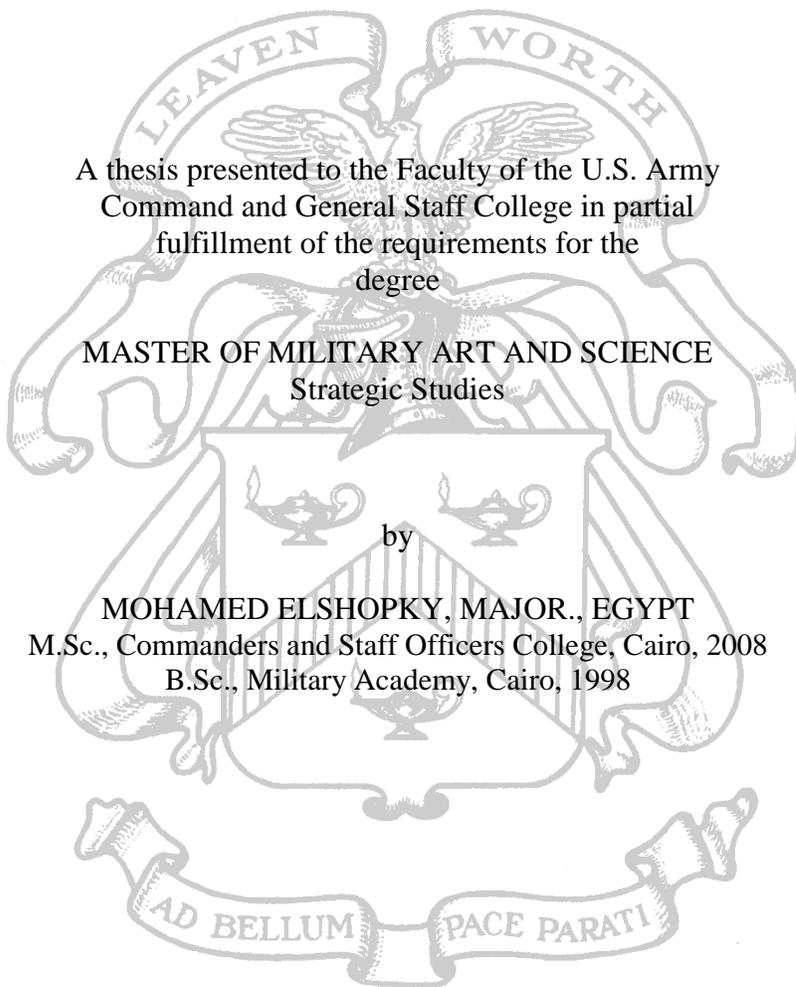


THE IMPACT OF WATER SCARCITY ON EGYPTIAN NATIONAL SECURITY AND
ON REGIONAL SECURITY IN THE NILE RIVER BASIN



A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE
Strategic Studies

by

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

THE IMPACT OF WATER SCARCITY ON EGYPTIAN NATIONAL SECURITY AND ON REGIONAL SECURITY IN THE NILE RIVER BASIN, by Major Mohamed Elshopky, 109 pages.

With a rapidly growing population, increased urbanization, higher standards of living and an agricultural policy which emphasizes expanded production in order to feed the growing masses, the Government of Egypt finds itself in a critical situation where both internal planning, along with regional and international cooperation are paramount for making optimum use of this incredibly scarce resource. Egypt, and the rest of the Nile Basin countries, have been sharing water under the “original” 1929 Treaty provisions; amended only in 1959. With the transformation of government in Egypt, as well as the rise of new actors (such as S. Sudan), planning objectives and management procedures must factor in the needs of not only the people of Egypt, but also the concerns of key regional actors; particularly Ethiopia and Sudan.

As water in Egypt becomes scarce, surface-water sources originating from the Nile River Basin now make it a ‘potential flashpoint’ in Africa as multiple countries compete for access to this precious resource. The possibility of a so-called ‘water war’ is indeed a tremendous threat to Egyptian National Security.

This thesis will examine the stresses placed on this diminishing resource (i.e. the supply and demand for water in the Region), and explore the need for improved international and cooperative planning and management procedures that must be developed in order to better appropriate, allocate and optimize the use of water and thus bolster internal development and strengthen external ties and stability.

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ACRONYMS

BCM	Billion Cubic Meters
DRC	Democratic Republic of Congo
FAO	Food and Agriculture Organization
IGAD	Intergovernmental Authority on Development
NBI	Nile Basin Initiative
SADC	Southern African Development Community
TECCONILE	Technical Co-operation Committee for the Promotion of the Development and Environmental Protection of the Nile Basin
UN	The United Nations
UNDP	United Nation Development program
UNESCO	United Nations Educational, Scientific and Cultural Organization
WB	World Bank
WTO	World Trade Organization

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CHAPTER 1

INTRODUCTION

From water we have created all living things.¹

— Qur'an

Background

The African continent is characterized by its unique geographical and geopolitical location among the continents of the world. Africa has control of the most important passages and straits linking east and west, north and south. It has great natural and human resources making it the focus of European colonial powers that sought to dominate its resources in all forms of colonialism over the centuries and even to the present day. The River Nile is the basic organic connection between Egypt and the rest of the African continent and has formed the nature of the relationship between Egypt and other African countries, especially those in the Nile Basin. Access to the water of the River Nile is one of the most important strategic objectives for the Egyptian Government.

Throughout its history, Egypt's interest in Africa has been associated with its strategic goals and objectives and its national security. The people of Egypt have always believed that all African countries have a right to be independent. That is why Egypt supported liberation movements in the African continent and helped them to rid themselves of their colonial masters and to obtain their freedom.² In 1990, Namibia was

¹Holy Qur'an, Verse 21:30

²Ashraf Mohamed, *Keshk Alysasa Alma'aya Tegah Dwal Hoad Elnil* [Egypt's water policy towards the Nile Basin countries] (Egypt's African Studies Program, 2006).

the last state to achieve independence with the active assistance of Egypt. South Africa also gained its independence in 1990 with Egyptian assistance, when it embarked on a political solution instead of an armed struggle, followed by its 1994 elections. Egypt also supported Eritrea in gaining its independence in 1993, and worked to solve the many problems plaguing Somalia, South Sudan and Darfur. Egyptian diplomacy plays a vital role in helping to achieve stability in African countries across all political, economic, cultural and security fields, especially in the Nile Basin countries and in Sudan.

Egypt has also received the support and solidarity of other African countries whenever it has had its own difficult situations. When Egypt came under the attacks of the tripartite aggression in 1956, the Israeli aggression in 1967, and in the 1973 war, most of the African countries extended support to Egypt to help solve the crises and to help Egypt fully recover in order that it could return to its prominent role in Africa.³

After gaining their independence, the Nile Basin countries suffered greatly from many external interventions. This area was greatly affected by the end of the Cold War in the 1990s as the Soviet Union dissolved; giving the new great powers such as United States, Europe, China more influence over the continent as well as other historically colonial powers such as France, England, Italy, Belgium, Portugal, Spain, Germany and Canada, all of which attempted to take part in gaining access to the many regional resources. Other international powers, such as China and Japan, have had some impact but to a much lesser extent. International interventions have come in the form of bilateral cooperation and joint programs, facilities and financial support, debt rescheduling,

³Gamal Hemdan, *Shakhsyeyt Masr* [Personal of Egypt] (Cairo: Madbouli Library, 1994).

military aid, rehabilitation and training of cadre, exchange of information, and cooperation in the arts, education, culture and information, as well as other hidden forms of interference, all of which have contributed to the interests of these powers.

At the regional level, the Nile Basin area has had significant outside intervention, especially during the 1990s, and at the beginning of the twenty-first century.⁴ Some of these interventions were intended to settle conflicts. Other actors became involved, either directly or indirectly, for their own national interests or for the benefit of one of the major international powers. Sudan, the CDR, Rwanda, Burundi, Ethiopia and Eritrea are the most vulnerable to regional interventions. The governments which intervene most include Uganda, Rwanda, Burundi, Kenya (from inside the Nile Basin), South Africa, Nigeria, Israel, Iran, Zimbabwe and Angola (from outside the region). In addition, non-governmental organizations which access the region include the Intergovernmental Authority on Development (IGAD) and the Southern African Development Community (SADC).⁵

These interventions, whether global or regional, have impacted Egyptian national security and have affected vital Egyptian political and economic interests. Water availability is the backbone of economic and social development in Egypt, and it is the major national issue that concerns the country at the present time. Egypt's future plans for upcoming generations are dependent on water. Hence, it is necessary for Egypt to

⁴Abas Altarabyele, *Alamn Alma'ae WA Sera'a Almyah* [Water security and water conflict] (Al-Ahram Library for Scientific Research - Part I - No. 6951-2009).

⁵Mohamed Abd Almehna Moa'aen, "Alta'awn Alestratege Bayen Misr Wa Dewal Hoad Elnil Wa Ta'atsero A'ala Ela'amn Elkawmee Elmasry" [Strategic cooperation between Egypt and the Nile Basin countries and its impact on the Egyptian national security] (PhD. Nasser Higher Military Academy, 1994).

work hard in order to face the repercussions of foreign interventions by the countries of the Nile Basin while trying to achieve and deepen cooperation with those countries, in accordance with the considerations of legal and international treaties, which organize the use of water among all of the Nile Basin countries.

Over two thousand years ago, a Greek historian said “Egypt is the gift of the Nile.”⁶ Without the River Nile, Egypt would be a vast arid desert. Even with the River Nile more than ninety percent of Egypt is uninhabited desert, and less than ten percent of Egypt's land area is inhabited by almost ninety percent of the million Egyptians.⁷ The Nile is the main source of irrigation for virtually all of the cultivated areas in Egypt. Therefore, one of the most important challenges facing Egypt is how to cultivate more land with the same share of Nile water. Egypt's quota of Nile water, in accordance with international agreements, is estimated at 55 BCM, a fixed quota since 1929.⁸ Nile water is shared by ten other African countries: Sudan, Ethiopia, Eritrea, Kenya, Uganda, Tanzania, Rwanda, Burundi, DCR, and South Sudan. These Nile Basin countries have varied interests and objectives. Sudan, as well as Egypt, has the same interests, while countries like Ethiopia, which supplies to Egypt about 86 percent of its quota, have different interests and are working for an increase of the Nile headwaters.⁹

⁶Herodotus an ancient Greek historian, who was born in Turkey, and lived in the 5th century.

⁷Egyptian Government, Official website (accessed 20 February 2012).

⁸Ibid.

⁹Ibid.

Historical rights to the water of the Nile were approved by the Convention on the Nile in 1929 and reaffirmed by the Convention on the Water of the Nile in 1959.¹⁰ Evidence suggests that at present, or in the near future, there is the possibility of a clash of interests between Egypt and some of the Nile Basin countries, particularly Ethiopia, which raises some problems about the legal rights to the Nile water from time to time. Ethiopia has started to set up some projects that would affect Egypt's share of water from the Nile. Also, recently some countries began to call for voting to amend the agreements on the distribution of Nile water among the Nile Basin countries, on the pretext that the conventions had been ratified by European colonial powers that occupied those countries at the time of signing the agreements.

The emergence of a new state (the Republic of South Sudan in July 2011) also has a major impact on Egypt's strategy towards the Nile Basin countries, especially since Egypt's whole share of Nile water passes through the entire portion of South Sudan, the so-called Blue Nile.¹¹

The Egyptian Revolution on January 25, 2011 has also caused significant changes in internal and external Egyptian policies and is expected to play a pivotal role in the development of the relationship between Egypt and the Nile Basin countries, which had been in a kind of deadlock by the former (Mubarak) regime during the last thirty years.

There is no doubt that Egypt must implement a new strategy in the Nile Basin. It has become necessary to focus on consolidating and deepening its ties for strategic

¹⁰Ibid.

¹¹South Sudan, an independent state on 9 July 2011. It is a United Nations member state, a member state of the African Union.

cooperation between Egypt and the Nile Basin countries in order to secure its historic rights to water and to ensure the future needs for agriculture, urbanization and the daily needs for Egyptians, whose population increases each year.

Description of the Nile Basin

The Nile River is the world's longest river; a total 4,132 miles from its source in the mountains of Burundi to downstream in the Mediterranean Sea. The Nile is formed by three branches, the Blue Nile, the White Nile, and the Atbara River. The White Nile rises from its source in Burundi, passes through Lake Victoria, and flows into southern Sudan. There, near the capital city of Khartoum, the White Nile meets up with the Blue Nile which has its source in the Ethiopian highlands, near Lake Tana. Over 53 percent of the Nile's waters come from the Blue Nile. The two flow together to just north of Khartoum, where they are joined by the waters of the Atbara, whose source is also located in the Ethiopian highlands.¹² Table 1 depicts the comparison between the River Nile and the largest rivers in the world. Figure 1 portrays the locations of the Nile Basin countries in the African continent.

¹²Egyptian Government, Official website, www.egypt.gov.eg/english/. (accessed 20 February 2012).

Table 1. Comparison between the River Nile and the Largest Rivers in the World

The River	Location	Length (km)	Area of the basin (Thousand km 2)	Total countries sharing the Basin
Nile	Africa	6825	2960	11
Amazon	South America	6700	7050	6
Congo	Africa	4700	3820	9
Mekong	Southeast Asia	4200	795	6
Niger	Africa	4100	1220	9
Mississippi	North America	3970	3270	2
Danube	Central Europe	2900	816	13
Alzambere	Africa	2700	1200	2
Rhine	Europe	1320	224	6

Source: The World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/> (accessed 20 February 2012).

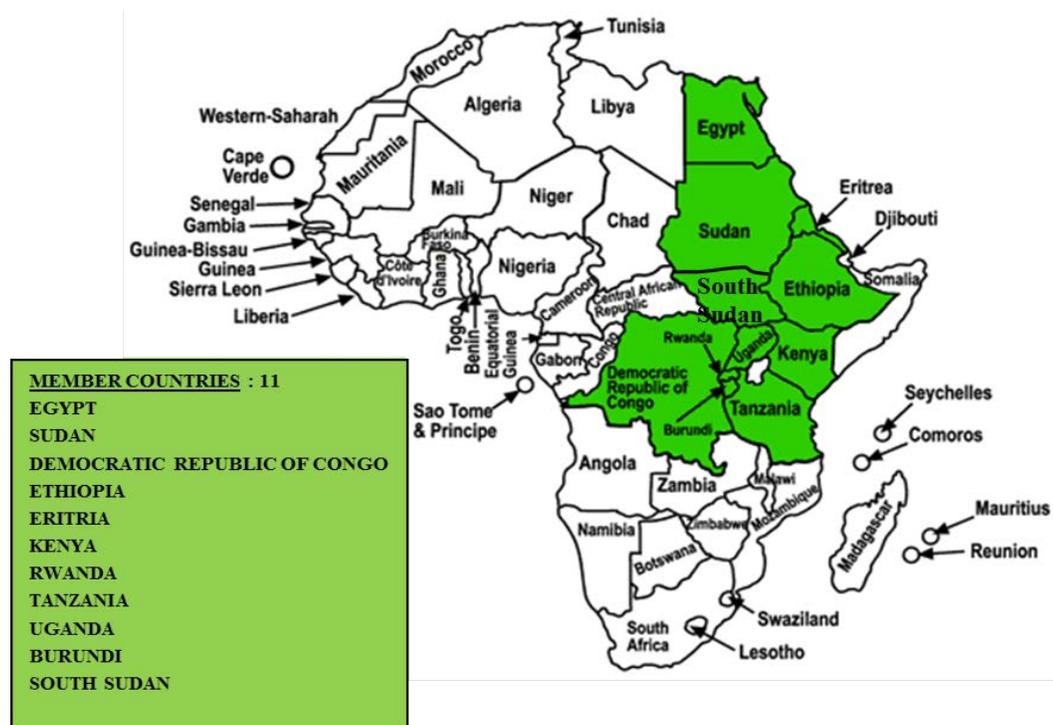


Figure 1. The Locations of the Nile Basin Countries in the African Continent

Source: Nilebasin.org, "Nile River Basin," <http://www.internationalwaterlaw.org/blog/wp-content/uploads/2012/02/Nile-Basin-Countries.gif> (accessed 20 February 2012).

The river then flows north through Lake Nasser, the second largest man-made lake in the world, and the Aswan Dam before splitting into two major distributaries just north of Cairo.¹³ The two distributaries are the Rosetta branch to the west and the Darneita to the east. In ancient times, the number of distributaries was much greater, but slow flow of water, human interference, and the accumulation of mud led to the disappearance of all the other major distributaries. This has effectually led to the desertification of these distributaries.¹⁴ Table 2 depicts the main river basin systems in Africa. Figure 2 portrays the geography of countries through which Nile River flows.

¹³The World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/> (accessed 25 February 2012).

¹⁴Egyptian Ministry of Irrigation, Official website, www.mwri.gov.eg/ (accessed 25 February 2012).

Table 2. The Main River Basins System in Africa

Basin	N0. of countries	Area in km	Total annual discharge in m ³	Basin countries
Congo	9	2,850	64900	Angola, Burundi, Cameroon, Central Africa Republic, DRC, Republic of Congo, Rwanda, Tanzania, and Zambia
Niger	9	2,000	180	Benin, Burkina Faso Cameroon, Chad, Cote d'Ivoire, Guinea, Niger, and Nigeria
Nile	11	6,700	84	Burundi, DRC, Egypt, Ethiopia, Eritrea, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda
Limpopo	4	413,000	170	Botswana, Mozambique, South Africa, and Zimbabwe
Orange	4	950	12,000	Botswana, Lesotho, Namibia, and South Africa
Senegal	4	340	41	Guinea, Mali, Mauritania, Senegal
Volta	6	1,850	400,000	Benin, Burkina Faso, Cote d'Ivoire, Ghana, and Togo
Zambezi	8	1,420	130	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe

Source: Elias Ashebir, “The Politics of the Nile Basin” (Master’s Thesis, University of Witwatersrand, Johannesburg, 2009).

totally impossible. After Sudan was reconquered in 1898, the British began to clear the Nile of the vegetation which was hindering the passage of ships; they prepared huge alternative drainage plans to improve the flow of the Nile. However, the British had no control over the Ethiopian shares of the Nile water, from which about 86 percent of the Nile's waters come. Therefore, they had to sign an agreement with the Ethiopians in 1902 to assure that the Nile would not be constrained. They also had to assert an extensive amount of pressure on the Italians and the French so they would not restrict the British hegemony of the Nile basin. This agreement worked well with the Italians, but poorly with the French. Egypt triggered the most problems for the British on the Nile which became a disputed matter between the two governments. In 1929, the British supported the Nile Water Agreement, which organized the stream of the Nile and assigned its use.¹⁵

After World War I, the British government commissioned a complete hydrological study to be made in the Nile Basin area. All the Nile basin countries were included in this study except Ethiopia due to some political problems. The study was published in 1958 as the Report on the Nile Basin Plan, and suggested many ways to increase Egypt's portion of Nile water. The most important of these ways was the establishment of the Jonglei canal, which would divert the flow of the Nile in southern Sudan in order to avoid the massive losses which occur there. The report, however, dealt with the whole Nile Basin as a single entity, and was undesirable to the newly independent African countries, especially since it was issued just two years after the Britain, France, and Israel attacked Egypt to seize control over the Suez Canal.¹⁶

¹⁵Egyptian Government.

¹⁶Ibid

Moreover, in order to develop the flow of the Nile, Egypt decided to build the High Aswan Dam to control the yearly floods of the Nile and also to produce hydroelectric power. However, this project was to have major consequences for the lands of northern Sudan. Building this dam would mean that whole sections of northern Sudan would be flooded by what was to be Lake Nasser. There were also severe environmental concerns as to how the dam would change life on the banks of the Nile. To deal with this problem, Egypt and Sudan signed an agreement on the "full utilization of the Nile waters" in 1959. This agreement specified that Sudan's yearly water portion would rise from the 4 BCM indicated in the 1929 agreement to 18.5 BCM. The Sudan would also be permitted to adopt a series of Nile improvement projects, such as the Jonglei Canal and Rosieres Dam. The 1959 agreement is still the most important agreement ever signed on the use of the Nile's waters.¹⁷

Building of the high Dam in Egypt began in 1959, and was finished in 1970. To build it, at a cost of over one billion dollars, Egypt had to obtain foreign aid. Rejected by the United States and the World Bank, president Gamal Abdul Nasser had to turn to the Soviet Union which was ready to help. The high Dam is one of the great architectural accomplishments of the 20th century.¹⁸ It is more than 17 times the size of the Great Pyramid. It now lies 4 kilometers across the river's path, rises over 100 meters from its base, and is almost a kilometer wide. The water forms Lake Nasser behind the high Dam,

¹⁷Ibid.

¹⁸Abd Elnasser (Nasser), the second President of Egypt from 1956 to 1970.

which is 600 kilometers long and 50 kilometers wide. This reservoir is the second largest man-made lake in the world.¹⁹ Figure 3 portrays a graphic depiction of the High Dam.



Figure 3. Depiction of the High Dam

Source: Paul Polak, “Out of Poverty: What Works when Traditional Approaches Fail,” blog.paulpolak.com (accessed 25 February 2012).

In the 1970s, Egypt and Sudan initiated the joint structure of the Jonglei Canal to increase the flow of the Nile waters by avoiding loss of a great deal of water by evaporation. Unfortunately, due to "rebel action" in Sudan, establishment of the Jonglei Canal stopped in 1984; falling one hundred kilometers short of completion. Thus, the

¹⁹Egyptian Government, Official website, www.egypt.gov.eg/english/. (accessed 25 February 2012).

civil war prevented this great project from being completed. The failure of this project was a great disappointment not only for Egypt, but also for both the Sudanese government and the World Bank, which funded this project, Over 100 million dollars was spent on the project of Jonglei Canal. As peace was restored in 2000 the Sudanese Government said the revival of the project was not a priority. However, in 2008, Egypt and Sudan agreed to restart the project and finish the canal after 24 years.²⁰ Figure 4 shows geography of the Jonglei Canal project.

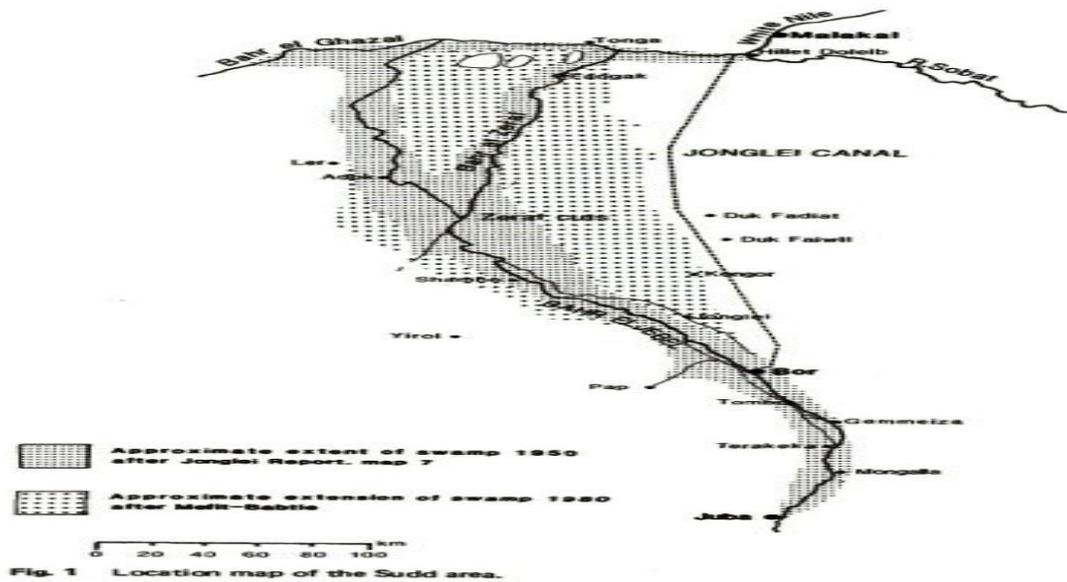


Figure 4. Geography of the Jonglei Canal Project

Source: phototvs.com, “Images of Jonglei,” <http://www.phototvs.com/imagenes/jonglei/1/> (accessed 25 February 2012).

²⁰Ibid.

In 1997, Egypt began planning the establishment of a new Nile valley, by creating a self-sustaining river that would flow through the Western Desert, called the New Valley Canal. This project would connect a series of oases to one another and would allow Egypt to settle a large number of people far from the Nile; something which has proven difficult up until now. The anticipated cost of the project was 2 billion dollars, which Egypt did not have. However, the actual problem remains that of where Egypt will find the water to fill the new canal and to keep it flowing as it already has its full portion of the Nile's water.²¹ Figure 5 shows the geography of the New Valley Canal in Egypt.



Figure 5. New Valley Canal in Egypt

Source: Photobucket, <http://media.photobucket.com/image/recent/pamcrabtree/Egypt%25202011/map-egypt.gif> (accessed 25 February 2012).

²¹Ibid.

Primary Research Question

This research will review the causes of the Nile Basin problem and its impacts on Egypt's national security. The result of this review will focus on finding a clear answer to the primary research question: How does the Egyptian government address the threat to both Egyptian national security and to regional security in the Nile River Basin brought about by the scarcity of and competition for water?

Secondary Research Questions

To address the primary question, the following questions must be answered:

1. What are the international and regional impacts of water in relation to Egypt and the other Nile River Basin countries? (A) What is the importance of Nile Basin? (B) What are the laws, rules, and conventions organizing the use of water among the Nile Basin Countries?
2. What are the demands and states of cooperation between Egypt and the Nile Basin countries? (A) What are Egypt's current and future needs for water? (B) What is the current state of cooperation between Egypt and Nile Basin countries?
3. What are the challenges which Egypt faces in trying to secure its historic rights to the waters of the River Nile? (A) What are the internal challenges which impact Egypt's development of a future water policy? (B) What are the external challenges which impact the dimensions of Egypt's future regional water strategy with the other Nile Basin countries?

Significance of the Study

The thesis deals with the study and analysis of a very important subject with direct impact on Egyptian national security under the international and regional contemporary changes, and the impact of these changes on economic, social and political cooperation between Egypt and the Nile Basin countries. The issue being studied necessitates the establishment of a new Egyptian strategy in order to achieve economic and social stability and political support for the various people of the Nile Basin countries, with maximum, positive consequences for the interests and objectives of Egyptian national security

Assumptions

Various assumptions which impact this research include:

1. The debate among the Nile Basin countries will continue because of the disparity in the goals and common interests among them.
2. Continuous foreign intervention in the Nile Basin countries will impact the relations between Egypt and these countries, which adversely affects the national security of Egypt, and requires a multi-pronged effort in all areas to minimize the impacts of these interventions on Egypt.
3. Facts, policies, and statistics relating to the thesis are subject to change due to the rapid changes taking place in Egypt and other African countries.

Limitations

The foremost limitation is lack of time and resources to conduct interviews with the people concerned in the actual region where the low intensity conflict is raging. The study, conducted in a period of eight months only, shall limit itself to the literature already written on the conflict as its major source of data.

Delimitations

During the course of the research, the study shall limit itself to the period from 1929 to present day. The study will consider the impacts of water scarcity during this period and how it has impacted Egyptian national security as well as Nile River Basin regional security.

Summary

Chapter 1 served as an introduction to the research, and aimed at developing the background to the problem of the Nile Basin and its historical overview. It also illustrated the strategic and geographical description of the Nile Basin, paving the way for Chapter 4 where the problem will be fully analyzed by way of providing the most suitable answers to the primary and secondary questions.

CHAPTER 2

LITERATURE REVIEW

There are many books, and a good number of articles written on the subject of the River Nile water problem and its impact on Egypt's national security. Additionally, much research has already been done on this topic. Several major works reviewed in this research include: Simon A. Mason, *From Conflict to Cooperation in the Nile Basin*; Abdel Fattah Metawie, *History of Co-operation in the Nile Basin*; Terje Oestigaard, *Nile Issues, Small Streams from the Nile Basin*, and Mahmoud Abu Zeid, *River of Hope and Promise*. All of those researchers believe that the population growth in Egypt is associated with increased urbanization, higher standards of living and an agricultural policy which emphasizes expanded production in order to feed the growing masses. The water scarcity in Egypt can lead to potential conflict among the Nile Basin countries. Some of those researchers assume that the next twenty years may see wars being fought over the water of the Nile Basin.

This chapter then states other international and regional water problems as similar cases to this study by reviewing the case of the Danube River in Europe, and the Hoover Dam in United States of America. Also, this chapter will review the recent researchers who have written on the topic after the January 25th revolution in Egypt and are associated with the statements and recommendations of the new government in Egypt. This leads to a review of the current condition of the Nile River conflict and its impact on Egypt's national security, which will be addressed in the analysis conducted in chapter 4.

There is no doubt that water plays a vital role in people's lives. Humans cannot live without constant and renewable sources of water to ensure their survival. Historical

experience shows that the establishment of communities and all human activities depend entirely on water availability. Most innocent civilizations were established around water resources. The relationship among many states is based mainly on common sources of water. There are over 260 international water systems which constitute about 60 percent of the earth's freshwater supply.²²

The Nile River is the major source of water for the eleven nations which make up the Nile Basin. The water provided by the river is barely enough to satisfy the massive water demands of Egypt and Sudan as downstream recipient countries.

Access to the Nile's waters has been defined as a vital national priority by countries such as Egypt and Sudan; particularly Egypt as the last country of the course of the Nile River. Also, as water demands for the nations in the Nile Basin area increase, the supply is likely to remain the same, which severely increases the risk of armed conflict over the Nile River water. In addition, development plans that are aimed to increase the flow of the Nile remain threatened by tension and instability in this region, as well as by regional and environmental concerns.

The River Nile is truly the "river of life" that has served the region since ancient times. The current regional and international commitments toward joint sustainable development in the Basin provide hope and promise for a better and prosperous future of the Nile River riparian nations.²³

²²Nicole Shema, "The Failings and Future of Nile Basin Management" (Political Science Honors Thesis, 27 April 2009), polisci.uoregon.edu/acrobat/HTShema.pdf (accessed 25 February 2012), 2.

²³Mahmoud Abu Zeid, the former Egypt's Minister of Water Resources and Irrigation and Chairman of the World Water Council. He participated in the international Consortium for Cooperation on the Nile, which met In Geneva In June 2001.

Simon A. Mason, in his book *From Conflict to Cooperation in the Nile Basin* argues that the dispute between regional and environmental system boundaries in the River Nile Basin area can cause future conflicts. National politics in the Nile Basin have consistently disregarded the fact that the people of the Nile Basin are bound together by shared environmental resources. The water resources for irrigation, hydroelectric power production, and other human uses are limited; floods and droughts know no regional boundaries. Water contamination is at present chiefly a national challenge.²⁴

Abdel Fattah Metawie, notes in his book *History of Co-operation in the Nile Basin* that the challenge which faces the Nile Basin countries to manage the water among them can also become a great opportunity-an opportunity to support regional economic growth in one of the poorest regions of the world. This opportunity could be achieved if those countries succeed in unifying their efforts to build regional and international interdependencies and promote economic activities that could enable co-basin countries to contribute as partners in evolving regional and global trade.²⁵ Operative water management, including water harvesting and conservation, can bring benefits to all involved countries. The writer also states that there is real 'win-win' potential. On the other hand he warns of the danger of one-sided development of the river which has opposite effects in the long run and leading to 'lose-lose' situations, promoting disputes, perpetuating poverty, even conflict. To illustrate, the writer uses the Danube River as a

²⁴Simon A. Mason, "From Conflict to Cooperation in the Nile Basin. Interaction Between Water Availability, Water Management in Egypt and Sudan, and International Relations in the Eastern Nile Basin" (Doctoral Thesis, Swiss Federal Institute of Technology ETH Zurich, 2004), 18

²⁵Abdel Fattah Metawie, "History of Co-operation in the Nile Basin," *Water Resources Development* 20, no. 1 (March 2004): 48.

similar example, which is shared by 10 countries.²⁶ River Danube is one of the main reasons for the consensus among eastern and western European countries due to the reliance of most of these countries on the river water for drinking, irrigation, and other human activities.

Another different perspective on the case similar to Nile Basin problem comes from the Hoover Dam in United States of America, which provides the water and the electricity to support the growth of the American metropolitan west. The cities that rely in one way or another, on the resources of the dam are Los Angeles, San Diego, Salt Lake City, Denver, and Phoenix. The rapid population growth of these big cities outgrew the Colorado River's capacity to serve their needs. So the people who were attracted by the promise of resources faced limitations on further growth and became locked in a conflict with each other over which city should get first call on the water and how it should be apportioned. The American west cities and suburbs would not exist as they do today without the Hoover Dam. They might also have been spared many problems that have come with decades of population growth.²⁷

Reviewing the Nile Basin problem from another perspective, Terje Oestigaard, in his research "Nile Issues, Small Streams from the Nile Basin," concludes that the Nile Basin region will face massive challenges in the future. The population growth will increase intensely and more people will rely on the Nile water, though to various degrees.

²⁶The Danube is a river in Central Europe, the continent's second longest river, http://ec.europa.eu/environment/enlarg/danubefactsfigures_en.htm (accessed 20 February 2012).

²⁷Michael Hiltzik, *Hoover Dam and the Making of the American Century* (New York: Free Press, 2010), 42.

The significance of the River Nile for the people who live in this region will be more vital than it has ever been. Water could be either a source of conflict or cooperation. The future challenges are various and inevitable.²⁸ After the Egyptian revolution of 25 January 2011, the Minister of Irrigation and Water Resources of Egypt issued a statement which recommended finding a valid solution to this problem as a top priority for the new government. The Prime Minister of Egypt after the revolution, Dr. Esam Sharaf, said that Egypt should have taken serious steps to consolidate the relations with Nile Basin countries to avoid the scourge of future wars.²⁹ Analysts also consider this problem as one of the most important challenges facing the new government of Egypt. Review of the recent published research about the revolution in Egypt shows the necessity of taking prompt steps to counter this challenge and development of a specific strategy for the government to deal with this problem and create the appropriate climate to reconsolidate the relations with the Nile Basin countries, which was noticeably ignored for many years by the former regime.

Summary

Chapter 2 reviewed the works of various authors who have been written on the water scarcity problem in the Nile Basin area and its impacts on Egypt's national security. The chapter also addressed the way other writers have studied this problem. The general consensus reached by those writers was that water scarcity is one of the main

²⁸Terje Oestigaard, *Nile Issues, Small Streams from the Nile Basin* (Fountain Publishers, 2010), 52.

²⁹Dr. Esam Sharaf, an Egyptian academic who was the Prime Minister of Egypt from 3 March 2011 to 7 December 2011.

issues that could lead most, if not all of, the Nile Basin countries to conflict with each other. In addition, many of these writers recommended finding new strategies aimed at forging better relationships among the Nile Basin countries in order to solve the problem regarding to the current needs and the future demands of the water. Lastly, this chapter addressed similar methodologies that were used on similar cases to that of the Nile Basin case. The other analyses included the Danube River in Europe and the Hoover Dam in United States. Both of these studies further illustrate why research on the Nile Basin is a necessary addition to the already existing works pertaining to this topic.

CHAPTER 3

RESEARCH METHODOLOGY

The aim of this chapter is to spell out the methodology to be used in the research in order to outline the steps taken to obtain information needed to answer the primary research question; namely, How does the Egyptian government address the threat to both Egyptian national security and to regional security in the Nile River Basin brought about by the scarcity of and competition for water? Also, this chapter addresses the criteria that will be used to determine feasibility and suitability of research methods as well as the credibility of the various sources.

This research uses mixed research methods to answer the primary research question. It is the method in which qualitative and quantitative techniques are mixed into one overall study.

Quantitative Research Methods

Quantitative research is one of the most significant research methodologies. It is used to employ and develop models or hypotheses relating to all sorts of phenomena. The quantitative research method totally depends on the process of measurement because it offers the critical connection between pragmatic and geometric expression of quantitative interactions. The researcher will use the quantitative research method by asking a precise, particular question and then collect accurate information about water problem in the Nile Basin. He will then analyze this data with the help of statistics, putting into consideration the variables that affect those facts. For example, current data on the usage of water in Egypt and the Nile Basin countries, compared to the future needs of water for those

countries is one such quantitative aspect. Other quantitative aspects concern the annual flow of the water into tributaries of the Nile Basin from other rivers and lakes, annual rainfall in the Nile Basin area, and population growth in Egypt compared to the Nile Basin countries, examines present and future impacts which affect water demands for Egypt (and the Nile Basin region). This analysis provides a more logical understanding and good expectation of potential future conflicts for Egypt with other Nile Basin countries.³⁰

Analyzing the aforementioned examples, the researcher will determine the potential for conflict as it relates to the Nile Basin water issue. As specified in the literature review, potential conflicts can be caused by scarcity of the water due to rapidly increasing water demands, population growth, agricultural and economic activities, and increased demand for energy in the Nile Basin countries. The quantitative method assesses the available information or existing data on the usage of water in the Nile Basin, helping the researcher to define current and future water demands for countries under study.

The Advantages and Disadvantages of the Quantitative Research Method

Quantitative research design is an excellent way to confirm results and prove or disprove a hypothesis. The structure of the quantitative research method has not changed for a long time; thus, it is standard across many scientific and social fields. After statistical analysis of the results, a clear answer is reached, and the results can be

³⁰Ellen Taylor-Powel, “Analyzing Qualitative Data,” 2003, learningstore.4wex.edu/assets/pdfs/G3658-12.pdf (accessed 28 April 2012).

justifiably discussed and published. The quantitative method also filters out external data and information. Additionally, the quantitative method is useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and a narrowing down of possible directions for follow-up research to take place.³¹ On the other hand the quantitative methods can be difficult and require a lot of time. It requires extensive statistical analysis, which can be problematic. Due to the fact that most scientists are not statisticians, the field of statistical study is a whole different scientific discipline and can be difficult for non-mathematicians. In addition, the requirements for the successful statistical confirmation of results are very strict, with very few experiments comprehensively proving a hypothesis; hence, there is usually some vagueness, which requires refinement and reexamination of the design. This means another investment of time and resources must be committed to modify the results.³²

Qualitative Research Methods

The second methodology of this study is qualitative research method. It is one of the two main approaches to research methodology in all kinds of researches. The qualitative research method aims to evaluate data and information obtained by quantitative methods in order to address the answers for the primary and secondary questions. The researcher intends to use the available information to establish primary security concerns to Egypt first and, regional security concerns to other Nile Basin countries second.

³¹Quantitative Research Design, <http://www.experiment-resources.com/quantitative-research-design.html> (accessed 28 April 2012).

³²Ibid.

Debora A. Paterniti argues in her research *Qualitative Research Methods* that the purpose of qualitative methods is to provide an open-ended, in-depth exploration of an aspect of research, also to focus attention on a particular experience to gain a specific insights about an experience to elicit subjective world views of an experience.³³

The Advantages and Disadvantages of the Qualitative Research Method

Qualitative method of research is helpful not only in giving clarifications of multi-part phenomena, but in forming theories or theoretical bases, and in suggesting hypotheses to simplify these phenomena. Also, the value of the qualitative research method depends on the validity of the information and data received by using quantitative methods. The qualitative method in examining research is that use of open-ended questions which have the ability to induce responses that are “meaningful and culturally relevant to the study, unanticipated by the researcher, and explanatory in nature.”³⁴ The qualitative research method has as its goal, sharing of well-defined parts, or variables. When we research the issue of water scarcity in Nile Basin area, which we know how to quantify, for example, what can be quantified for sure, we may leave out the factors which are vital to the real understanding of the phenomena under study – these other factors are examined fully via qualitative methods. On the other hand the

³³Debora A. Paterniti, Ph.D. “Qualitative Research Methods” (Briefing, Center for Health Services Research in Primary Care, Departments of Internal Medicine and Sociology), http://phs.ucdavis.edu/downloads/EPI298_Paterniti_071007.pdf. (accessed 28 April 2012).

³⁴Qualitative Research Methods: A Data Collector’s Field Guide, Module 1, “Qualitative Research Methods Overview,” Family Health International, <http://www.ccs.neu.edu/course/is4800sp12/resources/qualmethods.pdf> (accessed 28 April 2012).

disadvantage of the qualitative method, much like the quantitative research method, is that it does not always underpin understanding of multi-dimensional pictures.³⁵

Summary

The researcher uses mixed research methodologies in order to offer better logical tools, detailed analysis and an understanding of the varying dynamics in the problem of scarcity of water in Egypt as well as the other Nile Basin countries and their impacts on Egypt's national security. The quantitative research method refers to the methodical pragmatic analysis of social phenomena through arithmetical, scientific or computational tools, which generally focus on collecting and analyzing numerical data and statistics. The qualitative research method is the other type of scientific research which is used as a methodology in this study to analyze the information which is collected via quantitative research. In general terms, scientific research consists of an investigation that seeks answers to a researcher's primary and secondary questions using a set of specific procedures to answer these questions. These procedures include (but are not limited to) collecting evidence, producing findings that were not determined in advance, and creating findings that are applicable beyond the immediate limits of the research.³⁶ This study uses quantitative and qualitative methods to find a solution to the Nile Basin problem, taking into account the maximum benefit from the advantages of both methods while trying to find valid ways to avoid the disadvantages of each.

³⁵ArticleSnatch.com, <http://www.articlesnatch.com/> (accessed 28 April 2012).

³⁶Paranormality, "Quantitative Method," http://www.paranormality.com/quantitative_method.shtml (accessed 28 April 2012).

CHAPTER 4

ANALYSIS

The aim of this chapter is to answer the primary research question: How does the Egypt's government address the threat to both Egyptian national security and to regional security in the Nile River Basin brought about by the scarcity and competition for water? In order to answer this question, first, it analyzes potential conflicts over the use of the water of the Nile River, reviewing the geo-strategic importance for the Nile Basin, identifying the international laws and agreements which organize the use of the River Nile waters, stating the Nile Basin countries' reactions towards Egypt regarding those international agreements, explaining how these agreements save the Egypt's rights of the Nile water and challenges facing Egypt with the Nile Basin countries. Also, this chapter examines international and regional variables which have various impacts on the Nile Basin problem. Additionally, it reviews current and future use of water for Egypt, comparing it to the current and future demands for each of the Nile Basin countries. Finally, this chapter analyzes whether the existing international laws associated with the current relationship among the Nile Basin countries can be used to resolve these problems; proposing strategies to secure the historic rights of Egypt in the water of the River Nile.

Geo-Strategic Importance of the Nile Basin

The Nile Basin occupies a strategic location in the African continent and the world. It is surrounded by three bodies of water (Mediterranean Sea - Red Sea - Indian

Ocean), which are considered among the most important routes of shipping and world trade.³⁷

Water is also a source of hydroelectric power for many of the Nile Basin countries, which have sought to plan for the establishment of dams on the tributaries of the river and tie it to the security of Egypt's water .Egypt's historic right to the water of the Nile represents the Egyptian strategy towards the countries of the Basin. In contrast, as the most powerful country of the Basin, Egypt has a historic responsibility as a leader in terms of cultural, social and economic development of the people of this region.³⁸ The Nile is the main source of water in Egypt. Lack of flow of the Nile or its sources has negative impacts on its national security. Figure 6 shows the geography of the Nile in Egypt.

³⁷Egyptian Ministry of Irrigation.

³⁸Central Intelligence Agency, Official website, www.cia.gov/ (accessed 28 April 2012).



Figure 6. River Nile in Egypt

Source: Wikipedia, The Free Encyclopedia, "Outline of Egypt," http://en.wikipedia.org/wiki/Outline_of_Egypt (accessed 20 February 2012).

Sudan is one of the most important Nile Basin countries next to Egypt; a land-bridge linking Egypt with the other Nile Basin countries. The losses of the Nile's water through the flows in Sudan are about 33.5 BCM, which can be used to establish projects such as the Jonglei Canal, a project which stopped in 1984 that can provide about 7 BCM distributed equally between Egypt and Sudan (roughly about 3.5 BCM each). Also, Sudan is at the core of Egypt's strategy to secure its vital interests in the south. It is bordered by Egypt to the north, the Red Sea to the northeast, Eritrea and Ethiopia to the east, South Sudan to the south, the Central African Republic to the southwest, Chad to the

west, and Libya to the northwest.³⁹ Figure 7 portrays the geography of River Nile in Sudan.



Figure 7. Nile River in Sudan

Source: Nile Basin Initiative, NBI Country Profiles, “Sudan,” http://www.nilebasin.org/newsite/index.php?option=com_content&view=article&id=48%3Anbi-country-profiles&catid=35%3Anbi-country-profiles&Itemid=67&lang=en (accessed 20 February 2012).

Ethiopia, one of the most important sources of the water for Egypt, (about 86 percent), is among the top priorities of the Egyptian policy.⁴⁰ Figure 8 reveals the geography of River Nile in Ethiopia. It is bordered by Eritrea to the north, Djibouti and Somalia to the east, Sudan and South Sudan to the west, and Kenya to the south.

³⁹The World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/> (accessed 28 April 2012).

⁴⁰Egyptian Ministry of Irrigation.

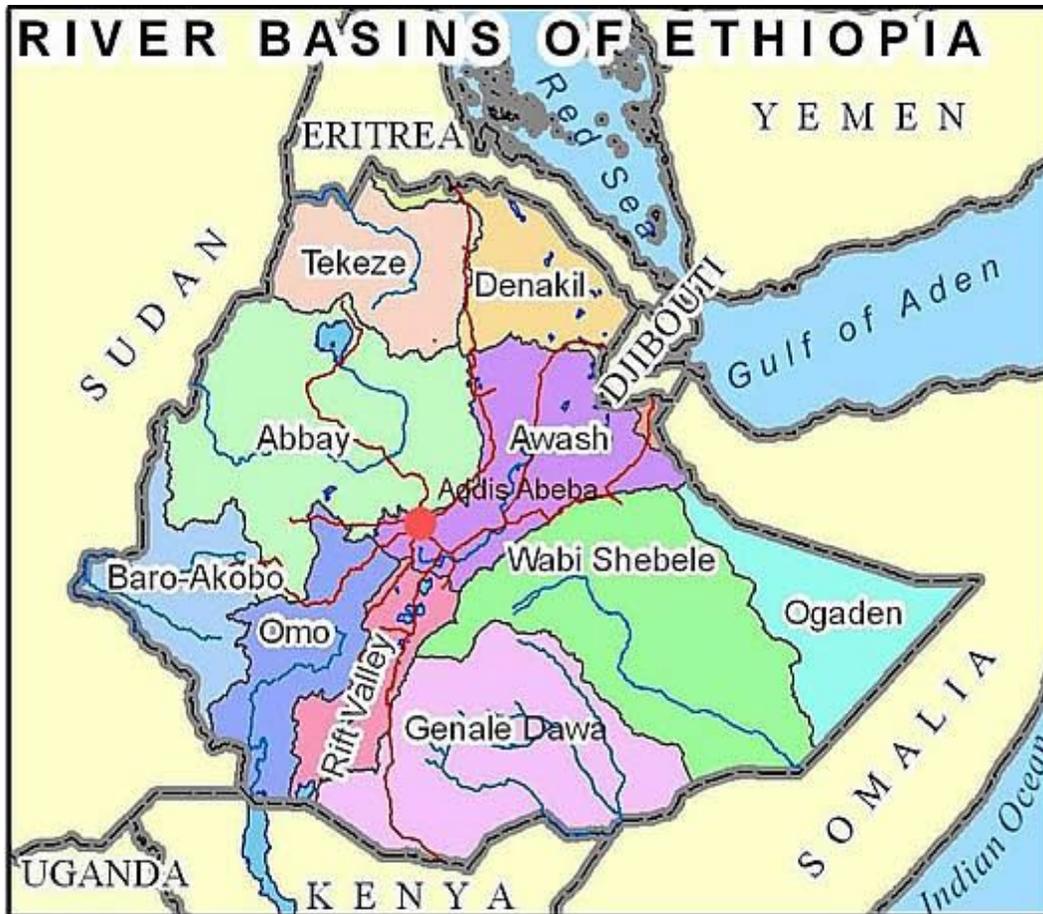


Figure 8. River Nile in Ethiopia

Source: Tuji Jidda, "Oromia-Ethiopia: The Mystery of the Black Nile," Gadaa.com, 24 December 2010, <http://gadaa.com/oduu/7242/2010/12/24/ethiopia-the-mystery-of-the-black-nile/> (accessed 20 February 2012).

Eritrea, one of the Horn of Africa countries, lies in a vital area in relation to Egypt and has a direct impact on Egyptian national security due to its unique geopolitical position overlooking of the Strait of Bab al-Mandab in the southern Red Sea.⁴¹ Its borders are shared with Ethiopia's main source of the Nile water to Egypt, as well as with

⁴¹A strait located between Yemen on the Arabian Peninsula, Djibouti and Eritrea, north of Somalia, in the Horn of Africa, and connecting the Red Sea to the Gulf of Aden.

Sudan, which represents a strategic depth to Egypt.⁴² Figure 9 depicts the geography of River Nile in Eritrea.



Figure 9. River Nile in Eritrea

Source: Lonelyplanet.com, "Map of Eritrea," <http://www.lonelyplanet.com/maps/africa/eritrea/> (accessed 20 February 2012).

Kenya is one of the most important countries in East Africa. It has a special regional and international position, with an extended coastline along the Indian Ocean. It is bordered by Tanzania to the south, Uganda to the west, South Sudan to the northwest, Ethiopia to the north and Somalia to the northeast. Kenya shares, with Tanzania and

⁴²Egyptian Ministry of Irrigation.

Uganda, the tropical plateau lakes, which account for 14 percent of the water sources of the Nile River.⁴³ Figure 10 portrays the geography of the River Nile in Kenya.



Figure 10. River Nile in Kenya

Source: MiddleEast and Africa Experts, “Kenya,” <http://www.goway.com/africa/kenya/index.html> (accessed 20 February 2012).

The DRC is one of the largest African countries in terms of area and mineral resources.⁴⁴ Most of Lake Albert, which represents the main water source of plateau lakes, is located in DRC. The DRC borders the Central African Republic and South

⁴³The World Fact Book, https://www.cia.gov/library/publications/the_world_factbook/ (accessed 28 April 2012).

⁴⁴Ibid.

Sudan to the north; Uganda, Rwanda, and Burundi in the east; Zambia and Angola to the south; the Republic of the Congo, the Angolan enclave of Cabinda, and the Atlantic Ocean to the west. Figure 11 depicts the geography of the River Nile in DRC.

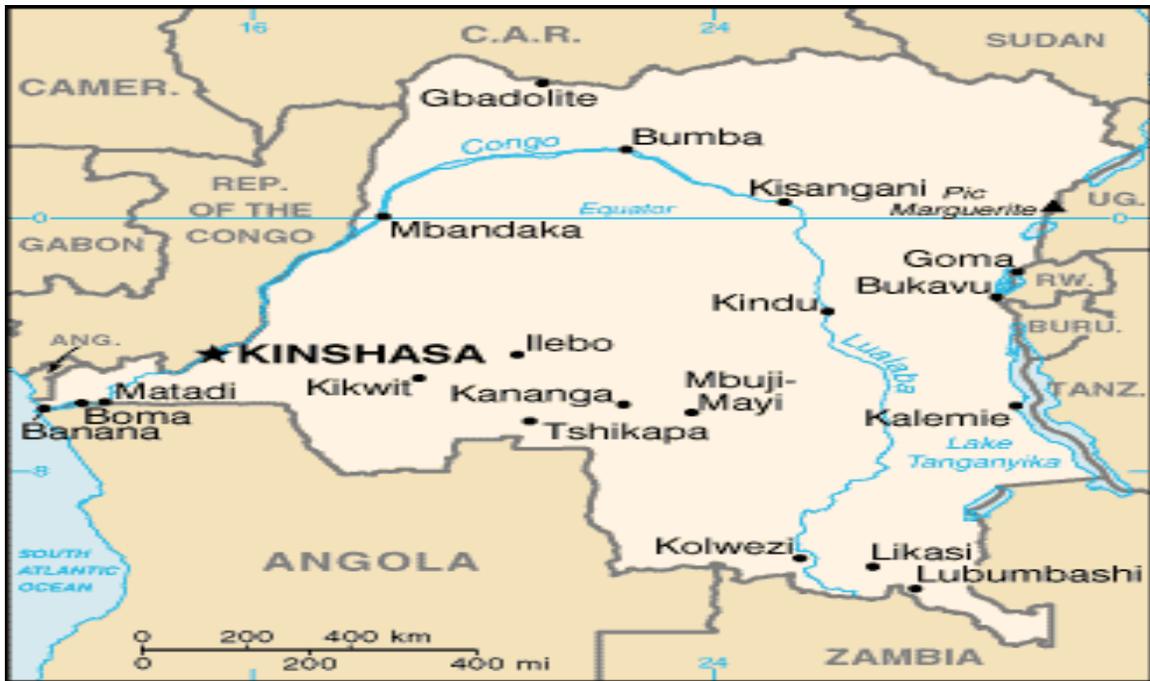


Figure 11. River Nile in Democratic Republic of Congo (DRC)

Source: CIA, The World Factbook, “Africa: Demographic Republic of the Congo,” <https://www.cia.gov/library/publications/the-world-factbook/geos/cg.html> (accessed 20 February 2012).

Uganda is located within the Heights of East Africa, including the areas of water which contain the northern part of Lake Victoria and Lake Albert. On this basis it can be said metaphorically that the sources of the Equatorial Nile start from Uganda.⁴⁵ Uganda

⁴⁵Egyptian Ministry of Irrigation.

is bordered on the east by Kenya, on the north by South Sudan, on the west by the Democratic Republic of the Congo, on the southwest by Rwanda, and on the south by Tanzania. The southern part of the country includes a substantial portion of Lake Victoria, which is also shared by Kenya and Tanzania. Figure 12 portrays the geography of the River Nile in Uganda.



Figure 12. River Nile in Uganda

Source: Infoplease.com, “Uganda Information,” <http://www.infoplease.com/atlas/country/uganda.html> (accessed 20 February 2012).

Rwanda is situated in central Africa. It is a landlocked country with the main tributaries of River Kagera and Lake Victoria, which supply about 7 BCM per year to the

River Nile. Also Rwanda shares the Kagera River with Burundi.⁴⁶ Rwanda is bordered by Uganda, Tanzania, Burundi and DRC. All of Rwanda is at a high elevation, with a geography dominated by mountains in the west, and the Savanna in the east. Figure 13 depicts the geography of the River Nile in Rwanda.



Figure 13. River Nile in Rwanda

Source: CIA, The World Factbook, “Africa: Rwanda,” <https://www.cia.gov/library/publications/the-world-factbook/geos/rw.html> (accessed 20 February 2012).

Burundi is located in Central Africa. It is a landlocked country as well, and represents the beginning of the Nile River waters. It is bordered by Rwanda to the north,

⁴⁶Ibid.

Tanzania to the east and south, and DRC to the west. Figure 14 depicts the geography of the River Nile in Burundi.



Figure 14. River Nile in Burundi

Source: WorldAudit.org, “Burundi: World Democracy Profile,” <http://www.worldaudit.org/countries/burundi.htm> (accessed 20 February 2012).

Tanzania, as one of the Nile Basin countries, is located in East Africa, and is bordered by Kenya and Uganda to the north, Rwanda, Burundi, and the Democratic Republic of the Congo to the west, and Zambia, Malawi, and Mozambique to the south. The country's eastern border lies on the Indian Ocean. The Nile River flows within Tanzania and forms part of the influx to Lake Victoria. Although the Nile portion forms only about 9 percent of its national area, it is significant in terms of the country's water

resources as it represents one of the more humid areas.⁴⁷ Figure 15 portrays the geography of the River Nile in Tanzania.

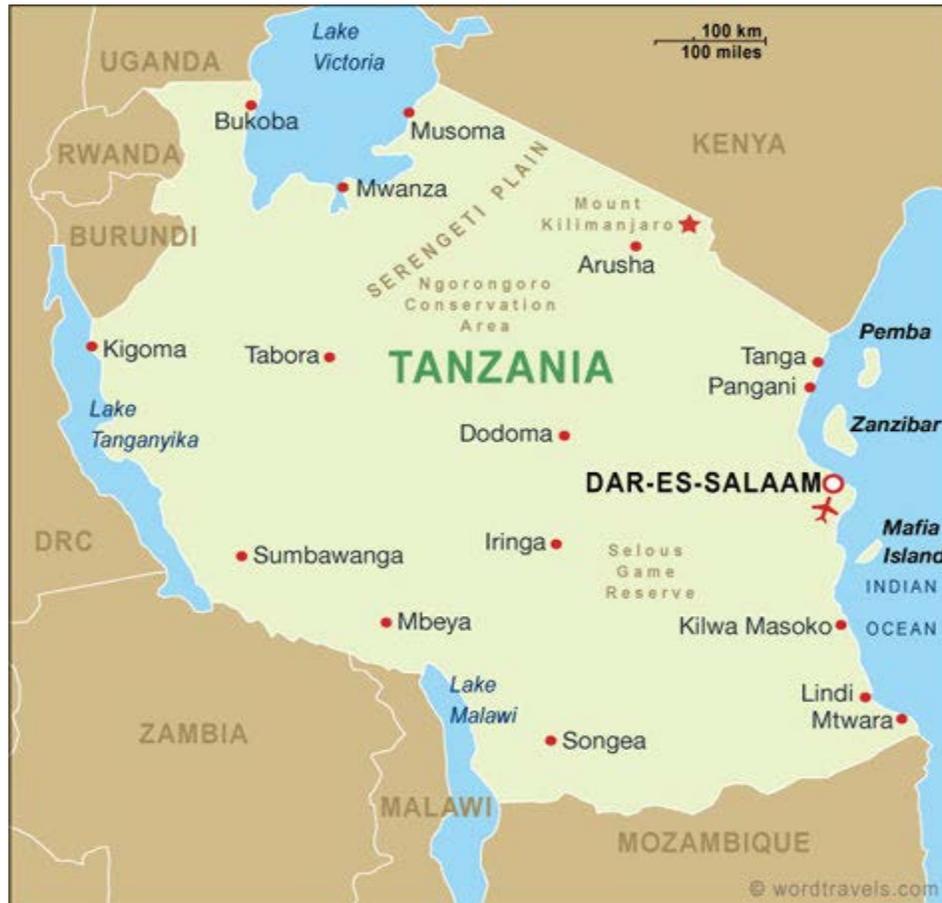


Figure 15. River Nile in Tanzania

Source: Uniglobe, Destination Guides, “Tanzania,” <http://www.uniglobetravel.com/site/viewhome.asp?sit=315&vty=WTG&a=Tanzania&c=0&aid=0&sessionid=#map> (accessed 20 February 2012).

⁴⁷Nile Basin Initiative, “Tanzania,” http://wrpmp.nilebasin.org/index.php?option=com_content&task=view&id=29&Itemid=39 (accessed 28 April 2012).

After independence, South Sudan, a new independent country, brought the number of the Nile Basin countries to eleven. It is commonly argued that the birth of South Sudan is more likely to complicate the dispute over the waters of the Nile. It is however, worth noting that one of the contributing reasons for the uprising in South Sudan in 1983 was the establishment of the Jonglei Canal Project. If it were to be completed, the canal would not only increase the speed of the flow of the water in the Nile, but would also drain water from the muddy areas in South Sudan, hence impacting negatively on agriculture, livestock and the ecosystem in general all across the region. The emergence of South Sudan is yet another new dimension to the existing water scarcity problems in the Nile Basin area. With this new country comes its need for Nile waters based on demands for socio-economic development. Even more critical, however, South Sudan's absolute necessity for safe and clean drinking water for its growing population. In the already volatile hydro-politics of the Nile Basin, the existence of South Sudan as a new country in the Nile Basin can only aggravate tensions in the region. South Sudan has struck a conciliatory tone toward both Egypt and Ethiopia, but two developments will certainly attract Egypt's attention. First, South Sudan wants to join the Nile Basin Initiative, the organization that is attempting to resolve the disputes over the Nile's water. This request surprises no one and indeed makes prominent sense, but it is a reminder to Egypt that South Sudan will soon have to develop a more detailed Nile policy; one that will predictably affect the Egypt interests of Nile water. Second, South Sudan has declared plans to establish a hydropower dam near the city of Wau, which sits on the Jur River, a branch of the Bahr el Ghazal River which is itself a branch of the White Nile. South Sudan's dam is not planned, and it seems to be an act of aggression

against Egypt and Sudan..⁴⁸ Figure 16 depicts the geography of the River Nile in South Sudan.



Figure 16. River Nile in South Sudan

Source: SudanUpdate.org, “Geography in the News,” <http://www.sudanupdate.org> (accessed 20 February 2012).

⁴⁸Major Ufulle Ga-Aro Festus Kenyi, Army of South Sudan, “Water Security and Hydro-politics of The Nile River: South Sudan’s National Security in the 21st Century” (Master’s Thesis, Army Command and General Staff College, Fort Leavenworth, Kansas, 2011-02).

The International Laws and the River Nile

The Nile Basin is subject to many laws, rules, norms and conventions concerning the use and management of the water. These include principles of international law and customs, the 1959 agreement, which regulate the use of Nile water, the rules of the 1966 Helsinki meeting, and the Convention of the Conservation of Natural Resources which was approved by the Organization of African Unity in 1968.⁴⁹

While, the territorial sovereignty base allows each Nile Basin country to exercise sovereign rights on the international river basin located in its territory this sovereignty is not absolute. It is restricted by the obligation of respecting the rights of other riparian states.⁵⁰

The treaty of Addis Ababa (1902) between Britain (for the Sudan) and the Emperor of Abyssinia (Minlk II) was agreed upon following Abyssinian independence and includes the organization of the border between Sudan and Ethiopia. Article III of the treaty also promised not to establish any facilities or businesses in the Blue Nile, Lake Tana, or the River Sobat that would affect the amount of water received by the Sudan.⁵¹

The 1929 agreement was a set of notes committed to by the British colonial government, on behalf of a number of Nile Basin countries (Uganda, Tanganyika and Kenya),⁵² together with Egyptian government. These provisions included the adoption of

⁴⁹Ibid.

⁵⁰Ibid.

⁵¹Ibid.

⁵²Tanganyika, a new state that changed its name to the United Republic of Tanzania in 1965.

Egypt's sharing of the Nile water, and guaranteed Egypt's right to use a veto power if any of other Basin countries create new projects on the river or its tributaries. It controlled the relationship between Egypt and the countries of the tropical plateau, and included articles concerning the water relationships between Egypt and Sudan.⁵³

The agreement between Egypt and Sudan signed in Cairo on November 1959 as a supplementary to the 1929 Convention, included full national control of the Nile water running through Egypt and Sudan.⁵⁴

The Convention of 1991 between Egypt and Uganda confirmed the respect of 1959 Convention as stated in the agreement signed by Britain on behalf of Uganda, is considered an implicit recognition of the 1929 agreement. It stated that the water management of Lake Victoria must be discussed and reviewed by both Egypt and Uganda within safe limits with no effect on Egypt's water needs.⁵⁵

The Convention of 1993 between Egypt and Ethiopia was an attempt to reach a common formula of cooperation between Nile Basin countries through the establishment of a common agenda to take advantage of the privileges afforded by the Nile Basin. It also created a framework of cooperation to improve the relations between Egypt and Ethiopia with regard to the waters of the Nile. This treaty assured the fact that neither of the two countries participated in any activity related to the Nile water that may damage the interests of the other country.⁵⁶

⁵³Egyptian Government.

⁵⁴Ibid.

⁵⁵Ibid.

⁵⁶Ibid.

In 1999, the Nile Basin Initiative (NBI) was formally launched as a partnership framework among the Nile riparian countries that anticipated developing the Nile River in a cooperative way, sharing considerable socioeconomic profits, and supporting regional peace and security. The Nile Basin Initiative was signed by the water ministers of nine countries that share the Nile River; Egypt, Sudan, Ethiopia, Kenya, Uganda, Burundi, Rwanda, Tanzania, and DRC, as well as Eritrea as an observer. The World Bank supported the Nile Basin Initiative as the lead development partner and as an administrator of the multi-donor Nile Basin Trust Fund. The NBI began with a negotiation among the riparian states that resulted in a shared vision for attaining sustainable socioeconomic growth through the equitable use of the Nile water, and benefiting from the common Nile Basin water resources.⁵⁷

The table at Appendix A shows the summary of agreements between the Nile Basin countries.

Nile Basin Reactions toward Egyptian and Sudanese Agreements

Ethiopia was the first country to reject the current distribution of the Nile water and urged some of the other Nile Basin countries not to accept this distribution. They argued that all previous agreements were concluded during a time of foreign occupation. They also (even today) believe that the 1959 agreement between Egypt and Sudan completely ignored them, and does not put their interests into consideration. Ethiopia assumes that it has sovereignty over its water resources, and criticizes the way that Egypt and Sudan use the Nile water, ignoring Ethiopia's current and future needs. Ethiopia's

⁵⁷Ibid.

claim is illustrated best by Egypt's decision to get the Nile water to Sinai through the Suez Canal. In 1989, Ethiopia complained about the draft submitted by the United Nations Development Program (UNDP) regarding regional cooperation among Nile Basin countries. This draft included various aspects of projects in the fields of energy, water, agriculture, and fishing. Ethiopia assumed that the project was against the principle of equitable sharing of Nile waters and prevented Ethiopia from freely using its part of the river, which is located in its national territory.⁵⁸

Like Ethiopia, Uganda declared in 1987 that the downstream countries (Egypt and Sudan) are benefiting from their Nile water, referring to the necessity of reviewing the agreements on the Nile water, which were signed by Britain on behalf of the rest of the Nile Basin countries. Uganda recommended the cancellation of previous agreements with Egypt.⁵⁹

Kenya, which has good relations with Egypt in all fields associated with several economic and investment agreements, does not recognize the 1929 agreement and keeps pace with the Ethiopian position on the need to reconsider the Nile water agreements.

Tanzania, Rwanda, and Burundi, which share in the Kagera River, have a common cooperation in all fields with Egypt, which provide them some social and economic aid, but they do not recognize the convention of 1929.

The DRC also has good relations with Egypt, and supports the governments of Egypt and Sudan with respect to water policies and agreements to regulate the exploitation of the Nile Basin water.

⁵⁸Ibid.

⁵⁹Ibid.

As a result of the various reactions of other Nile Basin countries, in May 2010, Ethiopia, Kenya, Uganda, Rwanda and Tanzania signed a Cooperative Framework Agreement to get more water from the River Nile, and to cancel the 1959 agreement. Burundi followed shortly thereafter by signing the agreement in February 2011. The DRC is also expected to sign as a result of pressure from the rest of those countries. In addition, South Sudan seeks to be part of this agreement as a new country in order to guarantee its right of the Nile water, but does not officially declare its position regarding the 1959 agreement. This cooperative framework agreement is new development in the Nile Basin and is strongly opposed by both Egypt and Sudan. According to Egypt's water resources and irrigation minister, the agreement is tantamount to asking Egyptians to "leave their culture and go and live in the desert."⁶⁰

Do these Agreements save the right of Egypt
to the Nile water?

Ethiopia does not recognize the old Nile water agreements based on the fact that those agreements were signed under the colonial powers. This is in spite of the fact that Ethiopia, as well as the other Nile Basin countries, accepts the agreements which recognize the borders among all African countries, which also were signed under the colonial powers on their behalf. This is one of the points that Egypt and Sudan use to prove their rights for the Nile water. The same holds true for the DRC. There was an agreement between the King of Britain and the King of Belgium, who was the king of the Congo at that time, which took place in London in 1906 to amend the spheres of

⁶⁰Abadir M. Ibrahim, "The Nile Basin Cooperative Framework Agreement: The Beginning of the End of Egyptian Hydro-Political Hegemony," *Missouri Environmental Law* 18, no. 2 (2011): 283-312.

influence based on a previous agreements signed in Brussels in 1894, which pledged to the Congolese government not to establish or permit the establishment of any works on the Smillki and Osanju Rivers or next to any of them, and which would reduce the volume of water flowing into Lake Albert unless with the consent of the Governments of Egypt and Sudan.⁶¹

The same situation is observed in the rest of Nile Basin countries; Rwanda, Burundi, and the DRC where they have water more than their needs. Beside the yearly rain, they get water from the Nile and its tributaries and Lakes Tanganyika in the south, Lake Kivu in the west, Lakes Boneton and Bolero in the center, and also lakes Edward and George on the border of the DRC to the west. Table 3 depicts water and land resources in the Nile Basin.

⁶¹Egyptian Government.

Table 3. Water and Land Resources in the Nile Basin

Country	Precipitation (a) km ³ /year	Total internal renewable water resources (a) km ³ /year	Total actual renewable water resources (a) km ³ /year	Dependency ratio (a) %	Total actual renewable water resources (d) m ³ /capita + year 2002	Total actual renewable water resources (e) m ³ /capita +
Burundi	33.9	3.6	3.6	0	537	310
D.R.C	3'618.12	900.0	1'283.0	30	23'628	12'242
Egypt	51.37	1.8	58.3	97	829	610
Eritrea	45.15	2.8	6.3	56	1575	940
Ethiopia	936	123.2 (b)	123.2 (b)	0 (b)	1'867	1'068
Kenya	401.91	20.2	30.2	33	947	722
Rwanda	31.93	5.2	5.3	0	654	427
Sudan	1'043.67	9.5 (c)	28.0 (c)	66 (c)	859	605
Tanzania	1'012.19	82	91.0	10	2'473	1'572
Uganda	284.5	39	66.0	41	2'661	1'486

Source: Nicole Shema, "The Failings and Future of Nile Basin Management" (Political Science Honors Thesis, 27 April 2009), polisci.uoregon.edu/acrobat/HTShema.pdf (accessed 25 February 2012), 2.

As well as most of Nile Basin countries, Uganda has huge water resources, such as the Lakes of Africa, the biggest lake in Africa, Albert and Kyoga Rivers and others with many of the tributaries of the Nile around the equator.

If these countries are arguing with Egypt now about the amount of its share according to the agreements of Nile water distribution, which is the same as it was since 1959 (55.5 BCM annually), Egypt then also has the right to ask these ten countries about the wasted Nile water and other rivers in these countries. It is scientifically known that these countries have more than 1,660 BCM annually, which represents 1:30 ratio comparing to Egypt's quota of the river Nile water.⁶²

⁶²Mason, "From Conflict to Cooperation in the Nile Basin."

International and Regional Variables which affect the Nile Basin Problem

Due to the successive international changes since the beginning of the twentieth century, including the World Wars, the Cold War, the collapse of the Eastern bloc and the disintegration of the Soviet Union and its replacement by the Russian Federation, the end of the era of bipolarity, and United States lead a new uni-polar world, the growing need for the role of international and regional organizations in the fields of world peace and human rights is paramount now more than ever before. The growing influence of economic blocs on international relations includes the structure of the interactions of political, economic and security issues between the components of the international system. Countries with weighty regional roles that seek to maintain their status in order to face the rapid changes in the world are far different than states who can no longer be isolated from the requirements of the new world system in order to preserve their own national security.

Many international authors, thinkers, and experts escalate the water problems in Nile Basin region using their books and articles (the coming water wars, conflicts of water, the struggle over the water, the water crisis and conflict, etc.); targeting the inflammation of the situation in this area by recommending the implementation of the interests of upstream countries while ignoring the interests of the others, which are caused by the problem.

During this era the world has witnessed many variables on the international and regional levels (politically, economically, socially, and militarily), as well as the emergence of the new phenomenon of international economic blocs and the expansion of

the World Trade Organization (WTO) and its influence on dissemination of economic markets and the privatization of government institutions.

Over the last few years, the Nile Basin area has witnessed international activities by many powers like the United States, China, France, and some other emerging economic powers, whose activities have begun to increase beyond the framework of relationships between Egypt and the rest of the Nile Basin countries, and which negatively affect the Egyptian role in the region over the short and long terms. Most of these international powers play a vital role in this region by agreeing to adopt the views of the upstream countries. In addition to the approval of the financing of dams, which has had impacts on Egypt's share of Nile water, consequently affects the national security of Egypt.

In dealings with the Nile Basin problem, the United States uses the concept of geo-strategic, while not using the term "area of the Nile Basin" or "the Nile Basin countries," it uses the term "the Horn of Africa" or "Great Horn of Africa" and these latter terms include the traditional concept of Horn of Africa and the Nile Basin countries, and commonly include Sudan, Ethiopia, Djibouti, Somalia, Kenya, Tanzania, Rwanda, Burundi, Uganda, and Eritrea with the exception of Egypt and DRC.

In the 1980s, the United States showed its concern about the Nile Basin problem. In 1988, the Strategic Studies Center in Washington issued a foreign policy paper regarding water resources in the Middle East and Africa. The policy paper stated that the main causes of the water crisis in the Nile Basin region are increases in the consumption of water as consequences of expansion and population growth, lack of maintenance associated with misuse of the facilities of the water, the lack of cooperation among the

Nile Basin countries, and an area distinguished by religious, political tensions, and fraught with ethnic feuds.⁶³

The 1980s also witnessed the significant increased presence of Israel in the area of Nile Basin with its desire to get a portion of the Nile water; putting pressure on Egyptian decision-makers to use sensitivity when addressing the seriousness of the scarcity of water on the Egyptian strategy. Israel's ambition in the water of the Nile River is old and known. Israel had formally requested to receive 1 percent of the waters of the Nile during multilateral negotiations within the Middle East, but its request was not accepted by Egypt.⁶⁴ This is why Israel played (and is continuing to play) an indirect role in water conflict between the Nile Basin countries as it can benefit from its considerable influence with other countries such as Ethiopia, Kenya, and Rwanda. With the outbreak of conflict in the Great Lakes region after the overthrow of Mobutu in the DRC, Israel tried to contribute to the rearrangement of geo-political conditions in this area; working under the umbrella of the United States, which has always played an active role in this region.

Current use and Future needs of Water for Egypt until 2017

Egypt's water supply is limited to its share of the Nile River. Egypt's per capita share of water has dropped from 20,000 cubic meters per year at the beginning of the 19th century, to less than 800 cubic meters per year in 2012. The population increase which rose from less than 2.5 million in 1800, to over 60 million in 1996, to over 84

⁶³Egyptian Government.

⁶⁴Ibid.

million in 2012, is one of the main reasons for the severe decline in the country's per capita share of water; almost 94 percent of Egypt's population lives in the Nile Valley and the Delta, which extends southward about 600 miles from the Mediterranean sea. Also it is one of the oldest agricultural areas in the world. More than three fifths of Egyptians engage in agriculture work. The Nile meets about 90 percent of the Egypt's water needs. The field of agriculture in Egypt accounts for 95 percent of water consumption. In addition to the agriculture, water in Egypt is used for drinking, industry, hydroelectric power, fishery, tourism services, and other domestic supplies. The population in Egypt is expected to reach to more than 115 million people by the year 2030 with agriculture expands, and urbanization increases. The country will face increasing needs of water.⁶⁵

In order to clarify the current use of the water in Egypt, the researcher will make a comparison between Egypt's water resources in 1997, and the resources now in 2012. The total water resources for Egypt in 1997 was 63.9 BCM (55.5 BCM represented Egypt's share of the Nile water plus 3.7 BCM reused water of agricultural drainage, plus 4.7 BCM groundwater), which is the same amount in 2012. In 1997 Egypt used 55.1 BCM for the cultivation, and 8.8 BCM for drinking, industry, and other fields. Consequently, the current water resources, which are the same as the resources of 1997, are barely enough to meet the needs of Egypt from the Nile water.⁶⁶

⁶⁵Aziza M. Fahmi "Water Management in the Nile Basin, Opportunities and Constraints" (2007), 143.

⁶⁶Egyptian Ministry of Irrigation.

Egypt's future need for water depends on several fields; most notably the horizontal expansion plan to increase the agricultural area, the rate of population, and industrial growth, as well as several factors which must be taken into account. These include the expected rise in the Egyptian standard of living and the efficiency of irrigation and drainage networks through a number of key alternatives, including the needs of the agricultural sector under the horizontal expansion plan of the state in the fields of agriculture and land reclamation. Also, the need for drinking water with the expectations of an increasing in population and the rise in the standard of living raises the need even more when factoring in the requirements of the industrial sector under the industrial growth and the use of modern technology.

The Future Needs of Water for the Agricultural Field in Egypt until 2017

Currently in Egypt 8 million acres of agricultural land requires irrigation, most of which is already cultivated, in addition to another 3.4 million acres which is planned to be cultivated based on Egypt's horizontal expansion Plan by 2017.⁶⁷ In order to calculate Egypt's future water needs for cultivation, those 3.4 million acres require 5200 cubic meters of water per acre for the lower lands, and 7000 cubic meters per acre for the Upper and the Western Desert and Sinai using an advanced irrigation system. When taking into account that planting crops consumes large quantities of water, the average amount or consumption will be about 4000 cubic meters per year. Thus, Egypt needs about 23.2 BCM of water to grow 3.4 million acres or crops in order to implement the

⁶⁷Ibid

agriculture horizontal expansion Plan by 2017.⁶⁸ Table 4 shows the drop in water Nile levels from 1965 to 1990.

Table 4. Depiction of the drop in water Nile levels from 1965 to 1990

Station	Water Level Drop, cm						
	Discharge (m ³ /s)						
	930	1040	1160	1390	1740	2310	2900
El-Gaafra	80	76	73	72	60	50	37
Esna	73	75	77	77	73	47	-
Naga-Hammadi	84	88	90	85	75	-	-
Assuit	60	63	62	57	56	-	-

Source: M.B.A.SAAD, Head of the Planning Sector, Ministry of Water Resources and Irrigation, *Nine River Morphology Changes Due to the Construction of High Aswan Dam in Egypt*, 2002, http://www.nbcbn.com/dynamic/Scientific_Paper/248C4-SD.pdf (accessed 10 May 2012).

The Future Needs of the Drinking Water in Egypt

The estimated need for drinking water in Egypt is based on three major factors. First, the population and its rate of increase projected in 2017. Second, the average of actual daily consumption per capita, and finally, water losses in the distribution networks.

In the context of the Egypt population in 2012, which is estimated at 84 million, and the current needs for drinking water, which is estimated at 4.54 BCM per year using the average of daily requirement per person per day, and considering that the average of losses in the distribution networks is 50 percent, due to the poor water networks the Egyptian National Authority of Drinking Water and Sanitation expects that the average

⁶⁸Ibid.

daily requirement per capita will be increased by more than 25 percent due to the high standard of living in 2017.⁶⁹ The increase in Egypt's population is in the range of 2.1 percent annually and is expected to reach to about 100 million people in 2017. Also, considering the increase in the daily requirement average of 25 percent which results from the high standard of living and the increase in distribution services it is expected that wasteful use of water must be factored in as well. Consequently, the amount of water required for drinking purposes in Egypt by 2017 will be 14.88 BCM.⁷⁰

The Future Needs of Water for the Industrial Field in Egypt

The development of the industrial field in Egypt is one of the most important factors of progress and economic growth. The development of the industrial base during the past decades required huge quantities of water, which reached to about 2.2 BCM in 2000. The surface water (the Nile and irrigation systems) is the main source of those uses. Based on the Egyptian industrial development plan, the total need for water in the industrial base will reach to about 10.6 BCM in 2017.⁷¹

The Other Future Needs for Water in Egypt

Egypt needs more water for use in other areas such as river navigation, tourism services, and fishery, as well as the needs for water to generate hydroelectric power, which contributes to solving the energy problem in Egypt.

⁶⁹Egyptian Government.

⁷⁰Egyptian Ministry of Irrigation.

⁷¹Al-Ahram, Statement by the Minister of Irrigation, Egypt's water policy until 2017, Egyptian daily newspaper, 2 June 2000, 3.

The Balance between the Input and the Output of Egypt's Water

The water balance shows the relation between the resources and the consumption of water in Egypt. This balance consists of three elements. The first is input, which represents the amount of water discharged from the high Dam, rainwater, and any other potential resources of water. The second is output, which represents the evaporation of water bodies and the discharged water to the sea. The third is the change in the amount of water stored in the water system (groundwater or surface water).

Applying the water balance system to Egypt's use of water in 1997, and Egypt's future needs for water toward 2017, it is clear that the deficit in Egypt's water supply during this period is about 18.1 BCM.⁷²

Current and Future Needs of Water for Other Nile Basin Countries

Future water demands for Nile Basin countries are matters consisting of challenges which include famine, droughts, poverty, urbanization, internal conflicts, global warming, environmental changes, and population growth. The governments of the Nile Basin countries seek to achieve peace and stability by building robust economic and security systems. Six countries in the Nile basin area with upstream riparian rights to Nile River water include Kenya, Uganda Tanzania, Burundi, Rwanda, and the DRC. These countries have established vital river basin systems from which the White Nile, one of the two major tributaries of the Nile River, originates. In addition, these countries have not been involved in any water-intensive economic activities on the Nile throughout the last

⁷²Egyptian Ministry of Irrigation.

century due in large part to the Nile River Water Agreement in 1929, which was later modified in 1959.

Water availability is one of the main factors in attaining the goals of peace and security. The Food and Agriculture Organization (FAO) study reveals that there is great potential for irrigation in the Nile Basin Area. It also shows that Burundi, Rwanda, Tanzania, Kenya, Democratic Republic Congo and Uganda have total irrigation areas of about 2 million acres of this land; only about 241,000 hectare is irrigated. Uganda has the largest irrigation projects among these countries. It has over 202,000 hectare, of which only about 5,500 hectare have been cultivated. Kenya has about 180,000 hectare, while Rwanda has about 150, 000 hectare. Burundi has about 105,000 hectare, and the DRC has about 10,000 hectare. Furthermore, these countries have invested heavily with foreign aid from countries such as China in the construction of dams to manage water for irrigation and production of power. Ethiopia is the first country to begin the construction of new dams, followed by Uganda, which has twelve dam projects. Tanzania is executing a huge water pump project which offers the ability to withdraw water from Victoria Lake in order to supply drinking water for its population. Kenya also plans to develop its irrigation capability by constructing dams to provide hydroelectric power and to prevent flooding. There is no precise data on the amount of water consumed, and the impacts of growing numbers of dams and the withdrawal of water from Lake Victoria throughout the region, but the clear results are the significant reduction of flow rates into the lower Nile River, which greatly affects the water portions to Egypt and Sudan.⁷³

⁷³Aziza M. Fahmi, 146.

Since South Sudan was part of Sudan until July 2011, there is no exact data showing its current water use or future needs. The 1959 Agreement gives Sudan 18.5 BCM per year, and there have been no main projects that need additional use of water. Since July 2011, South Sudan has been an independent country in the Nile Basin. After the signing of the Peace Agreement in 2005, South Sudan declared that its major priority would be the development of its agricultural projects in order to meet the food demands of its population, which is growing rapidly. The population of South Sudan in 2012 is about 8.4 million and the population growth rate is at almost 3 percent annually. It is projected that the population will be about 25 million by 2050, which will increase the demands for clean drinking water per capita. Moreover, South Sudan has strategies to construct several dams on the White Nile in order to provide hydroelectric power and water for its economic projects. The construction of these dams on the Nile means significantly reducing the overall flow of water in the lower Nile to Egypt and Sudan, since dams produce an overall loss in water.⁷⁴

Threats and Challenges Facing Egypt and the Rest of Nile Basin Countries

Egypt, along with the Nile Basin countries faces many challenges which are linked to a variety of factors. The challenges that cut across all boundaries are linked to economic issues, while others are related to political motivations. In addition, climate changes and natural phenomena affect most (if not all) of the Nile Basin countries. To confirm its historic rights to the waters of the Nile, and to convince those other Nile Basin countries of these rights, is the main challenge facing Egypt today. Also, the

⁷⁴Ufulle Ga-Aro Festus Kenyi.

growing needs for water among the other Nile Basin countries in order to face the drought conditions, desertification, population growth, and the requirements of agriculture is another challenge which adds to the obstacles that Egypt faces in attempting to solve its problem of water scarcity. Furthermore, after the failure of the Nile Basin Initiative, there is no comprehensive framework of cooperation between the Nile Basin countries which guarantee the common interests of all countries and get the maximum benefit from the waters of the Nile River.

Political Challenges Facing the Nile Basin Countries

The political relations between the Nile Basin countries are related to the common interests. The relation between Egypt and Sudan is strong because of their geographic positions, which requires them to have similar goals as they receive the Nile waters after it passes through the rest of the Nile Basin countries. The relations between the other Nile Basin countries are based on the mutual interests.

The lack of stability in most of Nile Basin countries, especially the southern part of the Basin, has negative effects on the political relations between these countries and the rest of the Nile Basin. Also the significant difference in trends between the upstream and downstream countries affects the political relation between them.

Additionally, external interference in the affairs of the Nile Basin countries, and the attempts by some foreign countries such as China and Israel to influence the political relations between the Nile Basin countries, is one of the most significant impacts on the political relations in Nile Basin area.

Natural and Environmental Challenges Facing the Nile Basin Countries

Due to the nature of the Nile Basin and climatic and environmental changes that affect the region, the Nile Basin countries suffer from a lot of physical problems that negatively affect the waters of the Nile. Soil degradation is the basic result of these changes and is caused by the over-cutting of the trees in the Upper Nile and Ethiopia. In addition, overgrazing causes the removal of vegetation from the land and causes soil erosion, leads to soil degradation, and thus, requires more water to cultivate this spoiled land.

Pollution of the Nile is also presenting a huge environmental challenge to all Nile Basin countries. Pollution is primarily caused by agricultural drainage and misuse of chemicals during the process of agricultural fertilization. In Egypt and Sudan, pollution caused by sewage, which lies directly on the banks of the Nile and its tributaries, also, contamination caused by chemical fishing methods is also problematic.

In addition to soil degradation and pollution, drought is considered to be the result of natural, environmental and climatic changes in the Nile Basin area. Drought affected a large number of African countries in the 1980s. As a result of prolonged droughts; large numbers of people were displaced from the affected areas to other regions. The catastrophic effects of droughts are the disappearance of forests and grasslands in semi-arid lands, the degradation of soil due to the lack of water storage underground, the death of grass, and the formation of desert-like lands in areas which were once productive.

Desertification is an obstacle that faces many of Nile Basin countries. Approximately 40 percent of Ethiopia's land was covered with forests at beginning of the twentieth century, and today the country suffers from a significant decline in forest cover,

which covers little more than 4 percent of its land area. Sudan, which has the longest part of the course of the Nile River, also suffers from desert encroachment to its waterways.

The flooding of the Nile is another natural and environmental challenge to all Nile Basin countries. It is a natural phenomenon that has devastating effects on human life, animals, and plants. To avoid these effects, all Nile Basin countries should cooperate with each other and attempt to provide required data and information for early warning and take the necessary measures in order to make use of excess Nile water.

Threats Facing Egypt's Quota of Nile Water

Most of the Nile Basin states declared that they refuse many of the old agreements which organized the Nile water shares among each Nile Basin country; especially those agreements which prevent them from conducting any activities on the Nile's course without approval from Egypt and Sudan. These states also intend to issue new frameworks for using the Nile water. These actions drastically affect the Nile water quotas for Egypt and Sudan.

Ethiopian Threats to Egypt's Water

Due to the drought that hit the Horn of Africa in the 1980s, Ethiopia shifted its policy priorities to agricultural expansion. This policy shift depended on irrigation water to meet population growth and its need for food. In addition, power generation projects were given priority among all other water proposals, and forced the Ethiopian government to increase its share of Nile water.

Ethiopia has also commissioned the assistance of the US Bureau of Reclamation in order to make a feasibility study for development of the Blue Nile basin. This study

proposed thirty-three projects, most of which affect Egypt's Nile resources. These projects included the building of four large dams (Mabel - Mendia - Cardy - and another on the Sudanese Ethiopian border), and the planting of about one million acres' worth of trees in the hills and surrounding mountains. The estimated water required for these projects is about 5.2 BCM per year, which presents a great threat to Egypt's and Sudan's share of Nile water. The implementation of these projects requires huge investments which are not presently available for Ethiopia because the country suffers from an economic crisis brought on by the recent civil war and its current border clashes with Eritrea. Additionally, Ethiopia is vulnerable to famine because of the successive droughts each year. The results of these hardships makes Ethiopia a key focus for external and regional powers who try to help Ethiopia implement these projects; all of which potentially affect Egypt's national security.⁷⁵

Ethiopia has received funding from the joint European markets for use in constructing a dam on the Nile River. The purpose of this dam is to store up to 180 BCM of water per year. Other Ethiopian projects include a dam on the River Alvaro, which is a tributary of the Sobat River. These projects afford the storage of about 1.5 BCM of water per year which is used in the reclamation of 750 thousand acres of land. Ethiopia has also been financed by the Italian government toward the implementation of two other projects on the Nile; both of which would facilitate the reserve of about 100 million cubic meters for the reclamation of 25 thousand acres of land.⁷⁶

⁷⁵Aziza M. Fahmi, 112.

⁷⁶Ibid.

The Ethiopian government insists on taking hardline position toward the historic Nile water agreements and has tried hard to convince the rest of Nile Basin countries to eliminate these agreements and to replace them with new ones, if this occurs, Egypt's and Sudan's Nile water quotas would be greatly impacted. There is also no doubt that the implementation of Ethiopia's Nile River projects, initiated without the consultation of upstream countries, would affect the revenue of the river and harm both Egypt's and Sudan's national security and prosperity. Regardless of its signing of the framework of cooperation with Egypt in 1993, Ethiopia still opposes the establishment of projects in the higher Nile resources in both Egypt and Sudan.

Eritrean Threats to Egypt's Water

Since gaining its independence in 1993, Eritrea's successive governments have pursued mysterious policies. Some of these policies have appeared to be hostile toward many of the regional and international issues which have been addressed throughout this research. Despite its recent addition to the Nile Basin Region, the majority of evidence reflects a similarity between the Eritrean and the Ethiopian position toward Egypt and Sudan.⁷⁷

Tropical Heights Countries' Threats to Egypt's Water

The tropical plateau countries include Tanzania, Uganda, Kenya, Rwanda and Burundi, and DRC. These governments appear to all take the same stance toward Egypt and Sudan. They refuse to acknowledge the existing Nile water agreements and try to

⁷⁷Ibid.

change them in order to prevent both Egypt and Sudan from maintaining their historic rights toward Nile water.

Tanzania has been seeking to establish joint projects with both Rwanda and Burundi in an effort to use the waters of the Kagera River and Lake Victoria for the cultivation of 55 thousand acres of cotton. Tanzania also plans to use about 3 BCM of Nile water to cultivate about 10 million acres in Shinya territory.⁷⁸

Uganda is currently planning several projects in the area of Tonga. These projects will affect the water storage in Lake Albert, and thus limit the water flowing into the White Nile. Also, Uganda plans to initiate five electoral power generation projects (Tank Bujagali - Tank Almar_Ezon - Camdeny – Abuja 1- Abuja 2). The danger found in these initiatives poses the possibility of losses in water flow at Aswan estimated at about 3 BCM.⁷⁹

Kenya uses only 16 percent of its Nile water resources, and is considered to be one of Nile Basin countries which has been less severely affected by the drought that hit the Eastern Africa. Still, Kenya shows greater prejudice toward the current Nile water agreements than the most of the other Nile Basin countries. Kenya seeks to provide water for the reclamation of 755 thousand acres around Lake Victoria, and it has already begun the reclamation of 120 thousand acres; requiring about one BCM of Nile water.⁸⁰

Rwanda and Burundi are targeting the expansion of their cultivated lands and power generation systems. They are planning to establish a huge reservoir (called

⁷⁸Ibid.

⁷⁹Ibid.

⁸⁰Ibid.

Rousseau) in cooperation with the government of Tanzania. This reservoir is expected to draw about one BCM of the Nile water per year.⁸¹

The DRC is the most cooperative country in the region. The DRC government intends to build a dam on Lake Albert in order to store water; which (if completed) would increase Egypt's Nile water quota and hopefully facilitate further cooperation between all of the Nile Basin countries.⁸²

South Sudan Threats to Egypt's Water

The aspirations of the new State of South Sudan in the Nile water directly affect the Egyptian interests in the Nile Basin in large part because the whole share of the Nile Egypt runs through South Sudan. It is anticipated that South Sudan plans to establish an assortment of dams and projects on the Nile in order to cultivate its arid lands and to generate power for its increasing population. If initiated, these projects would directly reduce Egypt's annual quota of Nile water.

Water Cooperation between Egypt and the Nile Basin Countries

Due to the ongoing developments in the eleven different countries who share the Nile Basin, and due to the nature of issues that have arisen since the demise of colonialism, the Egyptian government has been interested in extending bridges of cooperation across the entire region in its efforts to add strategic depth. Since the Nile is considered a life source for Egyptians, it has become necessary to find new mechanisms for regional cooperation in order to reach to satisfactory agreements among all parties

⁸¹Ibid.

⁸²Ibid.

while still appeasing the interests of each individual Nile state. Naturally, this is easier said than done.

In 1967, the hydro studies Nile water project was the first cooperative initiative among the Nile Basin countries. It was launched with the participation of Egypt, Kenya, Tanzania, Uganda and Sudan; later, Rwanda, Burundi, and DRC joined the project, with Ethiopia participating as an observer.⁸³

In November 1983, all Nile Basin countries, led by Egypt, established the association of INDOGO, which means ‘fraternity’ in Swahili. INDOGO’s location was in Sudan and its main goals were to support and increase political, economic and social relations among the Nile Basin countries, to support the economic and trade integration in Nile Basin area, to promote solidarity between Nile Basin countries, and to coordinate their common international and regional issues. The members of INDIGO included Egypt, Sudan, Uganda, Kenya, Tanzania, Rwanda, Central Africa, and Zaire (DRC); Ethiopia and Burundi were included as observers to this association.⁸⁴

In 1992, the Nile Basin countries launched the TECCONILE agreement which was initiated in order to develop and maintain the Nile River’s environment. The six permanent members who signed this agreement were Egypt, Sudan, Tanzania, Uganda, Rwanda, and the DRC. Four members, Ethiopia, Burundi, Kenya, and Eritrea, joined as observers. The agreement of TECCONILE continued during the period from 1992 to 1998. It was the first comprehensive agreement among Nile Basin countries and included

⁸³Egyptian Ministry of Irrigation.

⁸⁴Ibid.

22 projects; most notably the preparation project of a framework for regional cooperation between the Nile Basin states.⁸⁵

In 1999, Egypt proposed establishing a new mechanism for cooperation which included all Nile Basin countries. This initiative was called the Nile Basin Initiative. It began with the establishment of a strategy of cooperation between the Nile Basin countries and focused on projects that were based on principles of interest for all Nile Basin states. The initiative established an institutional structure which consisted of a council of ministers for water resources in the Nile Basin. Also, the initiative sought to open an active contact channel (dialogue) with some of the international donors such as the World Bank, the United Nations Development Program, and the Canadian International Development Agency, as support agencies to assist in implementing its projects.⁸⁶

The initiative also confirmed a number of general principles which govern the water relations between all of the Nile Basin countries. These principles included (but were not limited to):

1. That water is a historic right for all Nile Basin countries,
2. That no country can establish any projects that harm the interests of other countries.
3. That the benefit from any project on the Nile cannot be dominated by a single state.

⁸⁵Ibid.

⁸⁶Ibid.

In 2005, the first meeting of Ministers of Electricity from all of the Nile Basin countries was held in Rwanda. The meeting ended with an agreement on the required actions to exploit the continent's water resources such that it would enable the production of 13 percent of world's electricity use., At present, the Nile Basin currently produces a mere 3 percent. During this meeting, the Egyptian Minister of Electricity offered to establish seven projects. These projects would be in the areas of agriculture, irrigation, environment, tourism, and energy, and would help other Nile Basin countries reach greater economic and social development levels.⁸⁷

Egypt also established a regional training center which is affiliated with the Egyptian Ministry of Irrigation and which works under the umbrella of the United Nations Educational, Scientific and Cultural Organization (UNESCO). The training center is primarily used train many Ethiopian envoys and students who study the science of water resources.⁸⁸

The table in Appendix B provides an overview of water projects in the Nile Basin.

Bilateral Cooperation between Egypt and other Nile Basin Countries

Egypt has initiated a variety of plans and agreements which have been signed individually with most of the Nile Basin countries. The government's intent is to have some degree of bi-lateral cooperation with each separate Nile state in order to guarantee its right to Nile water and to strive toward sharing the common interests of other Nile Basin countries.

⁸⁷Ibid.

⁸⁸Ibid.

In cooperation with Sudan, Egypt has established many projects with their immediate Nile neighbor in order to save their rights toward Nile water. The most important project was a cooperative initiative to build the Jonglei Canal in 1979. The estimated goal for the establishment of this canal was 7 BCM per year for both Egypt and Sudan; however, the outbreak of civil war in southern Sudan prevented this project from ever being finished.⁸⁹ Egypt also funded several other projects in Sudan such as the drilling of 60 underground wells in Darfur which provided the people there with enough water for drinking and for agricultural irrigation.⁹⁰

Bi-lateral cooperation between Egypt and Ethiopia has been very important. The stability of the relations between Egypt and Ethiopia has been based mainly on the perspective of Egypt's keenness on continuing the flow of Nile water without external barriers or obstacles on Egypt's quotas. 86 percent of Egypt's water comes from the highlands of Ethiopia. In 1993 Egypt and Ethiopia signed a cooperation framework to develop the water resources for the two countries. This framework also established a mutual mechanism for consultation on the Nile waters and focused on the preparation of a comprehensive and integrated plan to increase the flow of the water and to reduce its waste. This framework was followed by the signing of many subsequent agreements between Egypt and Ethiopia in the fields of trade, economy, agriculture, energy, and industry.

Cooperation between Egypt and Uganda was limited to some projects and were mainly funded by Egypt. These projects were aimed at restricting the growth of aquatic

⁸⁹Ibid.

⁹⁰Ibid.

weeds in the Equatorial Lakes region in Uganda such that it would facilitate an unimpeded flow. Also Egypt has tried to promote its relations with Uganda in various other fields in order to expand economic and trade cooperation and other investments as well.⁹¹

Bi-lateral cooperation between Egypt and Kenya has been aimed at developing projects to implement the drilling of groundwater wells for drinking water. The projects have been forecasted in stages; proposing an initial stage of 140 groundwater wells followed by a second stage of another 140. The entire costs of these projects were funded by the Egyptian government.⁹²

In 1997, during a meeting of officials from Tanzania and Egypt in Cairo, Tanzania representatives asked for Egypt to assist its country with issues related to water resources and agriculture. The scope of their requests were geared toward the initiation of programs in hydrological studies which they asked be taught at the University of Dar es Salaam. Egyptian officials went beyond this request and offered to drill a substantial number of underground water wells as a gift from Egypt to the people of Tanzania. These requests (and gestures) were welcomed by both the Egyptian and Tanzanian governments, and Egypt funded the project to drill 30 underground water wells for drinking water which was completed in 2009. Today, the wells are operated by an Egyptian company. Additionally, Egypt funded other projects which later created another 75 underground wells in 2010.⁹³

⁹¹Ibid.

⁹²Ibid.

⁹³Ibid.

In 2004, Egypt and Rwanda signed a memorandum of understanding which addressed a number of areas where the two countries could find greater joint cooperation. The framework for this bi-lateral cooperation was addressed during a visit of Egyptian experts to Kigali, Rwanda in June of 2004. During this visit, both parties discussed the aspects of enhanced cooperation between Egypt and Rwanda in the field of water resources. The main points that were discussed were the development of irrigation systems for agriculture enrichment in Rwanda, the exportation of agricultural products from Rwanda to Egypt, and the establishment of a project aimed at generating hydroelectric power from the waterfalls in Rwanda.⁹⁴

In 2009, while sitting on the sidelines of African summit in Sharm el-Sheikh, the Egyptian President and Vice President of Burundi had a special meeting where they discussed the Water bilateral cooperation between Egypt and Burundi. The meeting reached the conclusion that Egypt would to support Burundi in the technical fields of irrigation and drinking water. The meeting also issued a proposal to hold joint meetings between the agricultural and water officials from the two countries in order to discuss Burundian water resource needs, to support the increase in the number of Burundian trainees coming to Egypt, and to dispatch Egyptian experts to train larger numbers in Burundi.⁹⁵

Since declaring its independence from Ethiopia in May of 1993, Eritrea has had limited relations with Egypt. As a result of the country's brief history and its limited

⁹⁴Ibid.

⁹⁵Ibid.

attention given to the issue of Nile water, the scope of agreements between the two country has been minimal.⁹⁶

Bi-lateral cooperation between Egypt and the DRC is incredibly vital because of the DRC's past trends in supporting Egypt (and Sudan) in gaining rights to Nile water. The relationship between Egypt and the DRC is represented by the joint Egyptian-Congolese committee which was held in Cairo and assured the cooperation between the two countries in a variety of fields. In particular, the DRC has requested special assistance from Egypt in the establishment of Congolese research centers that would train technicians in water management. In addition, the committee addressed other assistance arrangement Egypt which included the generation of hydroelectric power from the Congo River, navigation, agriculture and drinking water. This joint committee signed a protocol for the initial proposals of technical cooperation on the assessment of environmental strategies for the sustainable management of water resources and irrigation between Egypt and DRC.⁹⁷

The table at Appendix C depicts mutual water projects between Egypt and Nile Basin countries.

Summary

The analysis of this study provided a real picture of the current and the future situation of the Nile Basin countries concerning their current uses of and future demands for Nile water. The current uses of water in the Nile Basin countries, especially in Egypt

⁹⁶Ibid.

⁹⁷Ibid.

and Sudan, is barely enough to sustain its populations while the water demands are extremely high. Clearly, given that water resources are continually declining there exist grave threats to Egyptian (and Sudanese) national security.

In the 1990s, Egypt's Nile River quota was about 55 BCM. Its amount of consumption was about 63 BCM per year. Egypt's current population is approximately 84 million people and it has an increasing growth rate of 2.1 percent per year. By 2030, it is expected to be at approximately 100 million people. Meanwhile, in spite of this growth, Egypt's share of water is expected to remain the same. Coupled with a population growth are the demands to implement cultivation and other projects across approximately 3.4 million acres. Additionally, there exist water demands needed for industry, tourism, electrical power and other miscellaneous needs that grow with the rate of the forecasted population.⁹⁸

The Egyptian government seeks to ensure the confirmation of the historical rights of Egypt to Nile water (which is estimated to be about 55 BCM per year according to the Nile Water Agreement of 1959 between Egypt and Sudan). This Agreement also identifies Egypt's share of the revenue of the river in light of the fact that other water sources in Egypt, such as the underground water and the rain water, are limited.

Egypt must address the key challenges associated with the needs for Nile water. These challenges include the lack of a legal comprehensive framework for the Nile Basin countries that would support cooperation between them in order to implement projects that guarantee the interests of all parties who benefit from the Nile waters. Also, the exploitation of the Nile's resources where some Nile Basin countries look to share its

⁹⁸Ibid.

Nile water in return for some sort of aid in return is an issue of great concern. In addition, the intervention of external parties further divides the Nile Basin countries and Egypt.

Most of the Nile Basin countries are funded by foreign investments which try to establish projects on the Nile Basin with the intention to either reserve water for irrigation, or to build dams to generate electricity. Both of these ventures have affected the water share for Egypt and Sudan as well as the estuary of the Nile.

The degrees and the level of the cooperation between Egypt and the rest of the Nile Basin countries has no doubt increased since the beginning of 2009; especially with Sudan, Ethiopia, Tanzania, Kenya, Uganda and Burundi. Since then, there have been many official visits which have been coupled with interviews being held at the highest levels. Many of these meetings and interviews have led to the signing of several agreements and have provided grants and other assistance to Nile Basin countries in the fields of agriculture, drinking water, and electrical generation.

Egypt's water interests should always remain at the top of the list of Egyptian national security interests; especially since those interests are no longer just the interests of one country alone—they are universal. At present, the issue is larger than for Egypt and life in Egypt depends on Nile Basin waters exclusively. It is paramount to Egyptian prosperity and survival that the Nile water problem must come to the forefront of the political movement in Egypt in order to secure its national security both now and for future generations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The research throughout this thesis has shown that the assumptions about the impacts of water scarcity in Egypt impact its national security and thus, answer the secondary and primary questions.

The River Nile draws its water from two main sources, tropical sources, which supply the Nile with about 14 percent of its income yearly, and Ethiopian sources, which supply the Nile with about 86 percent of its income. The Nile Basin includes eleven countries (Burundi - Rwanda - Uganda - DRC - Tanzania - Kenya - Eritrea - Ethiopia - South Sudan - Sudan - Egypt).

The Nile Basin occupies a distinguished location on the African continent, which lies in the middle of three main water bodies, the Mediterranean, the Red Sea, and the Indian Ocean. It also controls two marine passages, the Suez Canal and the Strait of Bab el-Mandeb.

The River Nile is the lifeblood of Egypt, which has depended on its waters for thousands of years in large part due to the lack of alternative sources (unlike the rest of the Nile Basin countries). The annual flooding of the Nile was once sufficient to meet the needs of Egypt dating back to the days of the Pharaohs and up to the beginning of the nineteenth century; however, as a result of the population increase, Egypt has established several projects in an effort to organize and to achieve the best use of its Nile water. Egypt has also signed several agreements with other countries of the Nile Basin in an effort to get them to recognize Egypt's historical right to Nile waters.

The 1959 agreement between Egypt and the Sudan addressed Egypt's quota of Nile water at 55.5 BCM per year; however, Egypt's current needs are constantly growing due to population growth and the demands of continual development. Egypt's estimated water needs in 1997 was about 63.9 BCM per year and is expected to increase in 2017 by additional 21.5 BCM per year. This extreme issue will force Egypt to establish many projects in order to reduce losses of Nile water and to consolidate its relations with the Nile Basin countries in hopes of guaranteeing its quota of Nile water (or in hopes of increasing it).

Nile Basin countries suffer from many problems as a direct result of their roots which were vested in colonialism, regime changes, coups de'tat, and civil war. In particular, the conflict between Ethiopia and Eritrea, the fighting in Sudan and South Sudan, the instability in the DRC, and the continued Kivu threats facing Rwanda, create a semi-permanent climate of instability. Egypt is currently seeking to support and develop its leading role in the Nile Basin at both the regional and global levels. If Egypt is to be successful in this endeavor, it will require enhanced cooperation among the other countries of the region.

During the 1990s, there were numerous of international variables which impacted the nature of the relations among the Nile Basin countries; these variables included the disintegration of the Soviet Union, the dominance of the United States of America as a supreme power, the trend towards economic blocs, and the emergence of 'globalization'. In addition, regional variables affected the relations between Egypt and the rest of Nile Basin countries; most notably was the Israeli intervention in the Nile Basin area, which threatened Egypt's national security from the southerly direction. Despite the regional and

international threats facing Egypt in the Nile Basin, the Egyptian government believes that there it has duties and responsibilities toward the Nile Basin countries; these being political - security - economic - social – cultural. From these responsibilities, the Egyptian government hopes to create a base of common understanding in order to develop the better and more cooperative relations between Egypt and the rest of Nile Basin states.

Political Obstacles to Egyptian National Security in the Nile Basin

The political obstacles which affect the Egypt's national security in the Nile Basin area are:

1. Political instability, internal security, and border problems between the other Nile Basin countries.
2. The subordination of the Nile Basin countries to other major international powers.
3. Ethnic and tribal conflicts and the escalation of many separatist tendencies.

Economic Obstacles to Egyptian National Security in the Nile Basin

The economic obstacles which affect Egypt's national security in the Nile Basin area are:

1. Economic assistance from Western state to the other Nile Basin countries, and the rising of foreign indebtedness to the Basin countries.
2. The Israeli pursuit of economic growth and its influence in the Nile Basin region.

3. The instability of economic conditions, lack of capital, and lack of expertise.
4. High consumption and low savings rates.
5. The lack of shipping lines (land - sea - air) and the non-existence of road networks between Egypt and the Nile Basin countries.
6. The impact of the regional and international economic policies on the region.

Military Obstacles to Egyptian National Security in the Nile Basin

The military obstacles which affect Egypt's national security in the Nile Basin area are:

1. Most of the Nile Basin countries have militaries with limited capabilities and little (if any) modern military industries.
2. Civil wars, tribal conflicts, and the intervention of the armed forces in political situations (coups de' tat).
3. The continuation of foreign influence, and the presence of foreign bases in the Nile Basin region.

Social and Cultural Obstacles to Egyptian National Security in the Nile Basin

The social and cultural obstacles to Egyptian national security in the Nile Basin area are:

1. The spread of poverty, hunger, illiteracy, and poor education.
2. The spread of illegal immigration, human trafficking, and the drug trade.
3. The devastating effects of recurring floods in Nile Basin areas.

4. The lack of media attention in the most of Nile Basin countries (and sub-Saharan region).

Recommendations for Action

The strategic goal for Egypt regarding the Nile Basin is to secure the continuation of the natural flow of the Nile water in order to ensure Egypt's quota, and to develop the water resources in cooperation with the Nile Basin countries in an effort to meet the requirements posed by Egypt's future development plans. In addition, Egypt must seek to reduce the interference of external forces that threaten Egypt's interests in the Nile waters of the Nile.

Within the framework of Egypt's keenness for developing its role on the African continent (including the Nile Basin) it relies on its history and its relations with other African countries to secure not only its own strategic interests, but also those of the other countries in the Nile Basin. It is imperative for the Egyptian government to develop a comprehensive national strategy in all fields which serve its national goals (and survival) in that vital region. The researcher recommends a number of actions which can be taken at the national, regional, and international levels.

First, at the political level, it is important that the Egyptian government find a way to reach an agreement that would result in the signing of the Framework Convention for the Nile Basin Initiative before any events or regional disturbances disrupt the initiative. It is also essential for the Egyptian government to deal with the right political balance when dealing with the governments of Sudan, and South Sudan; especially in light of the on-going conflicts between these countries. Additionally, the Egyptian government should consider the creation of a special department among the various Egyptian

ministries, whose mission it is to plan, manage and coordinate with all government and non-governmental bodies, and the other Nile Basin countries, a future Nile Basin projects initiative which seeks engage the region as a ‘whole’ and not merely as ‘piece parts’.

Second, at the economic level, extending relations between Egypt and the rest of Nile Basin countries is very important as it not only focused on water issues, but includes the regional comprehensive development as it builds capacity. In particular, by using its comparative advantages in the areas of agriculture, industry, trade, finance, construction, and transportation, Egypt can play a key (lead) role in executing and managing many of the projects belonging to the Nile Basin Initiative and lend toward focusing on the projects that aim to reduce water losses in Sudan as a first priority (Jonglei - Machar - Bahr el Ghazal). By starting with the Jonglei Canal Project, Egypt would facilitate a project that would lend and additional 3.5 BCM of water per year to Egypt alone. Moreover, Egypt’s active role in support of the Nile Basin Initiative would also help accelerate the implementation of irrigation projects and power generation for the development of water and electric revenues and hopefully convince the Nile Basin countries of the importance of these projects for all parties involved. In addition to contributing to bilateral cooperation projects with the Nile Basin countries, especially in the area of drinking water (underground water well drilling projects - rainwater harvesting) as implemented with Kenya, Tanzania and South Sudan, and the completion of electrical interconnection projects between Egypt and the rest of Nile Basin countries, Egypt should increase the Fund for Technical Cooperation with Africa. This fund, which has a budget of 150 million (US) dollars per year, is allocated as a separate fund for the

Nile Basin countries only, with a focus on labor-intensive projects that deal with the peoples and individuals.

Third, at the security level, the Egyptian government needs to increase the role of security cooperation with the Nile Basin countries; particularly in the areas of terrorism, illegal immigration, human trafficking, the extradition of criminals, and anti-organized crime. Also it is important to coordinate friendly relations among Nile Basin countries in an effort to ensure the security of maritime navigation in the Red Sea and to resist acts of piracy; thus, safeguarding the traffic between Egypt and the Nile Basin countries.

Fourth, at the military level, it is important that Egyptian military increases its role in the areas of relief, disaster assistance, humanitarian assistance, and peace-keeping in the Nile Basin area by participating in all United Nations and African Union activities in Africa. Egyptian military participation in these initiatives would aim to show the presence of the Egyptian Army, and increase the trust between the Nile Basin countries and Egypt, and its lead role in African affairs.

Fifth, at the social level, it is vital that Egypt should build and fund social projects within the Nile Basin countries. These projects include hospitals, cultural centers, schools, colleges, stadiums, conference centers, and bridges, etc. It is equally important to intensify the relationships between Egypt's civil society organizations and NGOs with their counterparts in other Nile Basin countries in all social fields in order to find a common formula for understanding in common issues which cut across all Nile Basin countries.

Recommendations for Further Study

It is evident from all that has been researched that water scarcity in Egypt has dire impacts not only for Egypt and Sudan as upstream countries, but also for all Nile Basin countries. The debate over the historic rights to water quotas can be made for every country. They can also lead to conflict in the future. The researcher addressed the assumptions surrounding possible conflicts in making recommendations toward the increasing need to propose an appropriate strategy (or strategies) in finding a solution to this problem. Much, much more research is needed to address related issues which also affect Egypt's national security.

First, the continuation of the conflict between Sudan and South Sudan, which began immediately after the secession of southern Sudan, and its impacts on the Nile water share to Egypt that run through both of these countries should be carefully examined.

Second, the role of the external parties, either regional or international powers, which try to harm Egypt's interests in the Nile Basin area by supporting the Nile Basin countries' initiatives to establish dams and other projects on the Nile ways should be studied. The results of these projects and initiatives reduce Egypt's quota of water, and consequently, harm its national security.

Third, the continuation of disputes, wars and military coups on the African continent and their impacts on the nature of relations between Egypt and the rest of the Nile Basin countries needs to be fully dissected. These events allow foreign parties to interfere in the internal affairs of Nile Basin countries and make it difficult for Egypt to pursue their strategic Nile Basin initiatives.

Fourth, Study the most suitable ways to get alternative sources to the Nile water such as groundwater, desalination of sea water, and the creation of projects designed to reduce wastage of the Nile water.

Finally, the impact of the Arab Spring on the relations between Egypt and the Nile Basin countries is a phenomenon that must play out across this vital region. It is important for future researchers to study the future of Egypt after the 2011 Revolution, and the expected strategies for the new regime in Egypt as it bravely steps forward in engaging the Nile Basin and the rest of the world.

APPENDIX A

SUMMARY OF THE AGREEMENTS BETWEEN THE NILE BASIN COUNTRIES

Date	Type	Place	Countries Involved	Nile Water Relevant Articles/Statements	Other Important Subjects
15 April 1891	Protocol	Rome	Great Britain, Italy	The Government of Italy undertakes not to construct on the Atbara River any irrigation or other works that might sensibly modify its flow into the Nile.	Delineation of area governance for both countries in Eastern Africa.
12 May 1894	Agreement	Brussels	Great Britain, Congo		Delineation of area governance for both countries in Middle Africa.
22 Nov 1901	Shared statement	Rome	Great Britain, Congo		Delineation of bound- areas between Sudan and Eritrea.
15 May 1902	Treaty	Addis Ababa	Great Britain, Ethiopia	His Majesty the Emperor Menelik II King of Ethiopia engages himself towards the Government of his Britannic Majesty not to construct or allow to be constructed any work across the Blue Nile, Lake Tana or the Sobat, which would obstruct the flow of their waters into the Nile except in agreement with Great Britain and Sudan.	
9 May 1906	Agreement	London	Great Britain, Congo	The Government of Congo undertakes not to construct or allow any work on or near the Semliki or Isango which would diminish the volume of water entering into Lake Albert except in agreement with the Sudanese Government.	Adjustment of areas of government for both countries in Middle Africa as defined in the Agreements took place in Brussels in 1894
13 Dec 1906	Agreement	London	Great Britain, France, Italy	Fourth article stated that all countries should Cooperation to safeguard the British and Egyptian rights in the Nile Basin; in particular the Blue Nile waters and its branches that enter Egypt and the benefits of those countries in which the river passes through should be taken into consideration.	Cooperation to maintain the current state in Ethiopia.

Dec 1925	Exchanged letters	Rome	Great Britain (representing Sudan), Italy	Italy should recognize the prior hydraulic rights of Egypt and the Sudan in waters of the Blue and White Niles and guarantee not to construct any work the headwaters of the Blue Nile, the White Nile and their tributaries that might sensibly modify their flow into the main river. It is the right of local inhabitants to construct small dams and reservoirs on secondary branches to generate energy and for other localized purposes. Authorization of construction of a reservoir on Tana Lake	Construction of a railway through Ethiopia, from Eritrea to the Italian Somalia.
May 1929	Exchanged letters	Cairo	Egypt, Great Britain (representing Sudan, Kenya, Tanzania and Uganda)	No works that would reduce the volume of the Nile water reaching Egypt would be undertaken on the Nile, its tributaries and lakes in the basin. Egypt has the right to inspect implementation of projects. Agreement on Egypt's ancient rights of the Nile Waters. Egypt has the right to investigate along the whole length of the Nile all the way to the remote sources of the Nile tributaries in these territories.	
23 Nov 1934	Agreement	London	Great Britain (representing Tanzania), Belgium (representing Rwanda and Burundi)	Both sides agreed to return flows withdrawn from the Kagera River for hydroelectric power generation. Half the flows of the Kagera River can be diverted for utilization for industrial demands during minimum flows periods. Countries that wish to use the Kagera River waters for irrigation purposes should inform other countries involved in the Agreement 6 months in advance.	
Jan 1953	Exchanged letters	Cairo and London	Egypt, Great Britain (representing Uganda)	Construction of the Own Falls Reservoir at the downstream end of Lake Victoria which serves as a storage and to control water release for irrigation purposes in Egypt and to produce hydroelectric power for Uganda. Operation of the hydroelectric power station should not affect Egypt's share of water and should not alter the arrival timing of the flows nor reduce their quantities. No change of the flow regime at the outlet of Lake Victoria due to the	

				construction of the Owen Falls Dam. Egyptian Government operates the reservoir by Egyptian Engineers working at the site, while operation and maintenance of the reservoir is the responsibility of the Electricity Council of Uganda.	
8 Nov 1959	Agreement	Cairo	Egypt, Sudan	Interrelated with the Nile Water Agreement of 1929. Present acquired rights 48 km ³ /year for Egypt and 4 km ³ /year for Sudan. Full utilization of the Nile Waters and construction of the High Aswan Dam with Egypt's share of 7.5 km ³ / year and 14.5 km ³ /year for Sudan. Also, construction of Roseires reservoir in Sudan. Minimizing water losses projects in the Gabal and Zaraf Lakes, Ghazal Lake and its branches, Sobat River and its branches and the White Nile Basin. Technical cooperation between the two countries and with other Nile Basin countries. Establishment of the Permanent Joint Technical Commission (PJTC) of the Nile Waters.	
May 1991	Exchanged letters	Cairo	Egypt, Uganda	Compliance with the Agreement in 1953 of the construction of the Owen Falls Dam. Expansion of the hydroelectric power station of Owen Falls Reservoirs. Ugandan can regulate Lake Victoria, when needed, within safe flow margins that will not negatively affect downstream countries.	
July 1993	Agreement	Cairo	Egypt, Ethiopia	Both countries should not embark in any works on the Nile that could harm and affect other countries' share and benefits. Importance of safekeeping and protecting the Nile Water. Compliance with international laws. Consultation and cooperation between both countries for utilization of the Nile water to increase water flows and to reduce losses.	Strengthen the relationship between both countries and avoid intervention in internal matters to maintain stability of the region.
Feb 1999	The Nile Basin Initiative	Dar e salaam, Tanzania	All Nile Basin countries, except Eritrea	The Nile Basin Initiative's Shared Vision Program (SVP) is designed to help realize the shared vision of the Nile basin countries:	Membership of NBI now includes all Nile riparian

				harnessing the resources of the river to create a better life for the [300 million people] who depend on it.	countries
May 2010	Cooperative Framework Agreement	Kigali, Rwanda	Ethiopia, Kenya, Uganda, Rwanda and Tanzania were original signatories with Burundi signing in February 2011	Five upstream states signed a Cooperative Framework Agreement to seek more water from the River Nile, and to cancel the 1959 Agreement.	A move strongly opposed by Egypt and Sudan

Source: Magdy Hefny and Salah El-Din Amer, "Egypt and the Nile Basin," *Acquatic Sciences* 67 (2005): 42-50, <http://faculty.washington.edu/lorenz/Student%20Writing/week%20seven/Egypt-Nile2007.pdf> (accessed 9 May 2012).

APPENDIX B

OVERVIEW OF WATER PROJECTS IN THE NILE BASIN

Project	Objective	Description	Status
Nile Transboundary Environmental Action	Provide a strategic framework for environmentally sustainable development of the Nile River Basin	Identifying environmental and development synergies contributing to sustainable development opportunities will be an important task. Improve understanding of the relationships of water resources development and the environment in the basin	The project has made significant progress in implementing planned activities
Nile Basin Regional Power Trade	Establish the institutional means to coordinate the development of regional power markets among the Nile Basin countries	The present limited development of national power systems in the basin imposes a constraint on the exploitation of these resources at affordable costs at the national level. These constraints on supplying affordable power could be overcome by expanding the market for these resources by developing power trade among Nile Basin countries	Significant progress has been made in each of the components
Efficient Water Use for Agricultural Production	Provide a sound conceptual and practical basis to increase availability and efficient use of water for agricultural production	Irrigation is the dominant human use of water in the basin and that agriculture is an important element of the economies of all riparian countries in terms of employment, exports, and contribution to GDP. Hence, the judicious use of this resource in the sector is critical	Project personnel are in place and project activities are picking up
Water Resources Planning and Management	Enhance the analytical capacity for basin wide perspectives to support the development, management, and protection of Nile Basin waters	Components of water resources management that help in furthering cooperation include effective policies and implementation strategies, project planning and management skills, and communication and decision making tools	All the staff are in place and project activities are picking up
Confidence Building and	Develop confidence in	Confidence in regional cooperation and full stakeholder involvement are	Various types of workshops and trainings

Stakeholder Involvement	regional cooperation under the NBI, both at basin and local levels, and ensured full stakeholder involvement in the NBI and its projects	prerequisites to sustainable socioeconomic development and poverty reduction	are being conducted by the project
Applied Training	Strengthen capacity in selected subject areas of IWRM; strengthen centers with capacity to develop and deliver programs on a continuing basis	Most of the basin countries are burdened by weak human and institutional capacity to manage water resources in an integrated manner. This situation applies not only to the management of international waters but also to management of national waters	A number of training courses, seminars, long-term training, curriculum development are being conducted
Socioeconomic Development and Benefit Sharing	Strengthen Nile River basin wide socio-economic cooperation and integration	Broader cooperation could enable enhanced intra-regional trade and promote investment in the region's infrastructure, such as roads, rail, and telecom links that could increase the productivity of all countries within the region and allow them to develop more rapidly and trade more effectively both within and beyond the region	Although the project started late, activities of the project are picking up

Source: Egypt State Information Services, "Egypt and Nile Basin Countries," <http://www.sis.gov.eg/En/Story.aspx?sid=191> (accessed 9 May 2012).

APPENDIX C

MUTUAL WATER PROJECTS BETWEEN EGYPT AND NILE BASIN

Country	Egypt
Kenya	<ul style="list-style-type: none"> - Egyptian exports to Kenya in 2010 reached \$232 million as compared to the 2009 figure of \$120 million; imports from Kenya in 2010 reached \$228 million. The balance of trade in 2008 tipped by \$66 million in Kenya's favor. - The projects have been forecasted in stages; proposing an initial stage of 140 groundwater wells followed by a second stage of another 140. The entire costs of these projects were funded by the Egyptian government
Tanzania	<ul style="list-style-type: none"> - Egypt has trained Tanzanian doctors, pharmacists and medical staff. The Cairo-Dar es Slam air route contributed to the increase of Egyptian exports to Tanzania in 2010 by 72%. - Egypt funded the project to drill 30 underground water wells for drinking water which was completed in 2009. Today, the wells are operated by an Egyptian company. Additionally, Egypt funded other projects which later created another 75 underground wells in 2010
Rwanda	<p>Two Egyptian companies are currently working in Rwanda. A project is being carried out to extend two railroads in east Africa.</p>
Sudan	<ul style="list-style-type: none"> - Official visits were exchanged between the two countries to promote mutual economic interests particularly in the field of agriculture and investments. - The two countries maintain identical views with regard to protecting their interests and safeguarding their water quotas as downstream countries. - Egypt funded the project of drilling of 60 underground wells in Darfur.
South Sudan	<ul style="list-style-type: none"> - The Egyptian diplomacy has paved the way for strong economic ties with South Sudan. In addition to direct flights being operated between Cairo and Juba, a National-Bank-of-Egypt branch has been opened in Juba. - Egyptian businessmen have expressed willingness to invest in the fields of agriculture and livestock in South Sudan. - Egypt has offered 400 scholarships to Southern Sudanese. - Egypt has established numerous schools and carried out a number of infrastructure projects such as roads, airports and power stations there. - Egypt has sent several medical convoys to South Sudan. - Egypt has offered a \$6.62 million grant to clear the Bahr al-Ghazal region, build river dockyards, dig subterranean wells and build a dam to generate power and cultivate 40,000 acres.
DR Congo	<ul style="list-style-type: none"> - A \$5.01 million cooperation agreement was signed between the two countries to build 10 dams and dig 30 wells - A military cooperation agreement was signed in 1980 whereby Egypt would train Congolese army officers. - Egypt helps DR Congo manage its water resources. - DR Congo has lately announced it would not compromise

	Egypt's water interests.
Ethiopia	- In 1993 Egypt and Ethiopia signed a cooperation framework to develop the water resources for the two countries. This framework also established a mutual mechanism for consultation on the Nile waters and focused on the preparation of a comprehensive and integrated plan to increase the flow of the water and to reduce its waste. This framework was followed by the signing of many subsequent agreements between Egypt and Ethiopia in the fields of trade, economy, agriculture, energy, and industry.
Uganda	- Cooperation between Egypt and Uganda was limited to some projects and were mainly funded by Egypt. These projects were aimed at restricting the growth of aquatic weeds in the Equatorial Lakes region in Uganda such that it would facilitate an unimpeded flow. . Also Egypt has tried to promote its relations with Uganda in various other fields in order to expand economic and trade cooperation and other investments as well.
Burundi	- Egypt would to support Burundi in the technical fields of irrigation and drinking water. The meeting also issued a proposal to hold joint meetings between the agricultural and water officials from the two countries in order to discuss Burundian water resource needs, to support the increase in the number of Burundian trainees coming to Egypt, and to dispatch Egyptian experts to train larger numbers in Burundi
Eritrea	- Eritrea has had limited relations with Egypt. As a result of the country's brief history and its limited attention given to the issue of Nile water, the scope of agreements between the two country has been minimal

Source: Egypt State Information Services, "Egypt and Nile Basin Countries," <http://www.sis.gov.eg/En/Story.aspx?sid=191> (accessed 9 May 2012).

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