Agreement. This was mainly to grant Egypt total control of the Nile with huge economic benefits and the bonus of hydropower (Allan, 1999:4-5).

In short, both Agreements give Egypt and Sudan absolute rights to use 90 percent of the river's water, leaving the upstream countries to share 10 per cent, which creates an unsustainable solution. This solution impairs developments in upstream countries as they are forced to abandon certain projects due to limited access to water, or to get approval from Egypt to use the Nile water or construct water-related projects (Kameri-Mbote, 2007:3).

The 1929 Agreements granted the vast majority of the Nile water to Egypt, with 48 BCM/yr over the total average of 84 BCM/yr of the Nile's water flow, and granted Sudan 4 BCM/yr. However, Art.1, para.1-2, and Art.2, para.3-4 of the 1959 Agreement ensured that the unallocated 32 BCM/yr was also divided between Egypt

and Sudan according to their respective needs (Wolf and Newton, 2008; International Water Law Project, 2014b).

According to these provisions, the Agreement stipulates that the average flow of the river is considered to be 84 BCM/yr. The Agreement considered evaporation and seepage to account for 10 BCM/yr, leaving 74 BCM/yr to be divided between Egypt and Sudan. The Agreement argued that "*acquired rights*" for Egypt would account for approximately 48 BCM and Sudan would acquire 4 BCM. And the remaining "*benefits*" of approximately 22 BCM are divided by a ratio of 7½ for Egypt and 14½ for Sudan (International Water Law Project, 2014b) (see figure 2).

***Table 1: Water allocation from Nile Agreements (Wolf, 1996:3)***

| Nile average flow = 84 BCM/year | 1929 Agreements | 1959 Agreement |
|---|---|---|
| Egypt (BCM/year) | 48 | 55.5 (48 + 7½) |
| Sudan (BCM/year) | 4 | 18.5 (4 + 14½) |
| | Leaving 32 BCM/year<br><br>unallocated | Leaving 10 BCM/year for evaporation and seepage |

As indicated in the Agreement, these calculations are based on "*historical right*" plus "*acquired rights*". Despite the difficulties in determining, monitoring and quantifying the Nile River flow or its actual total annual flow, since it varies by season and year, the *"average annual BCM"* used to argue for the allocation in the Agreement has taken expected seasonal fluctuations into account (Knobelsdorf, 2006:6-8).

Irrespective of the burden laid upon upstream countries to obtain approval from Egypt if they desired to develop projects, the 1959 Agreement also made the process complex by requiring upstream countries to obtain approval not only from Egypt, but also from a technical committee on the basis of technical oversight and contractual supervision. Art.5, para.1 and 2 of Agreement stipulates:

> If it becomes necessary to hold any negotiations concerning the Nile, with any riparian state, outside the boundaries of the two Republics, the Governments of the Sudan Republic and the United Arab Republic shall agree on a unified view after the

> subject is studied by the said Technical Commission, (International Water Law Project, 2014b).

The said unified view:

> … shall be the basis of any negotiations by the Commission with the said states; and, If the negotiations result in an agreement to construct any works on the river, outside the boundaries of the two Republics, the joint Technical Commission shall after consulting the authorities in the Governments of the States concerned, draw all the technical execution details and the working and maintenance arrangements. And the Commission shall, after the sanction of the same by the Governments concerned, supervise the carrying out of the said technical agreements, (International Water Law Project, 2014b).

According to Katz (2013:1256), although the 1959 Agreement replaced, altered or updated allocations argued in the 1929 Agreements, it did not entirely replace the obligations of the 1929 Agreements. The updated allocations were merely a response to the political and agricultural changes and demands since the signing of the 1929 Agreements. Like the 1929 Agreements, the legal consequences of the 1959 Agreement are totally unacceptable (Demeke, 2013). For instance, following the 1959 Agreement, Egypt's plans included substantially increasing the use of Nile water. This was to overcome the challenges of increasing population growth and growing pressure over "*old*" lands in the Nile valley and delta (Cascao, 2009:249).

These challenges were addressed by expanding three major agricultural projects and a government policy of moving people out of these old lands into the newly reclaimed lands in the desert where these projects were taking place (i.e. converting these deserts into land for agricultural and industrial development). These projects have been ongoing horizontally since the late 1990s and they include the West Delta Irrigation Project, the North Sinai Agriculture Development Project, and the South Valley/Toshka Development Project, all of which aim to reclaim thousands of hectares (ha) of land (Cascao, 2009:249).

Of significance is the South Valley/Toshka Project, which started in 1997, has since attracted a high level of criticism from upstream riparian countries mainly because the project aimed to reclaim one-and-a-half million acres of land estimated to require 5 BCM/yr of water. For upstream countries, this means that Egypt will use more Nile

water than it is already using and attain legal rights to additional water allocations (Schilling, 2013).

Egypt's use of both natural and historic rights has constrained relations between upstream and downstream countries, since these rights are contradictory. Al-Din Amer (1997:381) expounds on these rights, arguing that the principle of prior appropriation or the international law principle of "*absolute territorial integrity*" (acquired rights) argues to *"protect the rights of use for the country that puts the water into use first"*. Therefore, downstream countries are given the power to accuse upstream countries of illegally taking measures disadvantageous to their interests. However, the principle of *"absolute territorial sovereignty"* (natural rights) regards water bodies as an integral part of the state's national territory, therefore protecting the sovereignty of countries within which watersheds, lakes and rivers originate.

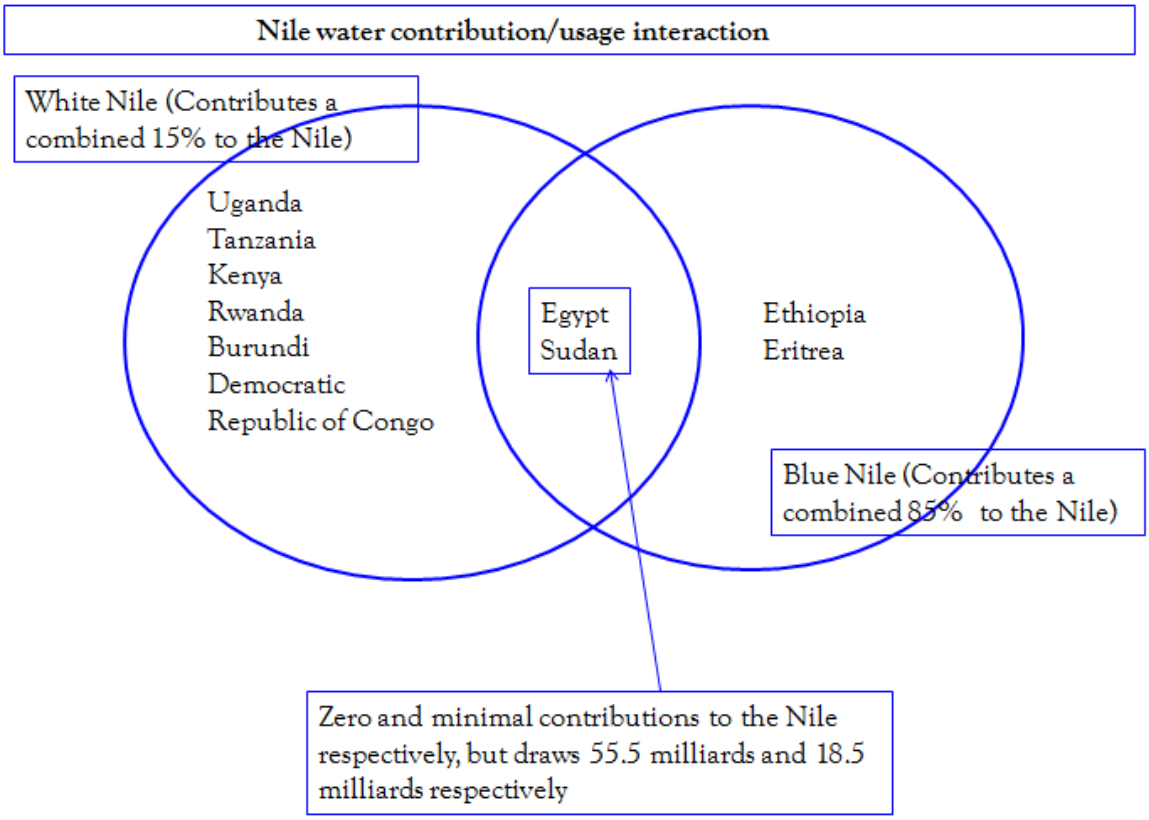
Egypt has relied heavily on its military might to safeguard its position on these Agreements and its rights to the Nile. For instance, in 2005 Egypt's military expenditure was more than twice the military expenditure of the other nine riparian states together (Adar, 2011:183) (South Sudan was not yet formed). This is a clear reflection of how central the security of the Nile is to the Egyptian military plans and Egypt as a whole. According to Yacobs (2004:2), the Egyptian High Command even went out of its way to establish contingency plans for armed intervention in each country in the NRB since they are all perceived as a national security threats to Egypt.

These military plans, also known as *Waraa-elhidoud*, include handling direct threats to the flow of the Nile water. Such behaviour can be traced back to the early 19$^{th}$ century when Mohammed Ali was rebuilding the Egyptian army. However, today full-time staff is appointed at the Nasser Military Academy in East Cairo to review and adjust these military plans to changing modern circumstances (Yacobs, 2004:2). This is proof of Starr's (1991:19) argument that *"water security will soon rank with military security in the war rooms of defence ministries."* It is such behaviour that has forced both upstream and downstream riparian countries to be in a state of preparedness to go to war, just in case there is one (Ashton, 2002:1).

Egypt has therefore structurally deterred upstream riparian states from using the Nile by these Agreements (Chesire, 2010:13). This has left upstream countries in a

position where they cannot develop and even get enough water to their people (Mayton, 2012). And this is despite upstream countries being major contributors to the Nile water (see figure 2). Ethiopia and Eritrea for instance, face challenges of droughts and famine and other severe implications that come with this lack of access to the Nile (Yacob, 2014).

***Figure 2: Nile water contribution and usage (Chesire, 2010:14)***




However, any means to develop and use the Nile has resulted in bitter disputes between Egypt and upstream riparian countries. For instance, Ethiopia has pushed its demands to develop water resources in an effort to address its challenges through irrigation schemes and the construction of dams such as the Grand Ethiopian Renaissance Dam (GERD) (Rahman, 2011). This ultimately resulted in waves of disputes and tensions, as anticipated by the environmental scarcity theory (Homer-Dixon and Blitt, 1998:6; Homer-Dixon, 1999:4). These disputes and tensions are evident between Egypt and Ethiopia.

In 1977, Egypt threatened Ethiopia with war on numerous occasions. For instance, in the same year, Egyptian President Sadat declared:

> … if Ethiopia proceeded there is no alternative but to use our force. We will retaliate when something happens but we have to be ready with plans and alternatives to firmly stop any action, (Adar 2011:182–3).

In May 1978, President Sadat warned:

> We depend upon the Nile100 per cent in our life, so if anyone, at any moment thinks to deprive us of our life we shall never hesitate to go to war because it is a matter of life or death,(Waterbury 1979:78).

In 1979 Sadat reiterated "… *the only matter that could take Egypt to war again is water.*" In 1991, the former Egyptian Defence Minister, Mohamed Hussein Tantawi Soliman, also gave an assurance of Egypt's readiness to use force, if necessary, to protect its control of the Nile.

The militancy expressed by Egypt also relates to its dominance and stature as far as the World Bank, as the main financer of the NBI, is concerned. Egypt is seen to be pushing these international donor bodies. The World Bank has played a major role in denying other riparian states access to the Nile. In 2004, the Ethiopian Minister for Trade accused Egypt of using undiplomatic strategies to control Ethiopia's development projects on the Nile. He stated, "*Egypt has been pressuring international financial institutions to desist from assisting Ethiopia in carrying out development projects in the Nile basin,*" (Braune & Xu, 2010:232).

For instance, the World Bank opposed Ethiopia's intention to construct the GERD Dam. In 2009, during the Alexandria meeting, World Bank officials said they would not fund any projects without the approval of Egypt, stating, "*Egypt is the leading country in this consortium and the World Bank will not get behind any initiative that leaves them [Egypt] out,*" (Green Prophet, 2010; Mayton, 2012). This was not the first time that Egypt had influenced financial institutions to desist from assisting Ethiopia. In 1990, Egypt blocked an African Development Bank loan to Ethiopia for new irrigation projects (Moffet, 1990:5).

On the other hand, Ethiopia's minister of water resources announced at a 1997 conference in Addis Ababa on the *Nile River Basin Action Plan* "… *as a source and major contribution of the Nile, Ethiopia has the right to have an equitable share of the Nile waters and reserves its rights to make use of its waters*." Ethiopia's foreign

minister stated in 1998, "… *there is no earthly force that can stop Ethiopia from benefiting from the Nile,*" (Shinn, 2006:3).

In 2004, Egypt restricted Tanzania from constructing the Lake Victoria pipeline claiming that according to the 1929 Agreements, Tanzania cannot construct any project without British permission. This project would have been of huge benefit to about 400,000 of Tanzania's north-western citizens. Egypt threatened to bomb the construction site arguing that it needed the water to flow northward into the Aswan Dam (Di Nunzio, 2013:6).

Although the nature of the 1959 Agreement supposes a cooperative relationship between Egypt and Sudan, the latter also received its fair share of military threats from Egypt (Deng, 201:39). In June 1995, President Mubarak announced, "*Those who play with fire in Khartoum … will push us to confrontation, [to] defend our rights and our lives,*" (Swain, 2004:102). Deng (2011:52-3) further argues that Sudan received more threats from Egypt than any other riparian; hence, it is also subjected to Egyptian manipulation and plots. This is highlighted by Egypt's interference in aiding the rebel Sudanese People's Liberation Army (SPLA) in southern Sudan (Klare, 2002:154).

It can therefore be concluded that these agreements have systematically denied upstream riparian countries access to the Nile by imposing obligations on their colonial administrations not to construct the Nile. For instance, Italy, acting on behalf of Eritrea and recognised as a sphere of influence in Ethiopia, agreed to these obligations. Belgium, acting on behalf of Burundi, the DRC and Rwanda, and the British acting on behalf of Kenya, Tanzania, and Uganda and with the exception of Sudan, also agreed to these obligations. This rendered Egyptians control over the Nile while compromising these upstream riparian countries' access to the Nile.

Today, all these upstream countries are subject to the same obligations and, because of their lack of access to the Nile or the obligation not to construct the Nile, are faced with serious humanitarian and developmental crises. Although Britain's representation in all the above-mentioned negotiations was meant to include the concerns of its colonies and mobilise upstream development (Paisley and Henshaw, 2013:5), the upstream riparians reject the claim as these Agreements were imposed and the populace had little input in designing or approving them. The Agreements

served primarily Egyptian and a minor British Sudan interest, thus binding the British-controlled upstream riparians to Egyptian interests (Knobelsdorf, 2006:1-5).

In addition, treaties prior to the 1929 and 1959 Agreements have played a huge role in the nature of both the 1929 and 1959 Agreements such as the principle of "*securing recognition of the principle that no upper-basin state had the right to interfere with the flow of the Nile in respect of Egypt,*"(Okoth-Owiro, 2004:7). These Agreements have been a source of structurally-induced scarcities in the NRB.

The Agreements outlined in this chapter provide an indication of the structural-induced scarcity as argued by Homer-Dixon's environmental scarcity theory. This is done in an attempt to provide the theoretical linkage for structural-induced scarcity and the potential for conflict in the NRB. This linkage is argued on the basis that property rights or other institutions are put into place to prevent access to water by other actors. The scarcity and grievances that may result can reinforce existing stress factors and play a role in inciting tensions and disputes (Homer-Dixon, 1999:48; UNEP, 2012:14). Tvedt (2004:480) argues, "*these water sharing treaties have kept Nile Basin countries into conflict over the regions' most precious resource.*"

## 2.4 Conclusion

Water scarcity is already affecting every continent. The demand for water will increase at more than twice the rate of population growth, making the Nile region chronically deprived of water (Baecher *et al,* 2000:39).

Although Homer-Dixon also believes that the issues of environmental scarcity and conflict may not be widely observable until the coming centuries, it is clear that scarcity is central to disputes and tensions in the NRB and in shared water resources.

Homer-Dixon's environmental scarcity theory also supported its hypothesis by indicating the nature and extent of the relationship between environmental scarcity and conflict, and the implications that these three kinds of scarcities have for the potential of conflict among the NRB countries. Homer-Dixon (1999:4) further argued

that environmental scarcity is likely to increase and will cause more internal and international violence.

There is much criticism levelled against environmental scarcity as a cause of violent disputes and tensions. This indicates the existence of extensive literature undermining the idea that the environment of the NRB is continuously subjected to processes of degradation caused by a lack of sustainability and efficient irrigation, increasing population pressure, climatic fluctuations and uneven distribution. This will lead to conflict. As a result, the study saw a need to deepen its understanding of the link between violence and environmental stress.

In this context, the growing demand for water in the region and abroad has been seen to increase the potential for tensions and disputes, which has subsequently increased the need for institutional support structures. Recommendation here include that a new international water agreement is needed for the NRB, one that is initiated by an African organisation or commission (Foulds, 2002:1). The chapter views an institutional framework as an important factor in enhancing and addressing both the management and distribution of the Nile.

# CHAPTER 3: THE AFRICAN UNION AND THE NILE BASIN INITIATIVE: THE APPLICATION OF THE ENVIRONMENTAL SCARCITY THEORY

## 3.1 Introduction

The Nile, as a critical source of water, has gained prominence as a defining factor to the peace and security situation in the Greater Horn and North-East African regions. This is due to the absence of a regional water development cooperation between upstream and downstream riparian countries about two salient features: the management (demand and supply) and the distribution (structural) of the Nile (Sinnona, 2012:3).

This chapter argues that an important factor to better enhance and address both the management and distribution of the Nile is the implementation of institutional support structures. Correspondingly, Godana (1985:264) posits that basin states can only gain by creating a comprehensive commission serving as an institutional vehicle for cooperation. Moreover, the equitable development of the Nile requires either an international institutional structure or a negotiated multilateral treaty regime as a bargaining tool between upstream and downstream countries (Okoth-Owiro, 2004:24). The aim of the chapter is to examine and discuss the role, responses and impact of the AU and the NBI in providing binding measures to the Nile disputes. The chapter will also address the importance of an institutional framework in this regard.

## 3.2 Institutional Framework

Political interactions between upstream and downstream riparian countries over the use of the Nile have affected the regional stability and livelihood of the NRB countries (Sinnona, 2012:3). However, the most significant aspect of these features is the absence of an effective regional organisation and/or commission to address these challenges. A precondition for the successful implementation of water management and sustainability interventions in the NRB is an institutional framework.

According to Othieno and Zondi (2006:2-3),

> There has to be a resolution to the question of balance between who has the historic right to the Nile's water, and issues of sovereign water rights especially with regards to where the river ought to be controlled, whether that be upstream or downstream.

The AU and the NBI both represent highly possible mechanisms for the sustainability, management and use of the Nile. On the one hand the AU, as a regional authority that has as its central role a focus on resolving issues detrimental to peace and stability on the continent, needs critical analysis as a successful mechanism of mediation. Rahman (2011) argues that in the past, a number of ethnic and tribal issues, land disputes and acquisitions in which the AU could easily mediate have dominated Africa's interstate conflicts. However, today the Nile has become a recipe for conflict in the region over the demand, degradation and distribution of water resources.

The fact that the Nile, as an internationally shared watercourse, moves across state boundaries and is a source of life for surrounding communities, yet is unevenly distributed, raises numerous red flags for the potential of conflict (Urdal, 2005:419). It is in this context that we need to critically analyse the role of a regional authority as a critical remedy.

On the other hand, the NBI poses as a successful mechanism on the basis that it is an inter-riparian commission aimed at coordinating both upstream and downstream interests. According to Lamere (2012), the NBI is the first contemporary attempt to forge a collective water sharing agreement (Lamere, 2012). It is the only legal framework for regional environmental management covering all eleven Nile riparian countries. The NBI is of critical importance to this chapter because it is an inter-riparian commission aimed at coordinating both upstream and downstream interests.

Water serves a number of important productive, environmental and social objectives, thus forming part of the Nile riparian countries' natural capital. Both these mechanism need to attach rights and responsibilities to water allocation. This includes the right to a share of the water made available for use, and a responsibility to use the Nile in accordance with environmentally sustainable usage conditions set by the AU and NBI.

This entails the need for both the AU and the NBI to rectify the status quo of the 1929 and 1959 Agreements. In so doing, it will subsequently enable them to develop a common position on the equitable exploitation and use of the NRB's resources. Their role should take into consideration the Nile region's already complex political environment defined in terms of the large number of states in the basin that differ in their historical experiences, inheritances and in the realities that they face.

Godana (1985:264) argues that an all-inclusive agreement that represents the needs and interests of all riparian states is imperative to ensuring the full development of the Nile. Garretson (1960:144) has also argued that an NRB authority or administration is essential to addressing the problems relating to the full development and use of the NRB. According to Kukk and Deese (1996:22), river basin organisations are essential for all riparian countries to voice and resolve water issues without resorting to force.

Okoth-Owiro (2004:25) is of the opinion that establishing an international river basin organisation, authority or commission presents itself as the best solution for preventing and resolving water conflicts. He argues that a river basin organisation is needed to engage water scarce and water rich countries in negotiations. Benvenisti (1996:400) asserts that this allows for collective action in which all riparian countries enjoy access to resources that cross political boundaries.

It is important to note that any institution, organisation or commission entrusted with the responsibility to ensure the management and distribution of the Nile water is in one way or the other required to address the salient features of environmental scarcity that challenge stability in the NRB, and needs to take into account the interdependence of these forms of scarcity. With the continued existence of these challenges in critical bodies entrusted with the responsibility of bringing a co-operative solution in the region, the potential for conflict in the NRB remains (Othieno and Zondi, 2006:3).

Jacobs (2012:120) considers it worth noting that multilateral cooperative arrangements are not the only solid footing by which cooperative norms can be achieved. He pointed out that the institutional design of multilateral agreements can either help or hinder the way in which actors behave as a collective.

Oloo (2007:101) is of the opinion that the inability of these mechanisms to ensure a process of institutional support in the basin will pose as a major challenge to ensuring the sustainability of cooperation in the basin. It is evident that the role of the AU and NBI in the Nile region's already complex political environment defined in terms of the large number of states in the basin that differ in their historical experiences, inheritances and also in realities they face is further complicated by numerous challenges.

Homer-Dixon's environmental scarcity theory presupposes that both healthy and degraded watersheds need to be restored and sustained.

According to Cowherd (2011), a watershed is:

> … an area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community. And these watersheds cross county, state, and national boundaries.

It is only through the sustainable development of the Nile resources that poverty can be alleviated (Rosenberg, 2007). Baecher *et al* (2000:39) argue that restoring watersheds will also ensure the sustainability of a growing population within the basin.

Without these organisations, political tensions and disputes along shared rivers tend to emerge (Kukk and Deese, 1996: 22).This is evident in the case of the NRB. The depletion, degradation and political tensions and disputes in the NRB are due to the absence or lack of capacity and capability of a river basin organisation that mediates and ensures cooperation in the rational planning, conservation and development of the resources of the basin as a whole (Godana, 1985:264). The following section of the chapter will therefore illustrate Jacobs' (2012:120) abovementioned assertion by discussing the role of the AU in mitigating the Nile dispute.

### 3.3 The African Union

The AU has acknowledged the causal relationship that exists between environmental scarcity and conflicts (Van Wyk, 2010:3).It has also outlined crucial steps in the

preservation of natural resources (African Union, 2003:4). Its environmental regime is one of its oldest. One of the earliest conventions adopted in 1968 by the AU's predecessor, the OAU, is the African Convention on the Conservation of Nature and Natural Resources. It emphasised the adverse impact of environmental change on human security (Van Wyk, 2010:9-11).

The convention's fundamental principle outlines measures by which member states can conserve, use and develop land and soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people (Van Wyk, 2010:9).This chapter takes an interest in the provisions made by the AU regarding the conservation, use and development of land and soil, and water since the degradation of these resources are paramount to the depletion of the Nile.

Firstly, *Article IV on Land and Soil*, in sections 1, 2, 3 and 4of the Convention state that it:

> … ensures to prevent land degradation through implementing land tenure policies to: establish land-use plans based on scientific investigations; implement agricultural practices and agrarian reforms; improve and introduce soil conservation, sustainable farming and forestry practices; and, control pollution and erosion caused by agricultural activities, mining and the disposal of wastes, (African Union, 2003:6).

Secondly, *Article V on Water*, in sections 2 and 3 of the same Convention propose considerable provisions for preserving water and minimising the possibility of water-related disputes in transboundary basins. Section 2 states:

> The parties shall establish and implement policies for the planning, conservation, management, utilization and development of underground and surface water, as well as the harvesting and use of rain water, and shall endeavour to guarantee for their populations a sufficient and continuous supply of suitable water, (African Union, 2003:7).

According to section 3:

> Where surface or underground water resources are shared by two or more of the contracting states, the latter shall act in consultation, and if the need arises, set up inter-state commissions to study and resolve problems arising from the joint use of these resources, and for the joint development and conservation thereof, (African Union, 2003:7).

On the other hand, in addressing water security, the AU has also adopted *Water Vision 2025*. In this vision, the AU acknowledges that "… *water can be a matter of life and death, that when too much or too little, it can bring destruction, misery and death,*" (African Union, 2000:3).

Another environmental initiative of the AU includes the New Partnership for Africa's Development (NEPAD). The initiative's focus includes eight priority sectors that range from combating land degradation to the cross-border conservation of natural resources. Through NEPAD, the AU has recognised the importance of the UN framework conventions for climate change, which obliges countries to meet current climate change commitments and future negotiations.

Also significant to the AU's conservation of natural resources is the 2004 Sirte AU decision on the challenges of implementing integrated and sustainable development on agriculture and water in Africa (Adar and Check, 2011:87).Nonetheless, tensions between upstream and downstream Nile riparian countries persist despite such protocols and the fact that the Nile has changed the landscape, politics and relations between the basin countries.

This is mainly due to the deadlocks faced by the organisation. These include: the over-emphasis of the structural scarcity over the demand and supply scarcities; the provision of an ideological solution rather than a sustainable inter-riparian solution; the power relations between upstream and downstream countries within the AU; and third party involvement and foreign aid dependence. These deadlocks are discussed below in detail.

### *3.3.1. Structural-induced scarcity over demand and supply-induced scarcities*

Despite the provisions of the convention, the NRB countries are still confronted by the challenge of land degradation. Each riparian country experiences different levels of degradation (Di Nunzio, 2013:6). The inability of the AU to combat land degradation has continued to increase the potential for conflict in the NRB as people are forced to migrate to other regions, competing over already scarce resources.

When people begin to use natural resources unsustainably, their resource base disappears quickly with overwhelming effects on local, national and regional stability (Baecher *et al*, 2000:18). The AU has not addressed the underlying issues of demand and supply scarcity in the NRB. This is despite its position on land and soil

and shared water resources; its pursuit of the establishment of regional organisations to deal with shared water resources conflicts; and its recommendation to set up inter-state commissions (Chesire, 2010:64; Kagwanja, 2007:332).

The commission has been focused on the adverse impact that the distribution of the Nile (i.e. upstream-downstream disputes) has on the peace and security of the region and has done little to consider factors detrimental to the degradation and depletion of the Nile either between and/or within upstream and downstream riparian countries. This is despite demand, supply and structural-induced scarcity not being mutually exclusive; they often occur simultaneously and interact with one another (Homer-Dixon, 1994:8-11).

"*Uneven distribution never acts on its own; its impact is always a function of its interaction with resource demand and supply,*" (Schwartz *et al*, 2000:80). An important AU institution vis-a-vis the impact of environmental change on human security is the Peace and Security Council (PSC). The PSC is bestowed with major powers and authority, which could be used to address the impact of environmental change on natural resources conflict on the continent. However, this institution is underutilised in this regard (Van Wyk, 2010:11).

It serves little, if any, purpose to focus entirely on addressing unequal distribution when water resources continue to diminish due to demand and supply-induced scarcities. The outbreak of environmental conflict is complex. Environmental scarcity emerges within a political, social, economic, and ecological context and interacts with many of these contextual factors to contribute to violence (Percival and Homer-Dixon, 1998:279).

### *3.3.2. Political ideology rather than a sustainable inter-riparian solution*

According to Chesire (2010: V), the AU has not played a significant role in resolving water disputes between the Nile riparian countries. The AU's efforts in addressing the structural scarcities in the NRB have been ideological rather than providing for a sustainable inter-riparian solution. The AU Chairperson Dr Nkosazana Dlamini-Zuma advocates, "*On the road to negotiations or cooperation, Ethiopia and Egypt should look at the win-win situation in a new context, that is, not in the context of colonial powers, but in the context of Pan-Africanism and African Renaissance*" (Fanowedy, 2013).

This appears to be an indictment against the AU since it seems to lay the focus on political ideology as opposed to truly creating a win-win scenario between the Nile states based on actual material gain. Such ideological posturing means little when upstream riparian countries need water for domestic and agricultural use.

To achieve a sustainable solution based on win-win gains, Egypt must give up part of its Nile shares given the needs of other riparian states. However, regarding the current zero-sum scenario, there is lack of clarity on what the AU regards as *"achieving a win-win situation not in the context of colonial powers"*. The AU fails to clarify if this means drafting a new water sharing agreement (Fanowedy, 2013).

The unaddressed unilateral actions and zero-sum strategy are very critical to the emergence of environmental conflicts (Kukk and Deese, 1996:22). This argument is in line with the simple scarcity conflict model. The model argues that water becomes scarce at a time when each state demands unhampered access to it. Despite several political and socio-economic elements being linked to conflict, the zero-sum strategy is central to environmental conflict (Homer-Dixon, 1991:106; Homer-Dixon, 1994:18-20).

Benvenisti (1996:400) argues that it has become difficult for a common action to institutionalise because Egypt has made the Nile a private good. As such, the Nile has been classified as an excludable and rival good (Homer Dixon, 1999:48). Therefore, to ensure a transition from rival to non-rivalry, an established commission or organisation must help riparian countries realise their shared interest in the water resource that guarantees win-win gains, and address their claims to water rights or historic rights that both upstream and downstream countries tend to make (Okoth-Owiro, 2004:28). Such a commission or institution should also refrain from political ideologies that often result in more cleavages.

#### *3.3.3. Power relations between upstream and downstream countries with the African Union*

With many riparian countries gaining independence in the late 50s and 60s, concerns about the validity of the 1929 and 1959 Agreements intensified. For instance, Ethiopia, Tanzania and Kenya expressed their refusal to be bound by what they see as colonial-era agreements (Carroll, 1999:279).Other upstream riparian countries have failed to refute the validity of these agreements due to challenges

such as resource excess, lack of capacity, prolonged periods of unrest and civil wars.

The above are among other salient features of these countries' failure to address the Nile water issue, thus compelling their administrations to focus on the day-to-day survival and not on planning the development of their countries' water resources (Godana, 1985:84).This is the case with Uganda and the DRC. These countries have not taken a firm stance against the validity of the Nile Waters Agreements despite their active role in the Nile Basin Cooperation discussions.

In defence, Egypt argues that colonial treaties are binding on successor states (Godana, 1985:143). Despite its current participation and interest in cooperative renegotiation and development with upstream countries, Egypt still holds that the 1929 and 1959 Agreements should continue to serve as valid yardsticks and as controlling international legal instruments for managing the governance of the Nile (Caroll, 1999:279).Sudan has followed Egypt in matters relating to the Nile and has benefited from Egypt's claim over the Nile (Lie, 2010:14-18).

Both Egypt and Sudan have expressed a desire to maintain the status quo of the Nile concerning the management, use and development as rooted in previous Agreements. For instance, Egypt is very reluctant to accept and quantify allocation claims by upstream countries and argues its share as a matter of national security. Egypt and Sudan revised the 1929 agreements as an indication that its provisions were no longer representative of Egypt and Sudan's interest due to the changing political and economic landscape.

Upstream countries want to revise both these agreements as they claim that these agreements are not representative of their political and economic interests. The failure by the AU to mediate both the upstream and downstream claims raises serious questions. Firstly, does the AU condone the colonial treaty obligations on independent states? Secondly, does the AU support these upstream riparian countries' Clean Slate Doctrine[12]?

[12]"*A successor state generally does not inherit the prior treaty rights or obligations of a predecessor state*" (Beato, 1994:534-5).

The AU has failed to support upstream countries in their rejection of both the 1929 and 1959 Agreements. The failure of the AU to support upstream countries and challenge the exploitation of the Nile by Egypt owes much to its position on the upstream-downstream debate. For instance, the AU is reluctant to provide an effective response or solution as the AU secretariat, the African Union Commission, is based in Addis Ababa, Ethiopia, but is financed by Egypt as the financial backbone of the AU project (Patel, 2013).

Arab states and Egypt in particular, contribute 15 per cent to the AU's general budget. Key members of the Arab League continue to support the position taken by Egypt. Therefore, any action against either Ethiopia or Egypt could prove very costly for the AU. This has caused internal challenges of power relations within the AU (Eriksson and Zetterland, 2013:38).

### *3.3.4. Third party involvement and foreign aid dependence*

The AU faces challenges in addressing issues detrimental to the Nile cooperation, peace and security agenda due to the financial dependence on foreign donors. Third parties become active players in environmentally-induced conflicts through the creation of insensible policies and programs. The role of third parties, such as the World Bank, continues to create a rupture between the project planners and those individuals directly impacted by its construction or implementation.

The involvement of third parties in the form of foreign aid donors such as the World Bank, the United States and Canada in environmental conflicts further complicates the issues of political, social, and economic interests, and hinders regional cooperation. For instance, the construction of the new AU headquarters was funded by China and African countries pay for only about 40 percent of the AU's budget. China, the European Union and the US pay for the rest (Al Jazeera, 2013).

According to Erastus Mwencha, the deputy chairperson of the AU,

> The AU has been finding itself in difficult situations since the finances from donors almost always come with strings attached. It's not possible that the partners will always align themselves to your priorities. That is always the danger you face. Partners have got their biases and rightly so. And this is one of the things many of us have been saying. You may find partners preferring certain areas of cooperation.

The presence of a complex array of foreign or external actors in mediation processes tends to dictate and influence the decision-making agenda of regional organisations. This deflects them from the interests of the parties concerned and consequently constrains the decision-making freedom of the respective leaders or states. The cooperation framework pursued is ultimately obscured. At some point or the other, African states and Nile riparian countries in particular, need to be politically and financially supportive, responsible and accountable to their peace and security mechanisms (Ong'ayo, 2008:4). Otherwise, the AU will fail to achieve the difficult goals of conflict resolution and regional cooperation in the NRB (Foulds, 2002:2). The following section of the chapter will discuss the role of the NBI in mitigating the Nile disputes. This section builds up on Jacobs' (2012:120) previous assertion that *"institutional design of multilateral agreements can either help or hinder the way in which actors behave as a collective"*.

### 3.4 The Nile Basin Initiative

The changing geopolitical environment has influenced the development of interstate mechanisms in dealing with potential conflict over water in volatile transnational water resources. A number of regional frameworks have been established in recent years to address environmental conflicts within transboundary basins. For instance, the Lake Victoria Basin Commission (LVBC) undertook to develop the Lake Victoria Environmental Management Project (LVEMP) designed to restore the degraded lake ecosystem; manage shared water and watersheds; and pointing out source pollution(Mbaiwa 2004: 1323).

Several initiatives were proposed in the NRB; however, they were not inclusive, institutionalised and structured mechanisms to bring together all riparian countries to address a common agenda. According to Wolf and Newton (2008), from 1967 to 1992, the United Nations Development Program (UNDP) supported a Hydromet project designed to collect hydrometeorological information within the basin.

Based on the findings of this project, the Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile Basin (TECCONILE) was formed in 1993 with the idea of creating informal dialogue

between riparian nations. The TECCONILE later resulted in the creation of the Nile River Basin Action Plan in 1995 (NRBAP) to ensure the joint planning of the use and development of the Nile water (Wolf and Newton, 2008).

In 1997, the Council of Ministers of Water Affairs of the Nile Basin States(Nile-COM), were allowed by the World Bank to direct and coordinate donor activities within the basin, which led the Council to work in cooperation with organisations such as the UNDP, the World Bank and the Canadian International Development Agency (CIDA) (Wolf and Newton, 2008).

A few years later, riparian countries came to a more inclusive and comprehensive cooperation platform. In February 1999, the NRBAP culminated in the creation of the NBI[13] to manage a complex river system that is faced with conflictual hydropolitics (Guvele, 2003; Othieno and Zondi, 2006:1). The NBI is a 10-member regional intergovernmental partnership with Eritrea holding an observer status. These members include Burundi, Egypt, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, the DRC, Sudan and the newly found South Sudan (Balleh, 2014).

The Nile-COM is the highest decision and policy-making body. It is comprised of ministers in charge of Water Affairs in each NBI member states. This decision-making body receives its technical support and advice from the Nile Technical Advisory Committee (Nile-TAC) on matters related to the cooperative management and development of the common NRB water resources. The Nile-TAC is comprised of senior governmental officials, two from each of the member states (*Nile Basin Initiative*, 2013).

As a regional intergovernmental partnership, the NBI seeks to develop the Nile in a cooperative manner and establish a comprehensive framework for the planning, management and use of the natural resources of the Nile, principally water (Oloo, 2007:95). The NBI also aims to include all members through participatory processes of dialogues (Wiebe 2001: 751; World Bank, 2008:2). The initiative was launched with the understanding that a cooperative effort in developing and managing the Nile will bring the greatest level of mutual benefit to the region. It was through this

[13]Also referred to as the “Entebbe Treaty” or “Entebbe Agreement” because it was signed and is based in Entebbe, Uganda, the NBI chair rotates between its members (Lie, 2010:13).

inclusivity that an understanding of the implications of member states' actions on neighbours, and opportunities for managing risks and realising tangible benefits will be created (Balleh, 2014).

The NBI is determined to oversee the cooperative, substantial socio-economic benefits and regional peace and security framework of the NRB (*Nile Basin Initiative*, 2014). However, the NBI is faced with challenges detrimental to its effectiveness within the region. These include: the challenges of transforming the initiative (NBI) into a permanent Nile River Basin Commission (NRBC); the stalemate in its Cooperative Framework Agreement (CFA) that aims to replace the colonial-era treaty that gave Egypt and Sudan a majority share of the Nile water; third party involvement and foreign aid dependence; and unilateralism in policy decision-making. These challenges are discussed below in detail.

### *3.4.1. Challenges of transforming the Nile Basin Initiative into a commission*

The NBI is currently serving in the capacity of an "*interim organisation*" that has the authority and means to facilitate a more permanent legal and institutional arrangement for the regulation of the Nile (i.e. NRBC) (Kassa, 2013). As such, the NBI is just a transitional mechanism that is expected to phase out when a permanent NRBC is established following the conclusion of the CFA (Balleh, 2014). The CFA establishes the principles, operational mechanisms and setup of the commission to facilitate and oversee the smooth equitable and reasonable use, management and protection of the Nile water. The CFA should be included in national legislation, thus disbanding the NBI and simultaneously establishing a permanent NRBC (Lie, 2010:11).

For the initiative to convert into a commission, six of the 11 countries must ratify the CFA as law by their parliaments. Ethiopia and Rwanda have done so. Tanzania, Burundi and South Sudan are waiting for ratification. The Ugandan parliament is expected to vote on it soon. In Kenya, the law is at cabinet level (Staff Reporter, 2014). In short, the NBI needs a legal status to become a permanent NRBC (Lie, 2010:2).

Transforming the initiative into a commission entails a different level of competencies. For instance, when the initiative converts itself into a commission, it will secure financial support from its development partners and will enable financial

support by having its own revenue generation scheme. The NRBC will ensure the use of the Nile by member states on a legal basis (Kassa, 2013).

The establishment of an interstate commission (i.e. the NRBC) complements Article V (3) of the AU convention on the conservation of nature and natural resources. This constitutes a departure from the past trend of unilateral water use and management, particularly in emphasising the issues of fair water allocation, joint management and developing resources (Lie, 2010:11). This also signals a fundamental shift in the status quo of upstream–downstream relations, particularly in the relationship between Egypt, Sudan and Ethiopia (Lie, 2010:11).

So far the NBI has not achieved its goal of being transformed into a commission. The CFA faces a stalemate due to conflicting arguments between upstream and downstream riparian countries regarding some of its provisions, thus delaying the establishment of a basin commission (Waslekar, 2013:7) (see. 3.3.2 below).

Since a basin commission has not been established, the basin is currently administered by the NBI. However, failing to establish a commission and having to deal with an initiative raises challenges for the full development and use of the Nile. For instance, an initiative has no legal status and, as a result, it cannot make binding and enforceable decisions. It can only enjoy financial support from development partners. This means having to rely on unconventional donors. Moreover, the impasse experienced in the CFA that is supposed to transform the NBI into an NRBC has threatened the support from development partners, which makes future support uncertain (Balleh, 2014).

### *3.4.2. Cooperative Framework Agreement*

The CFA is an important example of a multilateral agreement that hinders the way in which actors behave as a collective. The NBI proposed a cooperative framework agreement that would include all the Nile riparian countries and incorporate the principles, structures and institutions of the NBI. The CFA aims to provide legal principles to determine reasonable and equitable solutions for sharing the Nile among the basin states, and to guarantee the water security of the Nile riparian countries (Lie, 2010:11; Salman, 2013:20 -21).

The articles of the agreement include general aims and principles of protection, equitable and reasonable use, prevention of significant harm, community interest,

data and information exchange, peaceful resolution of disputes, conservation and sustainable development of the Nile (Jacobs, 2012:121; Salman, 2013:21).

Since its formation, the agreement has faced major complexities. The current status of the CFA is disputed among the Nile riparian states. Lino (2013:13) asserts:

> These complexities manifest themselves in the failure, thus far, of the basin countries to reach an agreement on an inclusive CFA, more than ten years after the start of the facilitative efforts under the NBI.

These difficulties are a result of the respective positions of the upstream countries on the colonial treaties, as well as the Egyptian and Sudanese claims to what they see as their acquired uses and rights of the Nile. Even the ministerial meetings that took place in Kinshasa, Alexandria and Sharm El-Sheikh in 2009 and 2010 failed to resolve these differences (Salman, 2013:20), leaving the CFA ineffective and in a stalemate.

The CFA owes much of this stalemate firstly to the contradiction and controversy caused by its principles, and secondly to the conflicting positions regarding rights and provisions on the use of the Nile, particularly in Articles 4 and 14 (a) (Waslekar, 2013:7).

Salman (2013:21) argues that the agreement causes contradictions and controversy between upstream and downstream countries by including both the “prevention of causing significant harm to other basin states” and “equitable and reasonable utilization” principles. The latter entails:

> The state whose use causes harm to other basin states, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of the CFA on equitable and reasonable utilization, in consultation with the affected state, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

As a general rule, upstream countries are likely to favour the equitable utilization principle because it provides more scope for states to use their share of the watercourse for activities that may impact downstream countries, while downstream countries will favour the no-harm principle since it protects their existing uses against impacts resulting from activities undertaken by upstream countries (Salman, 2013:21).

According to Article 4:

> [The] Nile Basin States shall in their respective territories utilize the water resources of the Nile River system and the Nile River Basin in an equitable and reasonable manner. In particular, those water resources shall be used and developed by Nile Basin States with a view to attaining optimal and sustainable utilization thereof and benefits there from, taking into account the interests of the Basin States concerned, consistent with adequate protection of those water resources. Each Basin State is entitled to an equitable and reasonable share in the beneficial uses of the water resources of the Nile River system and the Nile River Basin, (International Water Law Project, 2014).

"*Nile basin states agree in the spirit of cooperation, not to significantly affect the water security of any other Nile basin state.*" Egypt and Sudan on the other hand, want Article 14 amended to reflect their historic rights. On the basis of Article 14, Egypt and Sudan argue that "*Nile basin states agree, in a spirit of cooperation, not to adversely affect the water security and current uses and rights of any other Nile basin states*" (Sudan Tribune, 2008; Salman, 2013:21). Egypt required the CFA to acknowledge the 1959 agreement rather than to supersede it (Lie, 2010:11). This has resulted in the current stalemate in the NBI cooperative framework. The dangers of not agreeing on the CFA are a threat to the emergence of a Nile Basin Commission as indicated earlier. In this way, the institutional design of the CFA has hindered the way in which actors behave as a collective as far as its articles are concerned.

In addition, the upstream-downstream position conflicts the CFA with claims of historical and natural rights over the use of the Nile (Kendie, 1999:145). On the one hand, upstream countries have insisted this framework must disregard all previous agreements to which they were not part. Downstream countries seek a new framework to incorporate such earlier agreements. This has caused more disparities within the region (Oloo, 2007:101).The challenge was acknowledged by Beyene when he stated, "…*an important challenge the Nile Basin countries are facing is related to establishing a permanent legal and institutional set-up to anchor their cooperation on a solid footing,*" (Rutagwera, 2014). This means, the agreement, once effective, will transform the NBI into a permanent NBC (Steinbrueck, 2014:11).

According to Othieno and Zondi (2006:2-3):

> The agreement is also expected to provide a resolution to such issues pertaining to the balance between who has the historic right to the Nile, and issues of sovereign water rights especially with regards to where the river ought to be controlled, whether that be upstream or downstream.

This will eventually allow the status quo governing Nile water treaties to be rectified, and enable the Nile riparian countries to develop a common position on the equitable exploitation and use of the NRB resources. In this instance, the agreement has not addressed the equitable and reasonable utilization of the Nile, which would resolve the disputes between upstream and downstream riparian countries and develop a community of interest.

### *3.4.3. Third party involvement and foreign aid dependence*

Although the AU has expressed interest in endorsing the NBI, it is unclear whether this stance emboldens or deters the World Bank, the International Monetary Fund (IMF) or other foreign donors from getting involved (Ferar, 2010:91-92). The NBI faces similar challenges in terms of the involvement and funding by foreign donors (Foulds, 2002:2). It is evident that foreign donors (World Bank and CIDA) have been involved in the funding process that led to the establishment of the initiative (Wolf and Newton, 2008).

These are the same donors that obscure the cooperation framework in the NRB and therefore dictate the agenda of water cooperation in favour of technical rather than political interventions such as preventative diplomacy. These technical interventions for instance, include the World Bank's intervention to stop Ethiopia from building the GERD, or the refusal of funding for building this project. This ultimately protects Egyptian hydro-hegemony (Othieno and Zondi, 2006:3).

The Executive Director Engineer, Teferra Beyene, has also acknowledged the financial challenges faced by the initiative. However, instead of Engineer Beyene motivating riparian member states to take financial responsibility for the initiative rather than depending on foreign aid, he acknowledges the latter. This is harmful to policy-making since third parties are constantly involved and influence important decisions of the initiative.

During the Chinese delegation on a China-Africa transboundary water study tour on 7 May 2014, Beyene stated:

> The biggest challenge the NBI faces now, is lack of finance to implement the investment projects it has prepared and ensuring its institutional sustainability to continue providing the excellent services it has been providing for its member states. I believe the partnership that NBI has recently started with the Republic of China will help in filling some of these gaps as China is a key partner in Africa's bid, (Rutagwera, 2014).

This statement signifies a deeper entrenchment into foreign aid dependence.

#### *3.4.4. Unilateralism in policy decision-making*

The NBI faces challenges of addressing the unilateralism that exists in decision-making processes and laws governing the Nile. As has been argued, Egypt as the hydro-hegemony dominates and dictates these decision-making processes, which therefore remain in favour of Egyptian interests. This is evident in the CFA where the initiative has failed to resolve the stalemate due to conflicting rights at the expense of win-win gains. Progress regarding a cooperative framework constantly fails to materialise due to Egypt's disapproval. Therefore, these excessive unilateral actions pose a challenge to achieve cooperation that is mutually beneficial (Link *et al,* 2014:4-9).

It has been argued that the failure by the NBI to address unilateralism in its policy decision lies in the fact that it has involved only water technocrats in the process rather than an institutionalised political will from the riparian states. This reduces it to a mere water authority. It lacks a political centre and a presence in the public eye of the participating states. With this lack of political will, the issue of equitable use of the Nile is impossible and faces a number of political compromises (Oloo, 2007:101-104).

This unilateralism prompts competition, leading to lose-lose gains and the failure of the NBI. The inability to establish a commission will exacerbate more unilateral decision-making by riparian states regarding major water resource investment projects (hydropower projects) and therefore increase the level of disputes in the region.

## 3.5 Conclusion

The chapter has made two issues evident. Firstly, the management of the Nile faces challenges in terms of environmental degradation that has been exacerbated by high population growth. Population growth and the degradation of water in the Nile as a result of inefficient irrigation, pollutants from agricultural and mining fields and high salinization, has also increased both the demand for water and the probability of conflict (Water Policy Program, 2002).Industries, mining and agricultural activities along the NRB continue to degrade and deplete water and watersheds (Wiebe, 2001:741).

And secondly, the Nile has been subject to numerous water-related disputes and confrontations over disputed governance (Sinnona, 2012:3). According to Paisley and Henshaw (2013:1), it faces a complex array of governance challenges. The continued mismanagement of the Nile and its disproportionate distribution increases the likelihood of tensions and disputes. Therefore protecting, managing and sustaining water and watersheds through proper water use is critical for every state, company and community.

Although Homer-Dixon also believes that the issues of environmental scarcity and conflict may not be widely observable until the coming centuries, it is clear that the AU and the NBI are unable to address environmental scarcity (i.e. demand-induced, supply-induced and structural-induced scarcity). Disputes and tensions in the NRB and in shared water resources are central to scarcity. The inability of the AU and the NBI to address environmental scarcity is detrimental to peace and security in the NRB.

In an attempt to avoid conflict in the basin, the AU and the NBI have failed to clarify that the Nile is a shared resource and that what happens in one country, negative or positive, affects the others, hence the need for joint management and development for the benefit of all. Similarly, despite the AU and the NBI having shared watercourse agreements, they do not seem to know how to deal with environmental scarcity issues. According to Arnold (2013), this has led to many believing that one possible way to resolve the Nile dispute is the International Court of Justice (ICJ), like it has with the Okavango disputes.

The chapter noted three main obstacles to the Nile cooperation. Firstly, the international or external influence of actors in both the AU and the NBI challenge their abilities to effectively make independent decisions, resulting in a failure to address necessary issues in the NRB disputes. The dependency of the NBI and the AU on foreign donors will also mount due to the lack of domestic capacity.

Secondly, following the division over signing the CFA, tensions between the countries of the region (involving a war of words) have not only risen, but the potential for conflict over the Nile has also increased. The failure to agree on the CFA means a failure to establish a commission that will settle political tensions and disputes; represent the needs and interests of all riparian states; ensure the full development of the Nile; address the problems relating to the full use of the NRB; and provide the means for all riparian countries to voice and resolve water issues without resorting to force, as argued by Garretson (1960), Godana (1985) and Kukk and Deese (1996).The NBI's failure to address matters relating to its CFA ultimately results in continued tensions and disputes between upstream and downstream riparian countries. This has led to political instability, mistrust and a lack of confidence in the functioning of the NBI. The future and success of the NBI are contingent on securing the CFA (Lie, 2010:11).

Thirdly, the inability of the AU to address both the supply and demand scarcity and to clarify the validity and/or invalidity of the Nile Waters Agreements has inevitably increased the potential for conflict in the basin. By focussing on these deadlocks, the chapter aimed to illustrate both the AU's and the NBI's inefficiency in addressing the challenges proposed by the environmental scarcity theory. It is due to such deadlocks that the argument proposed by the theory, that environmental scarcity if not addressed will lead to conflict, becomes evident.

# CHAPTER 4: CHINA AND THE CHANGING STATUS QUO IN THE NILE RIVER BASIN HYDROPOLITICS: IMPLICATIONS FOR PEACE AND SECURITY

## 4.1 Introduction

For much of the past century, the hydropolitical landscape of the Nile has been dominated by Egypt. Egypt controlled and constructed the hydropolitical regime to favour its interests and maintain its hegemonic position in the basin. This was mainly made possible by its material, bargaining and ideational power (Cascão, 2009:248). Hanke (2013:59-68) argues that Egypt's powerful and influential status, for instance its economic development, military might, political stability, and access to external political and financial support vis-a-vis upstream countries, enabled it to influence and construct the Nile discourse.

However, the NRB is experiencing a change in its hydropolitical landscape and/or status quo. China has projected influence and has become a key partner in the construction of big dams and the expansion of irrigation systems (this involves massive infrastructural construction such as hydraulic infrastructure), which has changed the domestic political economy landscape and has affected how states in Africa relate to each other (Verhoeven, 2013).According to Cascão (2009:260), the emergence of China as a progressive financier to the global dams industry represents a shift for the international funding of hydraulic infrastructure, especially with regard to the African continent (Cascão, 2009:260).

China has become a major exporter of hydropower projects to the Nile region (Erdal, 2013). Chinese companies and financiers have been involved in several dams in upstream countries, as well as in Sudan (Bosshard, 2009:47). Today, upstream countries' are challenging Egyptian dominance and are pushing for a greater say and a share of the Nile. The NRB has undergone several political and economic changes that have promoted and affected the current balance of power in the basin and hydropolitical relations between upstream and downstream countries (Jacobs, 2012:137). Two aspects are pivotal to these changes, i.e. economic and political stability, which will be discussed in detail in the following sections of the study.

This chapter recognises that China's presence in the upstream dam industry (as well as in Sudan) has enabled them to embark on unilateral hydropower developments and has thus changed the upstream-downstream hydropolitical status quo. It must be noted that most dam projects undertaken by Chinese companies have a hydropower dimension, which demands more water from the Nile. This shift in the basin's hydropolitics poses serious challenges to the political stability, regional security, economic prosperity and environmental sustainability of the Nile. The chapter aim is to discuss the role of China as an alternative source of funding to upstream countries' hydropower infrastructure and their impact to the Nile environment thereof.

The chapter argues that ramifications of the availability of Chinese investments include upstream countries abandoning multilateral processes for unilateral projects. Without proper basin-wide cooperation, the Nile water system will experience severe pressure from uncoordinated projects. Firstly, the problems of degradation and depletion will persist. Since China does not impose environmental regulations or encourage further environmental studies, the NRB will experience severe degradation from such projects. And secondly, the rising population growth will not be addressed as a coordinated approach, but will rather be state-centric, failing to address a basin-wide demand-induced scarcity. The management, sustainability and use of the Nile, therefore, requires a coordinated approach to be successful.

## 4.2 Changing the status quo: China an alternative donor

Africa's bilateral trade with China has been growing rapidly from the early 1990s to date (Corkin, 2007:309). A number of features are imperative for this rapid growth, and also imperative to consider when analysing China's preference as a donor to African states.

Firstly, China's principle of non-interference and its less restrictive stance on environmental and social regulations must be noted. The growing involvement of China in Africa relates to similar norms and interests of economic prosperity. What makes this relationship stronger is that Africa desires non-intervention in domestic

affairs and standards of governance, and China is willing to respect these desires (Jacobs, 2012:140).

According to Thakur (2009:10), "*This non-interference of China in domestic affairs in aid receiving countries is welcomed by many African countries.*"The reason is the limited pressure from the Chinese government on countries to adopt good environmental and labour standards. Compared to Western donors who insist on human rights and democratic reforms, this means that aid from China is free from environmental regulation or criteria of human rights and democracy (Thakur, 2009:10-16; Swain and Jamali, 2011:8).

In addition, a more controversial point is that China is also known for being less restrictive when funding infrastructure projects with environmental and social impacts, which offers African states better opportunities for obtaining loans and funding (Thakur, 2009:10). Although social and environmental impacts have deterred many donors from funding large hydrological schemes on the Nile, China's momentum and funding has only intensified. As a result, China took the opportunity to fund many of these large schemes that no other donor wanted (Berthelemy, 2011:7).

Secondly, China is able to keep costs down. In the bidding process, Chinese firms purposefully bid below normally established standards, thereby beating international and local competition. Thirdly, Chinese firms complete projects on schedule. This is due to a combination of factors, including more effective access to cheaper capital and machinery than most foreign and local investors. And lastly, China has agreed to cover 85 per cent of project costs through preferential buyer's credit and concessionary loans (Reuters, 2009; Strange *et al*, 2013:12).

What is seldom discussed regarding the Sino-Africa relations is China's influential role in hydro-infrastructure construction (Verhoeven, 2013). China has contributed to numerous infrastructure, power and water supply projects as well as transport and telecommunications endeavours (Thakur, 2009:9).However, hydropower stands out as the largest beneficiary sector and an important focus area of the chapter. China built its own hydropower industry in the 1980s and 1990s and later expanded internationally, with Africa as an important focus area.

The number of hydropower projects on the Nile is on the rise. This is in response to population demands and also to the power shortages in these riparian countries. This power shortage is more evident upstream, for obvious reasons (Daly, 2013). For instance, Egypt's power shortage amounts to two per cent; Sudan's to 70 per cent; Ethiopia's to 85 per cent; Kenya's to 86 per cent; Tanzania's to 89 per cent; and Uganda's to 91 per cent (KPMG, 2011:23-35). As discussed in chapter 2, the environmental scarcity theory asserts that this is problematic since the driving force behind the conflict over shared water resources between riparian countries is the desire to increase supply and manage demand (Ohlsson, 1999:211).

Such extensive involvement by China in water development projects along the Nile and as a new financial partner to upstream riparian countries symbolises a monumental change to NRB hydropolitics. Insofar as the NRB is concerned, the emergence of China represents a strong incentive for hydraulic infrastructural developments. Upstream countries are now able to use the Nile and construct hydro and irrigation projects (Cascão, 2009:251).China's affordable contracts and speedier execution of projects than Western donors and companies can arrange has made it a more favourable partner and financier to upstream countries (Reuters, 2009).

Mbaria (2013) argues that China's presence in the region has proved detrimental to Egypt's power to stop upstream countries from using the Nile. He further states that China's involvement in upstream hydropolitics has also bypassed the previously successful attempts by Egypt to deny funding for costly projects in upstream countries.

One of Egypt's most common successful means of influencing the Nile discourse was its power to prevent financial institutions, regionally and internationally, from funding upstream countries' hydropower infrastructures (Waterbury, 2002:80).Donors such as the World Bank, European Investment Bank (EIB) and regional banks such as the African Development Bank (ADB) have been openly reluctant to fund projects in upstream countries due to Egyptian influence, stating that "… *all downstream countries, Egypt in particular, have to concede to it for any projects to be financed,*" (Green Prophet, 2010;Jacob, 2012:138; Mayton, 2012).In addition, the AU's failure to change the status quo in the basin and achieve an "equitable use" of the Nile further maintained Egypt's veto power.

However, despite these external challenges, other internal challenges were central to upstream countries' capacity to develop the Nile. For instance, according to Yimer (2015:104), upstream countries' position in the basin's hydropolitics and their ability to use the Nile was affected by political instability, a lack of financial resources, weak institutions, a lack of priority and strategy for the water sector, and a high dependence on rain-fed agriculture that reduced the need for irrigation (Yimer, 2015:104).As a result, large proportions of upstream countries' national budgets revolved around military expenditure (Cascão, 2009:251-64).

With already poor infrastructure and irrigation projects in upstream countries, political instability further exacerbated underdevelopment and was another factor contributing to the reluctance of donors to fund projects (Cascão, 2009:249-51). These external and internal constraints led to upstream riparian countries being unable to challenge Egypt's quasi-monopoly of the Nile. Nevertheless, this was about to change.

Upstream countries have become economically stronger, with satisfactory national economic indicators such as GDP and direct foreign investments, and more politically stable than in the past, allowing them to focus more on attracting international funding for hydraulic projects. As a result, upstream countries have become more determined to develop hydraulic projects (Cascão, 2009:249-51). It is evident that, as populations increase and economies of riparian states develop, the economic benefit of the Nile intensifies.

The emergence of China as financier to upstream countries' hydraulic infrastructure has become a determining factor. China as a key external actor and a willing alternative financial donor for upstream countries has been vital in the power shift and in shaping the landscape of transboundary water governance and development along the Nile. As such, upstream countries have entered into agreements with each other or with China to finance multi-billion dollar projects that will use more of the Nile's capacity and capability (Cascão, 2009:249-51).

However, Jacobs (2012:137) suggests that this shift of power in the Nile can also be traced to the signing of the CFA in 2010, when Ethiopia, Uganda, Tanzania, Kenya and Rwanda gained bargaining power and signed the CFA without interference from Egypt and Sudan. The agreement enables upstream countries to implement irrigation and hydropower projects without Egypt being able to exercise its 1929 veto

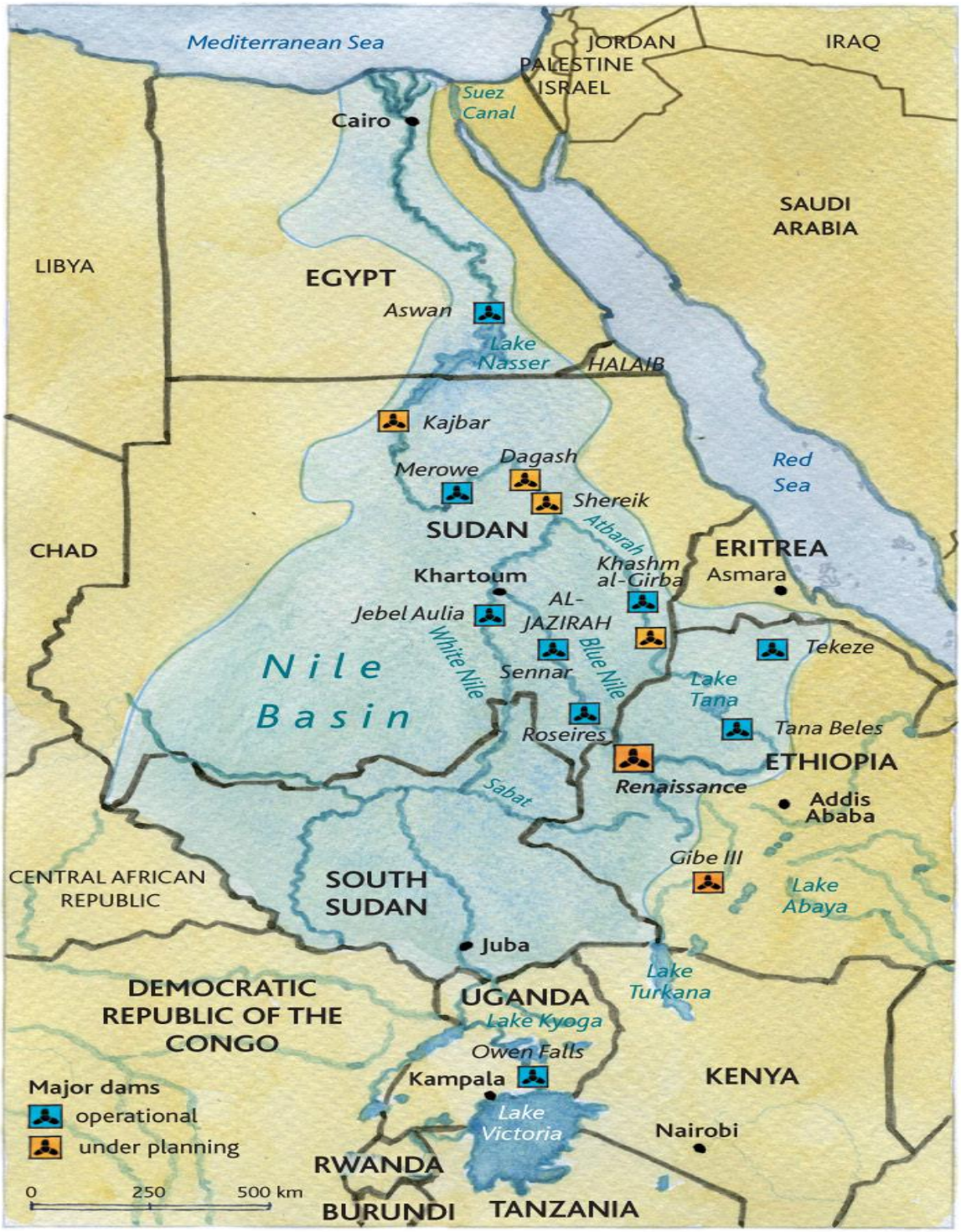
power as discussed in chapter 2. This inevitably saw Egypt slowly lose control over the agenda of Nile hydropolitics. As a result, upstream countries have begun to publicly defy Egypt's dominance in the region. They have become vocal in fighting for their share of the Nile and have begun to proceed with new development plans, new regional integration institutions and unilateral projects to develop the Nile within their territories.

This unprecedented bold confrontation also follows Egypt's recent political instability and internal strife, which saw its once hegemonic reputation among the East African states diminish. Egypt's hegemonic downfall in the region is also attributed to its high dependence on financial assistance from external powers. The Arab spring, which resulted in the restraint of trade and tourism, had a detrimental effect on its economy. This means that if Egypt were to attempt to maintain its hegemonic status through waging a war, it would compromise theUS$2 billion in aid that it receives per year from the US (Scarisbrick, 2013). Despite Egypt's changing hydro-hegemonic position in the Nile, it still remains an economic and military hegemony in the region.

Nonetheless, this fact represents a symbolic shift in that upstream countries are now able to access funding and construction contracts for costly hydraulic infrastructure. In the past, the main factor in the NRB's asymmetric power relations and a major constraint to the development of upstream infrastructure has been the lack of external financial support. Chinese companies and banks are currently funding and undertaking numerous hydraulic projects in upstream countries' such as Burundi, Ethiopia, Kenya, Tanzania, the DRC, Uganda, and in Sudan, making it the fastest growing player in the Nile developments (see map 2). As a result, the prospects of upstream countries building dams, particularly Ethiopia, is of concern to Egypt (Cascão, 2009:260).

China has given these countries countervailing power vis-a-vis Egypt and has initiated upstream countries' long overdue goal of developing the Nile. For instance, upstream countries had planned to use the Nile for irrigation since the early 1990s but with zero to minimal success. Ethiopia had planned to implement a significant irrigation project and several hydropower projects, requiring extensive use of the Nile (Shadid, 1995).

***Map 2: Chinese support to hydraulic projects in the Nile (Ayeb, 2013).***

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According to Tadese (1997), "*The willingness by Ethiopia to demand a greater share of the Nile was made clear in a 1997 February policy paper presented during a four-day annual conference on the use of the Nile*" (Tadese, 1997). Similarly, Kenya and

Tanzania planned to use Lake Victoria on the White Nile for irrigation, while Burundi, Tanzania, Uganda and many of the Great Lakes region riparians cooperated to develop another river feeding Lake Victoria and planned hydroelectric projects in the area (Shadid, 1995). Jacobs (2002:138-9) asserts that the lack of external financial support for hydraulic infrastructure projects in these countries rendered such plans impossible. China's involvement has therefore given upstream countries the freedom to proceed with unilateral projects without the consent of Egypt. China's involvement and influence in upstream countries' hydropower infrastructure will be examined and discussed in detail below. This, in essence, means that China has bypassed the Egyptian veto right to stop hydraulic developments upstream.

### *4.2.1 Ethiopia*

Ethiopia has been subject to numerous rejected loans by international creditors and donors such as the World Bank, the EIB and the ADB. However, with the emergence of China as an external donor in the region, the power dynamics in the Nile have changed to favour Ethiopia (Swain and Jamali, 2011:8). China-Ethiopia relations can be traced to the early 1960s and early 1970s (Gamora, 2008:2-3). These relations intensified in the early 1990s, with increasing diplomatic contacts, growing trade and Chinese investments in the Ethiopian economy (Thakur, 2009:9).

By 2005, the Chinese embassy in Addis Ababa hosted more high-level visits than any Western mission (Shinn, 2014).Chinese investments in Ethiopia have increased in the past decades to include large amounts of foreign aid, which is used mostly for infrastructure projects. These investments have also included large concessional loans (Davies, 2008:32).

Ethiopia, due to its strategic position, has become an important player to Chinese investors. Ethiopia serves as the headquarters for the AU and the UN Economic Commission for Africa. Its close ties with Ethiopia enable it to become a third party to AU decision-making. Symbolic of its influence, China provided US$200 million in grant assistance to construct the new AU conference centre, which contains a traditional Chinese-style garden (Shinn, 2014).

With political and economic changes such as the adoption of a market-oriented economic model, political stability and favourable construction contracts from China, Ethiopia began to contest its share of the Nile (Yimer, 2015:104).Despite occupying

a significant part of the upper-Nile, Ethiopia had in the past lagged behind other riparian countries on most standard indicators of infrastructure development (Yimer, 2015: 104; Thakur, 2009:9). Several factors such as protracted internal conflicts, a lack of financial resources and weak institutions explain this underdevelopment (Yimer, 2015:104).

Ethiopia has now taken the lead in planning 2.3 million ha of irrigation (Mbaria, 2013).Its plans include identifying or confirming several potential sites for hydropower dams and irrigation schemes and the construction or expansion of several hydraulic projects (Yimer, 2015:104).

In April 2011, former Ethiopian Prime Minister Meles Zenawi stated, "*Egypt will not be able to stop Ethiopia from building dams on the Nile … Ethiopia is able and willing to use its own resources to build dams on the Nile*" (Hussein, 2014).

Significant projects to the chapter include the Tekeze hydroelectric project, the Gilgel Gibe III and IV projects, the Tana-Beles hydropower station, the Fincha Amerti-Neshe hydropower project, and the GERD. China, through its public funds and enterprises, and state-owned China International Water and Electricity Corporation, has been involved in the construction and funding of these several multi-billion dollar hydropower plants (Verhoeven, 2013).

The energy generated through these hydroelectric projects will play a crucial role in Ethiopia's economy since it will be used as an export commodity to countries such as Djibouti, South Sudan, Sudan and Kenya (Tekle, 2014). This development will therefore serve several national interests such as providing industries and households with electricity, alleviating poverty and increasing economic growth (Maasho, 2014).This has created prospects for Ethiopia to become the next NRB power (Scarisbrick, 2013).

In 2002, China's leading hydropower dam company, the Sinohydro Corporation, started work on the Tekeze hydroelectric project with a 607 foot dam (Patel, 2009).The dam is situated in the Tekeze River, which is a tributary to the Nile. The company issued a US$224 million loan for the construction of this hydro-dam. It is Africa's largest dam and can generate 300 megawatts of electricity (MWe) (Swain and Jamali, 2011:8). The project was due for completion in 2007, but due to

problems with massive landslides, the project was only completed in July 2009. The project was therefore completed for a final cost of US$365 million (Patel, 2009).

In 2009, the ADB and the EIB rejected a US$500 million loan to fund the construction of the Gibe III project, a mega dam at the Omo River and Ethiopia's largest infrastructure project to date, stating concerns over social and environmental implications posed by this project (Kapchanga, 2013). Later in 2010, China signed a memorandum of understanding with the government of Ethiopia to finance the project .The Industrial and Commercial Bank of China (ICBC) finances the project. The ICBC approved a loan worth US$500 million for the Gibe III project, which is the same amount rejected by the two other banks (Swain and Jamali, 2011:8).

The Gibe III is estimated to generate 1,870 MWe, positioning it as the most productive hydropower plant in Ethiopia (CEE Bank watch Network, 2008:6). The ICBC is funding 85 per cent of the US$34 million cost of power distribution lines to the Dongfang Electric Machinery Company that will supply electrical equipment and turbines for this project (Brautigamand Tang, 2012:13). The Ethiopian government is expecting US$400 million annually from power export from this project (Kapchanga, 2013).

The Sinohydro Corporation further expressed interest in the Gibe IV project. An agreement for the Gibe IV in the Omo river hydroelectric project was signed between Ethiopia and China in 2009, immediately after the completion of the Tekeze project. This agreement included the construction of the Halele Werabesa dams in a deal worth US$2.67 billion, and the Sinohydro Corporation is responsible for these projects. These projects have the potential to generate 2, 150 MWe. It has been argued that both the Gilgel Gibe projects will also help to curtail annual floods that currently damage the livelihoods of local populations settled along the lower Omo River and will secure a water supply to the deserted Lake Turkana in Northern Kenya (Boshard, 2009:48).

The Tana-Beles hydropower station on the Blue Nile was inaugurated in May 2010 and the last generator was operational in February 2012. The project's cost was around US$500 million. The completion of the Tana-Beles was made possible through the help of Chinese investment (Sudan Tribune, 2011).

This 460 MWe project is focused on hydropower production and irrigation that would provide irrigation to an area of more than 100,000 ha (Hegazi, 2011:33). This generation of electricity could reduce Ethiopia's power deficit by 30 per cent. Ethiopian officials stressed that the tunnels used to divert water over the turbines that generate power is later released back into the river downstream. Water is therefore re-circulated causing no harm to the flow or discharge of the Nile (Sudan Tribune, 2011).

In 2011, Meles Zenawi and Chinese Ambassador to Ethiopia, Xie Xiaoyan, inaugurated the Fincha Amerti Neshe hydropower project. The Fincha Amerti Neshe hydropower project is a multi-purpose project with the capacity to generate 97 MWe, enabling it to expand the Fincha sugar factory by developing 6,000 ha of land (Berhane, 2011).

Chinese investments have helped in the construction of the Amerti-Neshe hydro-dam that can generate 100 MWe. China's Gezhouba Water and Power Company is responsible for the construction of this project (Swain and Jamali, 2011:9). According to the chief executive officer of the Ethiopian Electric Power Corporation (EEPCO), Mihret Debebe, "*the total project cost totalled over $137.8 million, 85 per cent of which was covered [by a] Chinese loan,"* (Berhane, 2011).

Following the completion of the Amerti-Neshe project in 2011, Meles Zenawi announced plans for a new project on the Blue Nile. This was the GERD project. The GERD project generated international media coverage during the summer of 2013 because of the unilateral decisions taken by the Ethiopian government regarding the development of the transboundary Blue Nile River (Veilleux, 2013:4).The Chinese government agreed to grant Ethiopia a US$1 billion loan to help finance the GERD project, which will become the largest hydroelectric power plant in Africa (Scarisbrick, 2013).

China has won the contract to build power transmission lines from the GERD on the Blue Nile. Interviews at Ethiopia's power utility, EEPCO, indicated that the GERD will have an installed generating capacity of 6,000 MWe and sixteen turbines with 375 MWe capacity each. Initial generation was planned for as early as 2014, with the completion of the entire project targeted for 2017. The project was envisioned as solving Ethiopia's chronic power shortages. Ethiopia aspires to be the green-energy

hub of East Africa. To further this aim, the EEPCO has already signed contracts with Kenya, Djibouti, South Sudan, and Sudan regarding the sale of electricity (Veilleux, 2013:4).

### *4.2.2 The Great Lakes Region*

Countries' in the Great Lakes region have planned irrigation and dams to exploit the Nile. Kenya has taken the lead and begun to plan for irrigation systems that would cover thousands of ha of land. It has targeted the Nile to irrigate some 180,000 ha (Mbaria, 2013). Uganda has followed suit, using the Nile to irrigate some 220,000 ha (Mbaria, 2013). The Ugandan government is also keen to exploit the Nile to generate power. These projects are all funded by China (Daly, 2013). The Karuma dam, which is the country's biggest hydro-infrastructure project, also received a US$1 billion loan from Sinohydro, while the Ayago north and south hydropower dams on the Nile River received a US$900 million loan.

### *4.2.3 Sudan*

Chinese interest and investments in the Nile have not been limited to upstream countries. Sudan has also taken the opportunity initiate unilateral projects through Chinese funding (Mbaria, 2013). This is despite its previous water sharing agreement with Egypt. Sudan has further taken advantage of China's financial support and has gained more geopolitical importance and hydropolitical relevance in the region. For Sudan to abandon bilateral projects with Egypt for unilateral projects with China sends a strong political message that Egyptian monopoly in the Nile is close to an end.

A major concern for Egypt and one that endangers its future with regards to the Nile, is that its partner in water use, Sudan, has sided with Ethiopia (Swain, 2013).This is almost similar to the threat that was posed to Egypt with the 1991 pact between Ethiopia and Sudan, which stipulated that the two countries would cooperate in terms of the use of the Blue Nile and Atbara Rivers. However, this bilateral cooperation has not been practically applied yet (Hegazi, 2011:34). Sinohydro has been responsible for constructing Sudan's Merowe dam that received aUS$1.2 billion loan; heightening the Roseires dam wall that received a US$396 million loan; the Kajbar dam that received a US$705 million loan; the

Shereik dam that received a US$711million loan; and the Upper Atbara Project that received a US$838 million loan.

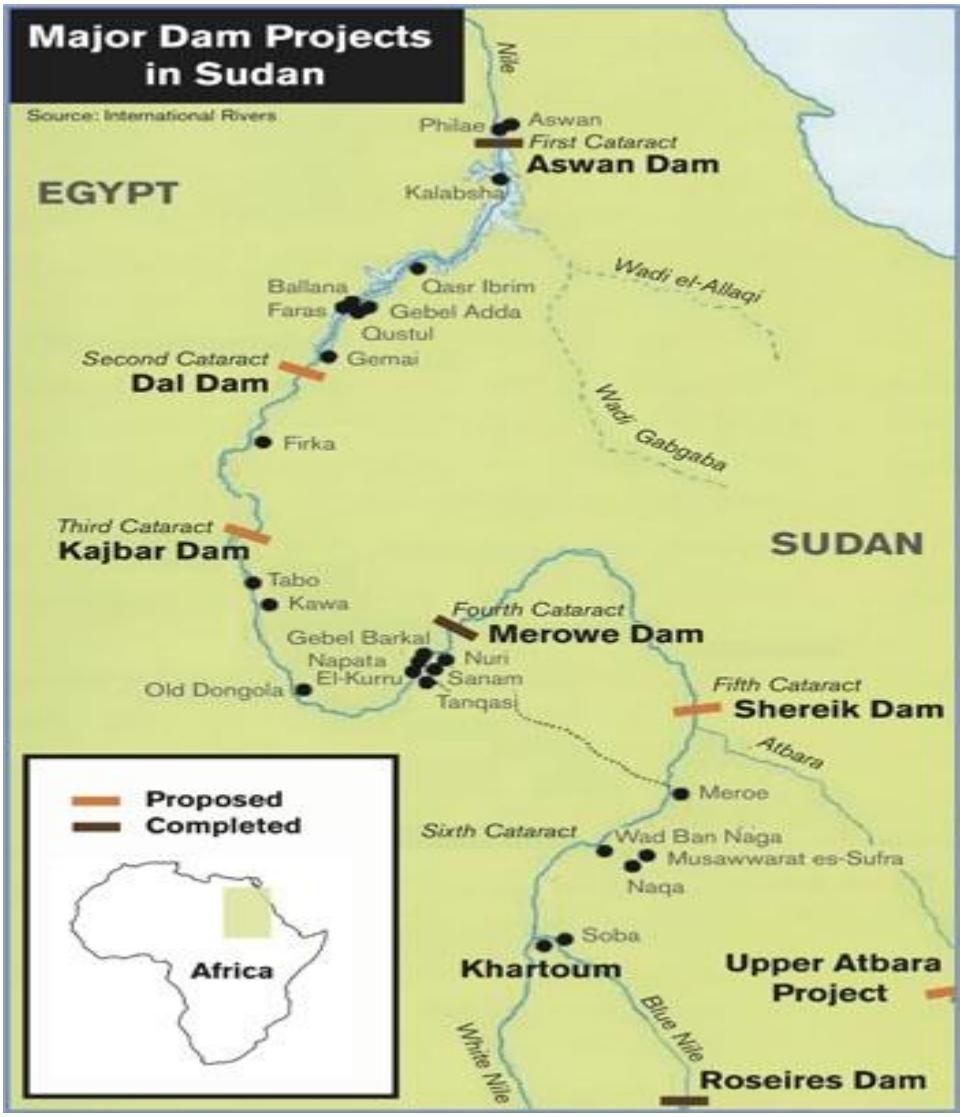
In 2003, the Chinese and Sudanese governments signed an agreement stipulating that China will provide a substantial loan for the Merowe project. The construction of this project was delayed by protests from the communities that were about to be submerged by the reservoir. As a result, the Canadian, European and other donors rejected the funding of this project. However through China's technical and financial support, the project went ahead (COIS, 2008:36-37).

Sudan was able to construct the Merowe Dam on the fourth cataract of the Nile. This is where the landmass of a river is lifted, thus exposing parts of the river bed (Warren, 2006:352). Despite this project being built in accordance with the 1959 Agreement, however, its high water demand for irrigation and other future irrigation projects close to the banks of the Blue and White Nile raises a number of concerns in terms of water supply to Egypt (Swain and Jamali, 2011:9).

Through its huge turbines, the project uses the Nile's flow to generate electricity and is seen as a solution to the country's power crisis. The dam was officially opened in 2009 and is the biggest water project in the Nile since the construction of the Aswan High Dam. The dam has the potential to generate 1,250 MWe of electricity. The project was funded by Chinese and Arab financiers, and built by Chinese, German and French companies (International Rivers, 2015).

In 2010, the Sudanese government, together with the Chinese government and/or companies constructed a number of hydropower and irrigation projects in Sudan. These include the 360 MWe Kajbar Dam on the Nile's third cataract located in the Nubia region; the Shereik Dam on the Nile's fifth cataract; and hydropower and irrigation projects on the Atbara River in Eastern Sudan (Bosshard, 2015) (see map 3).

***Map 3: Chinese support to hydraulic projects in Sudan (International Rivers, 2015)***




## 4.3 Implications for environmental security and multilateral processes in the Nile region

Upstream riparians now appear as stronger parties in the competition for the Nile. According to Cascão (2009:251), deeper regional integration upstream to challenge the status quo and develop the Nile is intensifying. On the one hand, the East African

Community (EAC) consisting of Kenya, Uganda, Tanzania, Burundi, and Rwanda has started hydro-electrical developments of hydraulic infrastructure in the Lake Victoria basin and the Nile sub-basin of the Kagera River, which includes irrigated agriculture and hydropower (Cascão, 2009:260).

On the other hand, Ethiopia has ignored calls from Egypt to negotiate on the GERD project. According to Egyptian Foreign Minister Nabil Fahmy, "*We believe that Egypt, Ethiopia and Sudan will benefit from reaching solutions through negotiations*" (Ahram Online, 2014). This appears to be a contradictory statement since the same words were used by Ethiopia and other upstream countries pleading for a share of the Nile. It is evident that Egypt has realised the alarming threat of increased upstream unilateral developments (Swain and Jamali, 2011:9). As a result, Egypt has shifted from coercive strategies to strategies that are more cooperative in an attempt to maintain its hydro hegemonic position over the Nile (Hanke, 2013:100).

Verhoeven (2013) asserts that the hydro-infrastructure construction effects of China's influence on the continent regarding state relations are significant and more consequential in the NRB. Such dynamics may significantly affect the relations between the Nile riparian countries.

There are several consequences caused by these unilateral hydropower developments: Firstly, there is a significant threat to environmental security. Environmental security challenges posed by these unilateral developments will be discussed in conjunction with Homer-Dixon's environmental scarcity theory. Secondly, there is a significant threat to on-going multilateral processes such as the NBI, which intended to mediate the upstream-downstream tensions.

#### *4.3.1 Environmental security and Homer-Dixon's environmental scarcity theory*

The chapter argues that unilateral hydropower developments in the Nile will exacerbate environmental scarcity (i.e. demand-induced, supply-induced and structural-induced scarcity) and lead to inter-riparian tensions and disputes in that they will increase the demand for water, reduce the supply of water, and further increase the skewed distribution of water. As argued in chapter 2, it is important to note that these types of scarcity are not mutually exclusive; they often occur simultaneously and interact with one another (Homer-Dixon, 1994:8-11). "*Uneven distribution never acts on its own, its impact is always a function of its interaction with*

*resource demand and supply*" (Schwartz *et al*, 2000:80). This notion is supported by Homer-Dixon's environmental scarcity theory.

According to the environmental scarcity theory, the increasing demand for water due to rising population growth and large hydropower projects, the reduced supply of water to other riparian countries and the uneven distribution of the Nile have the potential to cause interstate tensions and disputes (Homer-Dixon, 1994:8-11).

#### *4.3.1.1 Demand-induced scarcity*

It is sufficient to argue that countries currently developing water resources through dam projects are doing so in response to pressures from population growth and economic development (Veilleux, 2013:1).However, the social and environmental implications for the inhabitants associated with these projects are far greater than the hydropower potential expected. For instance, with a growing economy and an increase in population in Uganda, the two hydropower stations (i.e. the Karuma hydropower project and the Ayago north and south hydropower dams) have not reversed the power shortage and/or crisis and poverty of the country. These hydropower stations only meet a fraction of Uganda's electricity demand. According to Ugandan State Minister of Energy Simon D'Ujanda, only 9 per cent of Ugandans have electricity (Afedraru, 2014).

These projects have also been responsible for displacing communities living along the Nile. According to Pottinger (1996) these large projects have not reversed poverty and power shortages but have made it worse through major displacements and the destruction of arable land (Pottinger, 1996). This is due to China not imposing environmental, human rights or good governance conditions prior to funding (Thakur, 2009:10). Pottinger further states that the benefits of these projects are concentrated in the hands of a very small elite (1996).

Environmental scarcity has been exacerbated and population growth has not been addressed, resulting in thousands of displaced people in the basin who are thus populating small unsustainable areas.

The issue of the lack of proper social and environmental assessment studies and the impact that large projects have on inhabitants can be traced back to 1899 during the construction of the Aswan Low Dam when thousands of Nubians were forced to move to agriculturally unsuited areas in the West Bank of the Nile around the Aswan

region. This was followed by a second and traumatic displacement of 120,000 Nubians in both Egypt and Sudan in May 1964, when the second stage of the construction of the Aswan High Dam commenced. Similarly, these displaced people were taken to villages far from the Nile and away from their agricultural subsistence (Scudder, 2003:1).

Today, China's lack of proper environmental studies has similarly affected the population of the basin. For instance, a proper environmental impact assessment of the Merowe Dam and the Kajbar Dam projects was not carried out. As a result, many people were displaced and a number of human rights violations occurred. On the one hand, the Merowe reservoir with a length of 174 kilometres displaced more than 50,000 people from the fertile Nile valley to arid desert location (Brewer, 2008:11). Similarly, the Kajbar Dam displaced 10,000 people. On the other hand, thousands of protesters were killed and some injured in protests from the affected communities (Bosshard, 2015).

While many African leaders perceive Chinese funding as an opportunity, however, China's lesser concerns for the environmental and social impacts pose a number of threats to the populations and resources along the Nile. Bosshard (2009:48) for instance, argues that Gibe III and IV have created possible devastating effects on the environment and people living along the Omo River (Bosshard, 2009:48).

Since the Gibe III and IV dams are located on the same river (the Omo River), they will also affect natural habitats negatively if inappropriate environmental and social studies are conducted. The Gibe III dam and the associated decrease in water levels and seasonality of flows in the Omo River threaten the continuation of the only two options for survival in this arid environment, i.e. recessional cultivation of food along the riverbanks, and livestock herding (BBC, 2010).

According to the director of International Rivers African Programme, Terri Hathaway, "*Gibe III is the most destructive dam under construction in Africa. The project would condemn half a million of the region's most vulnerable people to hunger and conflict,"* (BBC, 2010). Bosshard (2009:48) further argues that Gibe IV will push the fragile ecosystem of the lower Omo River Valley and Lake Turkana to the brink of collapse.

As such, the unilateral developments of upstream hydropower projects through China's financial support have exerted pressure on the Nile by increasing the

consumption of water, thus decreasing the amount available to each riparian state and aggravating the demand-induced scarcity. This kind of scarcity could lead to conflict, as argued by Homer-Dixon's environmental scarcity theory.

As discussed in chapter 2, the environmental scarcity theory posits, "*an increase in consumption levels decreases the amount of limited natural resources available to each individual and/or state,*" (Bingham, 2001). Homer-Dixon (1999:48) asserts that demand-induced scarcity has the potential to cause interstate conflict in that the "*uncoordinated*" use of a resource such as shared water resources by one economic actor reduces its availability for others, leading to increased intergroup competition, which can take the form of violent conflict.

#### *4.3.1.2 Supply-induced scarcity*

Environmental implications for the Nile are controversial as far as China is concerned. This raises the question of whether China is addressing the overwhelming pressures on water supplies in the NRB or increasing them. The rising demand to unilaterally develop large hydropower projects in upstream countries has rapidly increased the consumption of the Nile and has negatively affected the supply of limited water resources available to each riparian country. These unilateral projects in upstream countries are negatively impacting the sufficient transfer of water, which will be detrimental to ensuring peace and security in the region.

Soil conservation in the basin has been heavily impacted because effective environmental and social impact assessments were not carried out. For instance, the displacement of people during the construction of the Merowe project hugely affected agricultural activity. A concern when it comes to the distraction of arable land and displacement is that agricultural activities cannot be restored in these new resettlement sites because the soil is too poor and does not compensate for a realistic source of income despite the provision of irrigation water(Brewer, 2008:11).

In 2006, the Swiss Federal Institute of Aquatic Science and Technology, in an independent review of the Merowe project, outlined that strongly fluctuating water levels and sedimentation would have serious negative impacts on aquatic ecology, water quality and public health. As a result, Europe, Canada and other financial institutions withdrew funding for this project. However, the project went ahead because of Chinese funding (Brewer, 2008:11).

The unilateral development of hydropower projects in the Nile has aggravated supply-induced scarcity. In the entire NRB, 1 million ha of fertile land has been destroyed because of hydropower stations and dams. The loss of arable land was also witnessed in Ethiopia through massive landslides that took place in the Tekeze River as a result of the construction of the Tekeze hydroelectric dam. Many environmentalists, including Richard Leakey, have expressed concerns about the possible impact of the Omo River dams on Lake Turkana (Greste, 2009).

These projects have led to the degradation and depletion of the Nile and, as a result, have reduced the supply of water to neighbouring riparian countries. According to an International Rivers environmental group report, the completion of the Gibe III dam will impact negatively on the water quantities for communities that live near Lake Turkana in neighbouring Kenya. The survey predicts that in these areas, including areas near the lake, there will be more conflict if the water levels decline (GeeskaAfrika Online, 2015). This prediction is not only limited within riparian countries but also between riparian countries. There is currently no comprehensive integrated water-resources management plan for the Blue Nile basin and no adequate monitoring infrastructure though erosion-prevention efforts (Veilleux, 2013:6).

According to Ugandan environmentalist Muramuzi (2011), Lake Victoria, the largest lake in Africa and the most renowned source of the Nile, is slowly and gradually shrinking due to the increasing number of hydropower projects and irrigations in Uganda which draw large amounts of water out of the Lake.

With millions of people in the basin severely affected by soil degradation, these uncoordinated development projects will further affect water security, soil conservation and food production to supply a growing population. The soil degradation has rendered large amounts of arable land unusable for food production (Muramuzi, 2011).

It is evident that these unilateral projects have produced a supply-induced scarcity in that they have intensified the degradation and depletion of the Nile. According to Homer-Dixon's environmental scarcity theory, supply-induced scarcity in the Nile is an increasingly salient element of interstate tensions and under unfavourable conditions will lead to violent conflicts (Homer-Dixon, 1999:48). Muramuzi (2011)

further asserts that these unilateral developments, although a positive achievement for upstream countries' developments, are extracting more water than the Nile can provide. These projects will exert pressure on already exposed water beds downstream (as evidenced in the Nile's cataracts) and upstream. These uncoordinated developments will result in lower water tables and rivers running dry due to unsustainable use (van der Molen &Hildering, 2005:135).

#### *4.3.1.3 Structural-induced scarcity*

The unilateral development of hydropower projects has further worsened the already uneven distribution of the Nile. Notwithstanding upstream countries now being able to access the Nile and develop hydropower projects through China's financial support, this does not entail an equitable distribution of the Nile. According to the environmental scarcity theory, the shortage of water from other water users has the potential to cause violent conflict (Homer-Dixon, 1999:48).

According to Homer-Dixon (1999:48), structural-induced scarcity is a major cause of violent conflicts in that it deprives certain water users of access to water. Unilateral hydropower developments in upstream countries have become a major source of structural-induced scarcity. These developments have produced an unequal distribution of the Nile. Given the fact that upstream countries are gradually becoming more powerful water users on the Nile, it is evident that in the near future they will confiscate a larger part of the Nile.

Although these unilateral developments have bypassed the colonial agreements that governed the Nile, they do not address structural-induced scarcity in a mutual sense; rather, they exacerbate it. Unilateral hydropower developments have increased the unequal distribution of the Nile. Because of these developments, Egypt will experience physical water scarcity (Martens, 2011:9).

The basis of the threats posed by unilateral hydropower developments upstream is that these projects severely affect the water allocation formula on which Egypt has been heavily dependent for decades (Swain and Jamali, 2011:9). As argued before, Egypt's dominance over the Nile was detrimental to the peace and security of the region, but so are these unilateral developments. This chapter argues that an equitable allocation is only possible through a negotiated treaty.

Because Egyptian interests are not considered when constructing these projects, environmental studies to determine the impact of these developments on Egypt's water security are not conducted (Hegazi, 2011:33-4). As a result, the issue of uneven distribution will continue to grow rapidly. For instance, the hydropower station at the Karuma Falls threatens the natural flow of the Nile (Muramuzi, 2011).This may be the beginning of a new phase of competition over the use of the basin's transboundary water resources.

### *4.3.2 The unilateral processes vs. multilateral processes*

One might draw a hypothesis that individual riparian countries may opt for developing infrastructure unilaterally and directly via Chinese support, resulting in major impacts on the hydropolitical relations between upstream riparian countries and Egypt that would probably endanger the on-going hydropolitical cooperation process.

China's involvement in the Nile has brought both new opportunities and new challenges to the hydropolitical relations of the region. On the one hand, financial support from China appears to represent a large incentive for the unilateral development of hydraulic infrastructure in the basin to respond to growing population demands. It is evident that upstream countries have lost confidence and trust in the NBI, since it failed to facilitate the win-win and benefit-sharing scenarios promoted by cooperation. These projects also represent the end of the enduring monopoly of the Nile by downstream countries (Lie, 2010:23).

On the other hand, China's involvement in the regional dam industry as an alternative source of funding to several of the upstream riparian countries' hydropower development projects and as a country unencumbered with international water and environmental regulations in its financing approach, has presented new challenges to the NBC. These unilateral developments are carried out despite on-going multilateral cooperation processes, which promise to promote political stability, regional security, economic prosperity and environmental sustainability (Cascão, 2009:251).

As a result, China has brought about uncertainties to multilateral relations. Upstream countries will abandon multilateral processes for unilateral projects. By doing this, upstream riparians might opt for increasing their own water resource use through

unilateral projects, while disengaging from multilateral processes. This notion poses challenges to the security of the Nile in that it defies the ideals of sustainability, management and use and the possibility of a co-ordinated agreement guaranteed by multilateral processes. As stipulated in chapter 3, the study recognised the NBI and the AU as possible multilateral mechanisms for the sustainability, management and use of the Nile. What is certain is that the implementation of current and future unilateral projects might endanger the basin's peace and environmental cooperation processes.

Unilateralism cannot co-exist with multilateralism. The main reason is that when multilateral processes such as the NBI attempt to negotiate for a more equitable use of the Nile, unilateral processes contradict these coordinated efforts (Yimer, 2015:101).Despite upstream countries' ability to use the Nile, unilateral developments do not entail equitable utilization but an every man for himself scenario, which will not help the peace and cooperation process in the basin. Considering that tensions have always been high between upstream and downstream countries, this external influence will further constrain these delicate relations.

These unilateral projects emerged because the NBI failed to implement a basin-wide approach and harmonise projects in the basin. In addition, the NBI failed to address the colonial agreements that governed the Nile in its policy environment towards this basin-wide approach (Cascão, 2009:264).Due to the progress of these unilateral projects, the NBI will face further challenges to demonstrate that cooperation brings a greater number of (higher-value) benefits than unilateral strategies.

The funding and development of hydro-dams in upstream countries by China are examples of unilateral water developments. This indicates that upstream countries have decided to withdraw from multilateral cooperation and opt for the unilateral development of the Nile as opposed to waiting for multilateral agreements to materialize (Scarisbrick, 2013).

These unilateral projects affect the objective of the NBI, and in particular the already challenged CFA. The future of the CFA is uncertain, and these projects add more uncertainties to basin-wide cooperation in that they affect the initially proposed equitable use of the Nile (Swain and Jamali, 2011:10). For instance, legal

negotiations regarding the principle of equitable use and negotiated volumetric water allocations will become more complex. These factors will certainly have a bearing on the future success of cooperation in the NRB and of the NBI itself. Therefore, through unilateral developments, the success of basin-wide cooperation is compromised.

## 4.4 Conclusion

The chapter has shown that China has brought about both opportunities and uncertainties for upstream riparian countries as far as the changing lifelong status quo in the Nile region is concerned. The lack of proper coordination between the Nile riparian countries has led to the construction of these hydropower projects being subject to inadequate environmental and social assessments, leaving devastating environmental and social impacts as discussed through demand-induced scarcity.

Without proper basin-wide cooperation, the water system of the Nile will experience severe pressure from uncoordinated projects. The lack of cooperation will lead to an increasingly ineffective use of water. As argued in chapter 3 of the study, the development of unilateral hydropower projects is a result of the inability to establish a commission that will create a more conducive win-win environment for all Nile riparian countries. The chapter further argued that unilateralism prompts competition, which leads to lose-lose gains and the failure of the NBI. This subsequently influences the development of more unilateral decision-making by riparian states regarding major water resource investment projects (i.e. hydropower projects) and therefore increases the level of disputes in the region.

This situation forms the cornerstone of the NRB's past and current hydropolitical dilemma. The chapter argues that it is evident that water needs for both upstream and downstream countries cannot be solved by massive water transfers, but rather through a coordinated water-demand management and a supply-oriented approach. This is only possible through multilateral ventures coupled with an agreement that serves and protects the interests of all Nile water users.

Since China's growth in upstream countries' hydropower development is inevitable, recommendations here include that China needs to adequately balance water

demand management and a supply-oriented approach to avoid the emergence of disputes within the region (GeeskaAfrica Online, 2015).

# CHAPTER 5: SUMMARY, RECOMMENDATIONS AND CONCLUDING REMARKS

## 5.1 Summary

Chapter 1 aimed to identify and assess the extent to which environmental scarcity is a source of conflict in the NRB. The study presented this case to become familiar with the water status in the NRB. It used the case of the NRB to recognise the interrelation between environmental scarcity and violent conflicts. The main aim of chapter 1 was to provide the framework of analysis for environmental conflicts in the NRB. It provided the problem statement, aims and objectives, and methods that applied throughout the study to support and answer the research questions of the study.

As discussed in chapter 1, the scarcity of valuable resources, ranging from minerals to oil, is paramount to environmental conflicts (Libiszewski, 1992:14). Despite the contentious state of this notion, however, the chapter indicated the traditional concerns confronting IR, i.e. the role that resource scarcity plays in inciting conflicts (Barnett, 2000:272). As discussed, a major resource of concern to international peace and security both domestically and internationally is the scarcity of shared water resources, which has intensified the competition between riparian countries (Bujra, 2002:11). As a result, this competition has led to water wars.

To distinguish clearly between environmental conflicts and water wars, the study viewed environmental conflicts as a term encompassing a variety of conflicts that take place over a wide variety of scarce resources that include water and agricultural land, and an ever-widening list of categories ranging from minerals to oil (Libiszewski, 1992:14). Within the context of environmental conflicts, the study has narrowed the scope of these conflicts to focus on conflicts over shared water resources.

Given that shared water resources flow across and not along riparian borders and, as a result, are shared among several countries, this tends to complicate the management, sustainability and distribution of water. The chapter's arguments are

supported by the increasing demand for water, which, coupled with its unsustainable use and uneven distribution, can lead to violent conflicts. The NRB played a central role as a case study of water wars to this research.

Chapter 1's assertions of water wars in the NRB are based on current river water shortages due to increased population growth, the depletion and degradation of the Nile, and fierce competition due to the uneven distribution of the Nile as conditions that constitute water conflicts. The Nile faces considerable challenges of population growth, water scarcity, environmental degradation and insecurities because of uneven distribution. The chapter's focus on the issue of water wars in the Nile was due to predictions of global water wars. The NRB became a focal point of interstate relations that has become firmly embedded in the diplomatic discourse of the Nile riparian countries.

While no water wars have occurred yet, there have been increasingly fraught diplomatic tensions and statements from government leaders both upstream and downstream suggesting that this is not such an outlandish possibility for the NRB. For instance, in 1977, Egypt threatened Ethiopia with war on numerous occasions. Egyptian President Sadat declared:

> If Ethiopia proceeded there is no alternative but to use our force. We will retaliate when something happens but we have to be ready with plans and alternatives to firmly stop any action, (Adar 2011:182-3).

In 1991, the former Egyptian Defence Minister reiterated Egypt's readiness to use force, if necessary, to protect its control of the Nile.

In 2004, the Ethiopian Minister for Trade accused Egypt of using undiplomatic strategies to control Ethiopia's development projects on the Nile. He stated:

> Egypt has been pressuring international financial institutions to desist from assisting Ethiopia in carrying out development projects in the Nile basin, (Braune &Xu, 2010:232).

For instance, Ethiopia's intention to construct the GERD was opposed by the World Bank, which would not fund any projects without the approval of Egypt, stating:

> Egypt is the leading country in this consortium and the World Bank will not get behind any initiative that leaves them [Egypt] out, (Green Prophet, 2010; Mayton, 2012).

In 1990, Egypt had blocked an African Development Bank loan to Ethiopia for new irrigation projects (Moffet, 1990:5)

On the other hand, Ethiopia's Minister of Water Resources announced in 1997

> As a source and major contribution of the Nile, Ethiopia has the right to have an equitable share of the Nile waters and reserves its rights to make use of its waters.

In 2004, Egypt also restricted Tanzania from constructing the Lake Victoria pipeline claiming that according to the 1929 Agreements, Tanzania cannot construct any project without British permission. This project would have been a huge benefit to about 400,000 of Tanzania's north-western citizens. Egypt threatened to bomb the construction site arguing that it needed the water to flow northward into the Aswan Dam (Di Nunzio, 2013:6).

The chapter noted the disparities that exist between the Nile riparian countries such as social, economic and political development and the different levels of need for water. The chapter has also argued that such disparities between riparian countries make conflict inevitable and finding equitable water-sharing solutions in the Nile complex. The possible emergence of water wars in the NRB has been under scrutiny from conflict analysts, scholars and academics (Gleick, 1993; Homer-Dixon, 1994:1999; Toset *et al,* 2000; Turton, 2000; Klare, 2002; Tulloch, 2009).

The significance of the case study is that conflict over the Nile represents one of the most crucial issues confronting the continent. The competition forthe Nile has created a new landscape of conflict on the continent since it goes beyond ideological, religious and ethnic norms. The chapter recognises that the competition for the Nile has shaped politics in the north-eastern parts of Africa.

The purpose of chapter 2 has been to argue the possibility of violent water conflicts between upstream and downstream riparian countries in the Nile. Chapter 2 contextualised environmental scarcity and deepened the understanding of the relationship between environmental scarcity and violent conflicts. To achieve these aims, the chapter adopted Homer-Dixon's environmental scarcity theory to illustrate the possibility of a conflict in the NRB, with special reference to water. Under the environmental scarcity theory, the chapter found that the term environmental scarcity incorporates three distinctive causal forms, i.e. demand-induced scarcity, supply-induced scarcity and structural-induced scarcity. The chapter focused on Homer-

Dixon's environmental scarcity theory because it allowed these three distinct sources of scarcity to be incorporated into one analysis.

The theory was also used to establish environment-conflict linkages. The theoretical framework of the study focused on environmental scarcity as a potential cause of conflict in the Nile. This theoretical perspective is essential in identifying the possibility of conflict in the NRB through the extrapolation of environmental scarcity. The study's use of Homer-Dixon's environmental scarcity theory was driven by the speculative nature of early explanations of the link between the environment and conflict, which were also imprecise and made in isolation from other salient features.

The environmental scarcity theory viewed the increased demand for water (demand-induced scarcity), the reduced supply of water (supply-induced scarcity) and the increased skewed distribution of water (structural-induced scarcity) in the Nile as causes of environmental scarcity that increased the probability of conflict. The theory based its arguments on these three causes to support the environmental conflict perspective in the Nile. The argument of the study suggests that the NRB has become prone to environmental conflicts, i.e. water wars, due to environmental scarcity.

Homer-Dixon's environmental scarcity theory supported the chapter's argument that water will be the future cause of interstate conflicts in the Nile. The study discovered that environmental scarcity along the Nile is a leading cause of environmental conflicts between and within upstream and downstream riparian countries. Population growth, the on-going processes of degradation coupled with uneven distribution of the Nile makes scarcity-induced interstate conflicts over water probable.

Although the environmental scarcity theory focused mainly on civil violence including ethnic clashes and insurgencies, the chapter was able to expand the theory's scope to include disputes and tensions between the Nile riparian countries over its water resources. In short, the findings presented in this chapter regarding the Nile are structured around environmental scarcity. Below are the findings of the chapter when the environmental scarcity theoretical framework was applied to the NRB.

The demand-induced scarcity perspective argued that an increase in population or consumption levels in the NRB may lead to the scarcity of its water resources

(Weiner and Russell, 2001:3), since it decreases the amount of water resources available (Bingham, 2001). This may lead to increased intergroup competition, which under unfavourable conditions can take the form of violent conflicts.

The evident mounting regional pressure on the Nile's limited fresh water resources supported the chapter's assertions. The research also supported this assertion by illustrating present and future estimates of the total population growth within the basin boundaries.

Demand-induced scarcity caused by population growth is worsening in the NRB, and, coupled with the fall in per capita water availability, disputes over water could cause conflict among riparian countries. In addition, by 2025 riparian countries such as Egypt, Ethiopia, Kenya, Rwanda and Burundi will experience water scarcity while Uganda, Tanzania and Eritrea would face water stress (Karyabwite, 2000:6-7). Chapter 2 argued that under these conditions, fierce inter-riparian competition over the Nile will occur ultimately leading to an inter-riparian conflict.

The supply-induced scarcity perspective noted that the Nile scarcity emerged because of the degradation and depletion of its resources due to the unsustainable use of a specific resource. Although Homer-Dixon argued that water resources can be degraded and depleted from causes that are not human induced, the chapter clearly stated and argued environmental degradation within the context of human-made environmental changes that consequently have a negative impact on society.

The chapter showed that certain factors such as land degradation, agriculture, industry and domestic use in the NRB, within and between riparian countries, are paramount to environmental degradation. The environmental security literature therefore argued that supply-induced scarcity in the form of environmental degradation is a key driver of violence.

In view of the above, the aim of the chapter was to illustrate that the high uncoordinated dependence of all 11 riparian countries on the Nile has caused it to deplete. The chapter supported this notion by illustrating the contribution of all riparian countries to factors such as land degradation, unsustainable agricultural, domestic and industrial use paramount to the Nile's degradation and depletion. The chapter centred on degradation and/or land degradation because it viewed land

degradation as intricately linked to the quality, volume and timing of water flow in the basin.

The structural scarcity perspective argued that unequal access or skewed distribution of the Nile's shared water resources may cause violent conflicts (Homer-Dixon, 1998:48). The chapter argued that this form of scarcity emerges and causes conflict when more powerful segments of water users confiscate a larger part of the scarce resource.

The chapter further showed that structural scarcity is possible property rights or institutions prevent some actors from accessing the resource. In the NRB, the chapter discovered that several agreements granting Egypt the right and veto power to use the Nile and to restrict other riparian countries 'access to the Nile. For instance, the 1891 Protocol between the UK and Italy for the demarcation of their respective spheres of influence in Eastern Africa sought to protect Egyptian interest in the Nile's Atbara River, the upper reaches of which fell within the newly acquired Italian possession of Eritrea (Okoth-Owiro, 2004:6). Other such treaties and agreements included the 1902 Anglo-Ethiopian Treaty, the 1906 Treaty between the UK and the Independent State of Congo, the 1906 Tripartite Agreement between the UK, France and Italy and the 1925 Exchange of Notes between Italy and UK recognising the rights of Egypt and Sudan in the Blue Nile and the White Nile and their tributaries, which stipulated that no work would be constructed which might modify their flow into the main river (Okoth-Owiro, 2004:7).

These series of agreements shared the principle of protecting Egyptian interests in the Nile region, stipulating that signatories would not construct or cause to be constructed irrigation or any work that might negatively affect the flow of the Nile to Egypt. The UK, France and Italy argued that they were acting on behalf of upstream riparians. According to Knobelsdorf (2006:5), these series of negotiations and understandings became what are known as the 1929 Nile Water Agreements, which granted Egypt extensive usage of the Nile. The Agreements stipulated that Egypt has a right to utilize the Nile and a property rule to protect this right. This was done with Egypt's exclusive propriety right to the Nile without obligation, consent or even voluntary transfer of property rights from Egypt to other riparian countries (Kieyah, 2007:19).

However, the 1929 Agreements were later revised through the 1959 Agreement, which granted exclusive and full use and control of the Nile water to Egypt and Sudan, thus effectively excluding other Nile riparians (Lino, 2013:12).This competitive exploitation over the Nile has led to intense tensions and disputes over its use.

The struggles between upstream and downstream riparian countries over the Nile are longstanding. Based on past and present analyses of the Nile's disputes, the use of the Nile has always been a controversial issue. The politics of distribution in the Nile has threatened the availability of water for agricultural and industrial purposes in the region.

The chapter argued that the underlying issue regarding distribution is the numerous agreements that governed and continue to govern the Nile. These agreements supported the chapter's argument that they were a major source of structural scarcity as they structurally denied upstream countries access to and use of the Nile. This is apparent in their provisions in which the principle *"no upper-basin state had the right to interfere with the flow of the Nile in respect of Egypt and Sudan"* was evident.

The chapter found that the 1929 and 1959 agreements have been a major stronghold for Egypt to exclude upstream countries from the use of the Nile. The chapter also recognised that these agreements were pivotal in Egypt's hydro-hegemonic position in the Nile. The chapter therefore concluded that these treaties are responsible for the conflict over the Nile between upstream and downstream countries and, as a result, must be re-negotiated.

Having observed the three kinds of scarcity confronting the Nile, Homer-Dixon (1994) suggests that it is important to note that there is more than one cause to environmental scarcity. As empirical evidence suggested, resource distribution cannot be used as a point of analysis in addressing environmental scarcity in isolation from resource depletion and population growth. Hence an all-encompassing approach (i.e. Homer-Dixon's environmental scarcity theory) is needed to analyse and address environmental scarcity.

The environmental scarcity theory's determination to analyse the environmental scarcity of the Nile as a cause of conflict is because one form of scarcity alone is

neither a necessary nor a sufficient cause of conflicts. However, a number of contextual factors play a major role in inciting interstate conflicts.

In light of the preceding discussion on the relationship between the Nile's scarcity and conflict, chapter 3 turned to evaluate and discuss regional legal aspects deemed possible as mechanisms for addressing the Nile issue. Chapter 3 of the study focused on the implementation strategies and cooperative measures of the AU and NBI. The chapter gave special reference to critically analysing the roles, responses and impact of the AU and the NBI in providing for binding measures to the disputes regarding the sustainability, management and equitable water use in the NRB. The main aim of chapter 3 was to highlight the importance of the AU and, most importantly, the NBI as mechanisms that can be used to address the past legal and historic claims that are causes of conflicts along the Nile.

The chapter found that a major problem surrounding the Nile is the lack of a binding agreement that ensures an equitable share of the Nile for all the eleven riparian countries. The environmental and human pressures on the Nile mean that the already finite water of the Nile will not adequately meet the demands of all the Nile countries; hence, a cooperative mechanism is essential. Without such a mechanism, it will become lose-lose situation for everyone and thus increase the likelihood of continued tensions and disputes over the Nile.

The chapter viewed both the AU and the NBI as the AU holds regional binding authority and has, as its central role, to resolve issues detrimental to peace and stability on the continent. As a regional organisation, the AU represents a highly possible mechanism for the sustainability, management and use of the Nile. Complementary to this is that the AU has acknowledged the causal relationship that exists between environmental scarcity and conflicts and has also emphasised the adverse impact of environmental change on human security.

The chapter made use of the 1968 African Convention on the Conservation of Nature and Natural Resources to outline the crucial steps intended by the AU for the preservation of natural resources and to minimize the possibility of water-related disputes in transboundary basins.

The NBI on the other hand, represents an inter-riparian commission aimed at coordinating riparian countries' water demands by forging a collective water sharing

agreement. The chapter viewed the initiative as a mechanism that would provide an understanding that a cooperative effort in the development and management of Nile water will bring the greatest level of mutual benefit on the region. The direction brought by the NBI became important for the study as a possible mechanism for the cooperative sustainability, management and use of the Nile. It signalled the recognition of shared interests among NRB countries in an effort to foster cooperation. It also supported the notion that without proper basin-wide cooperation, the water system of the Nile will experience severe pressure from uncoordinated projects that will ultimately lead to conflict.

Nonetheless, the Nile remains a high priority risk as far as its sustainability, management and use is concerned. The problem evidenced in the roles played by both the AU and the NBI is that they address resource distribution in isolation from resource depletion and population growth. As discussed in chapter 2, uneven distribution never acts on its own; its impact is always a function of its interaction with resource demand and supply (Schwartz *et al*, 2000:80).

However, the chapter acknowledged that these structures alone cannot serve as a solid footing for achieving cooperative norms. Their roles can either help or hinder the situation. And in the case of the NRB, they have further hindered the way riparian countries relate to each other. Both the AU and the NBI have significantly shown their failure to understand environmental scarcity by addressing environmental scarcity only on the basis of uneven distribution. As discussed in chapter 2,the environmental scarcity theoretical framework clearly indicated that the concept of environmental scarcity encompasses resource demand, resource supply and resource distribution.

Both the AU and the NBI have been entirely focused on the adverse impact that the distribution of the Nile (i.e. upstream-downstream disputes) has on the peace and security of the region and have done little to consider factors detrimental to the degradation and depletion of the Nile either between and/or within upstream and downstream riparian countries. Their lack of understanding of environmental scarcity, will lead to their failure to achieve the difficult goals of conflict resolution and regional cooperation in the NRB. Chapter 3 therefore concluded by emphasising the need for an institutional support structure that understands environmental scarcity and its salient features to address water-related competition or conflict accordingly.

Chapter 4 has indicated that upstream countries have challenged the Nile status quo (i.e. Egypt's monopolisation of control over the Nile) by undertaking a number of unilateral hydropower projects. The main aim of Chapter 4 was to discuss the recent power shifts in the Nile and their impact on changing the hydro-hegemonic status quo. The findings of this chapter assert that this was possible through the financial support that these countries received from China. Until the recent past, no other riparian country undertook any significant development project without prior consent of Egypt as discussed in chapter 2. The political and economic instability that was recently experienced in upstream countries played a huge role in affecting their ability to address hydropower infrastructure in their countries and challenging Egypt's quasi-monopoly of the Nile.

As discussed in previous chapters, one of Egypt's most common and successful means of influencing the Nile discourse was its power to prevent financial institutions, regionally and internationally, from funding upstream countries' hydropower infrastructures (Waterbury, 2002:80). In addition to Egypt's longstanding dominance over the Nile, was the failure of the AU and the NBI to change the status quo in the basin to a more equitable environment. Although upstream countries faced hurdles with regards to financial and institutional support, the chapter found that their recent political and economic stability enabled them to acquire funding from China. This funding enabled them to use the Nile to develop hydropower projects in their countries, challenging Egyptian dominance over the Nile.

The chapter acknowledged China's influential role in upstream countries' infrastructure. Although China's contribution ranges from telecommunications to transport, the chapter considered China's contributions to hydropower as an important aspect to the arguments of the chapter. The extensive involvement of China in the Nile upstream countries' hydropower projects was identified in numerous projects in which China provided funding.

The chapter focused on Burundi, Ethiopia, Kenya, Tanzania, the DRC, Uganda and Sudan as case studies to illustrate the involvement of Chinese companies and banks in undertaking these hydropower projects. It was evident that the number of hydropower projects in upstream countries was increasing. The need and importance of these hydropower projects was argued by the chapter as a response to power shortages and poverty reduction.

Four key factors show why China is perceived as a suitable donor for African states, and upstream countries in particular. Firstly, China has become a preferred financial partner due to its principle of non-interference and its less restrictive environmental and social regulations. This principle is favoured because most countries have poor or a lack of good governance, environmental and labour standards. Secondly, China has become a viable donor to upstream countries due to its low costs. As discussed in chapter 4, China purposefully bids below normal standards of the bidding process and also offers cheap equipment and labour. Thirdly, China's access to cheaper machinery has enabled it to complete projects on schedule. And lastly, in its funding process, China agreed to cover 85 per cent of project costs through preferential buyer's credit and concessionary loans.

Nonetheless, the study maintained that this shift does not guarantee peace. The study argued that without an all-inclusive agreement governing the Nile, this lack of cooperation has led to the inefficient use of water, which threatens the sustainability, management and use of the Nile. For instance, these projects have negatively affected the flow of the Nile because of their uncoordinated nature.

As a result, these unilateral projects have made the Nile prone to conflict. The use of the Nile by one economic actor reduces its availability for others, thus exacerbating the uneven distribution of the Nile. In addition, due to China's poor environmental and social studies prior to funding and constructing these projects, the chapter concluded that these projects brought more uncertainties than positive outcomes. It found that these hydropower developments have not reversed poverty and power shortages, but have rather made poverty worse through major displacements from arable lands and the destruction of these arable lands.

Based on the research findings of the chapter, the fact that these projects were developed unilaterally will exacerbate environmental scarcity (i.e. demand-induced, supply-induced and structural-induced scarcity) and lead to inter-riparian tensions and disputes. They will increase the demand for water, reduce the supply of water, and further increase the skewed distribution of water. According to the environmental scarcity theory, this provides for a potential cause of interstate tensions and disputes (Homer-Dixon, 1994:8-11).

Furthermore, the chapter found that these unilateral projects pose potential threats to on-going multilateral processes in the Nile. The chapter provided four reasons to support this notion. Firstly, unilateralism contradicts multilateralism in that it entails lose-lose scenarios over a win-win scenario. The rising demand to unilaterally develop large hydropower projects has rapidly increased the consumption of the Nile and has negatively affected the supply of limited water resources available to each riparian country.

Since no riparian country is coordinating with other riparian countries in terms of the use and/or distribution of the Nile, more water is used unilaterally by riparian countries, thus placing pressure on the Nile water system. Such means of consumption by riparian countries constitutes a lose-lose or zero-sum game in that what is used by one riparian country is not adequately available for the other.

Nile riparian countries should be fully aware that the sustainable development of water resources requires cooperative development of the Nile. This cannot be achieved unilaterally. Riparian countries need to establish and realise their common goals and purpose of the Nile in order to increase the likelihood of cooperation and/or win-win gains. By realising their shared interests, win-win gains are easy to achieve. Institutions such as NBI are imperative mechanisms since they illustrate a sense of cooperation and the importance of developing strategy programs that will enhance a win-win scenario.

Secondly, the unilateral development of hydropower projects has aggravated the supply-induced scarcity in that these projects have reduced the supply of water to neighbouring riparian countries due degradation from poor environmental assessments. And lastly, the unilateral development of hydropower projects has further worsened the already uneven distribution of the Nile that the multilateral processes aimed to address. From this it can be concluded that unilateralism cannot co-exist with multilateralism.

In conclusion, chapter 4 found that a deeper regional integration among upstream countries was pivotal in challenging the status quo and developing the Nile. However, the chapter learned that a threat to the Nile associated with this integration was that it was not consultative among riparian countries with regards to the

sustainability, management and use of the Nile. This places further pressure on the quality and quantity of the Nile.

## 5.2 Recommendations

These recommendations are largely based on the limitations that have framed the study as outlined in chapter 1.

- Recommendations in chapter 2 include understanding the causal link that exists between environmental scarcity and violent conflicts and applying an all-inclusive approach to analysing environmental scarcity and its contribution to conflicts. In this regard, the answers acquired by chapter 2 through the use of Homer-Dixon's environmental scarcity theory can help to clarify and better understand the link between environmental scarcity and violent conflicts, how environmental scarcity contributes to these conflicts and the contribution and importance of environmental scarcity to violent conflicts. The findings of the environmental scarcity theory can be used to inform mechanisms such as the AU and the NBI to better understand and incorporate these three distinct sources of scarcity in their analysis of the Nile.
- Chapter 3 recommends that for the Nile riparian countries to manage their competing interests and successfully establish a sustainable equitable solution to the Nile disputes, a basin-wide agreement guided and supervised by the AU and the NBI is essential. In addition, alongside pursuing a sustainable inter-riparian solution to the Nile dispute, the AU and the NBI need to consider addressing the Nile agreements in conjunction with rising population and the degradation of the Nile.
- Chapter 4 recommendations include that China, through upstream countries' assistance, adequately balances water demand management and a supply-oriented approach to avoid the emergence of disputes within the region.

## 5.3 Concluding remarks

The following main research questions were asked:

- Might there be an outbreak of war between upstream and downstream riparian countries over water in the NRB?
- What binding measures are taken by the AU and the NBI to enforce cooperation in the NRB and ensure an equitable use of the Nile water?

With regards to the main research questions, subsidiary research questions were asked:

- Can environmental scarcity contribute to violent conflict?
- If yes, how can it contribute to violent conflict?
- Is this contribution important?
- How has China, as an alternative source of funding for upstream countries' hydropower projects, changed the hydropolitical status quo of the Nile?
- What are the potential threats posed by the changing status quo to the Nile water system?

Several conclusions can be drawn to the research questions posed by the study. Firstly, the scarcity of the Nile's vital resource (i.e. water) can contribute to environmental conflicts in the basin. The study was successful in showing that water has the potential of being subject to environmental scarcity. The scarcity of water and its contribution to the intensity of the competition over resources has presented a new landscape of global conflict. The study was successful in showing that water, just as any other economic resource, has the potential to cause tensions and conflict among users (i.e. interstate conflicts).The Nile was used as a case study to support this notion.

The simple scarcity perspective was essential in denoting the occurrence of these interstate conflicts in the NRB. This perspective stipulated:

> Conflict over resources between states is likely to break out over resources that are essential for human survival and can be physically seized or controlled such as river water. States would rationally calculate their interests in a situation where there is a fixed or shrinking pie of natural resources,(Homer-Dixon, 1991:87).

The challenges of population growth, water scarcity, environmental degradation and insecurities as a result of the uneven distribution of the Nile posed the likelihood of water wars. In addition was the lack of cooperative measures to consolidate water sustainability, management and use. The volatility and proximity of the Nile due to the high dependence of all riparian countries on its water resources was also a salient feature of the Nile water wars.

Secondly, the hypothesis that *"resource scarcity through demand-induced, supply-induced and structural-induced scarcity has the potential to cause conflict"* was substantiated by using Homer-Dixon's environmental scarcity theory. The theory argued that resource scarcity results in four principal social effects that either singly or in combination can produce or exacerbate conflict. These include decreased agricultural potential, regional economic decline, population displacements, and the disruption of legitimised and authoritative institutions and social relations (Homer-Dixon, 1991:91).

The theory also noted that the occurrence of these forms of scarcity over a shared resource can result in resource capture and ecological marginalisation, thus making the likelihood of conflict inevitable (Homer-Dixon, 1999:15).The case of the NRB validated the probability of these conflicts in that, given the reduced outputs due to population growth, degradation and depletion of the Nile, and the uneven distribution of the Nile, competition over the Nile increases the potential for an inter-riparian conflict in the NRB. The theoretical underpinnings of the study found that environmental scarcity can lead to environmental conflicts; hence, Homer-Dixon's environmental scarcity approach is key in explaining the current state of the Nile's scarcity and conflict.

Thirdly, chapter 3 of the study was aimed at addressing the need for institutional support structures as important factors for the sustainability, management and use of the Nile. Institutional structures would be essential in this regard as they would forge a new international water agreement for the NRB. According to Othieno and Zondi (2006:2-3):

> There has to be a resolution to the question of balance between who has the historic right to the Nile's water, and issues of sovereign water rights especially with regards to where the river ought to be controlled, whether that be upstream or downstream.

There also has to be a resolution on the impact of improper environmental and social assessments in the construction of hydropower projects that ultimately lead to massive displacements while degrading and depleting the Nile.

The fact that a comprehensive cooperative framework over the management and use of the Nile does not exist makes the occurrence of disputes and environmental stress on the Nile is inevitable. The AU and the NBI need to rectify the current Nile environmental issues by forging a cooperative framework to enable a common position on the management and equitable exploitation of the Nile. Their role should take into consideration the Nile region's already complex political environment.

And lastly, China has become an alternative source of funding to upstream countries' hydropower projects, which has subsequently changed the hydropolitical status quo of the Nile. However, the presence of China in the Nile dam industry has presented both positive and negative effects on the Nile and its surrounding environment. Positively effects include that upstream countries have been able to use the Nile and develop hydropower projects. Negative effects include the creation of more environmental and social uncertainties through the financial and technical support of these unilateral projects. Homer-Dixon's environmental scarcity theory was helpful in outlining these uncertainties of human and environmental security, and showing how these projects aggravated environmental scarcity.

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