

American University in Cairo

AUC Knowledge Fountain

Archived Theses and Dissertations

November 2021

Cooperation in the eastern Nile basin

Paul L. Rau

The American University in Cairo AUC

Follow this and additional works at: https://fount.aucegypt.edu/retro_etds



Part of the [International Relations Commons](#)

Recommended Citation

APA Citation

Rau, P. L. (2021). *Cooperation in the eastern Nile basin* [Thesis, the American University in Cairo]. AUC Knowledge Fountain.

https://fount.aucegypt.edu/retro_etds/2446

MLA Citation

Rau, Paul L.. *Cooperation in the eastern Nile basin*. 2021. American University in Cairo, Thesis. *AUC Knowledge Fountain*.

https://fount.aucegypt.edu/retro_etds/2446

This Thesis is brought to you for free and open access by AUC Knowledge Fountain. It has been accepted for inclusion in Archived Theses and Dissertations by an authorized administrator of AUC Knowledge Fountain. For more information, please contact fountadmin@aucegypt.edu.

THE AMERICAN UNIVERSITY IN CAIRO
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF POLITICAL SCIENCE

COOPERATION IN THE EASTERN NILE BASIN

PAUL L. RAU

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARTS IN POLITICAL SCIENCE

JUNE/2011

TABLE OF CONTENTS

Chapter 1: Introduction	1
Chapter 2: The Concept of International Regimes.....	5
Chapter 3: Historical Background.....	11
Overview.....	11
Egypt and the Nile	15
Ethiopia and the Nile	27
Sudan and the Nile Basin.....	35
The Complex History of Conflict and Cooperation the Eastern Nile Basin.....	42
Egypt-Ethiopia Relations	42
Sudan-Ethiopian Relations.....	46
Egypt-Sudan Relations.....	51
The Sudanese Partition	58
The Pressure on the Nile	61
Population Growth.....	61
Water Scarcity.....	63
Chapter 4: Cooperation and the Nile Basin Initiative	69
Early Post-colonial Nile Cooperation	69
The Nile Basin Initiative.....	72
Chapter 5: The Determinants for Cooperation in the Eastern Nile Basin.....	78
The Benefits of Cooperation.....	78
The Implausibility of Water Wars	83
Addressing Domestic Politics	86
Chapter 6: The Eastern Nile Basin Regime Organization	92
Flexible Water Sharing	92
Pollution Controls	97
Joint Hydroelectric Investment	101
Chapter 7: Conclusion.....	107
Bibliography	114

CHAPTER 1

INTRODUCTION

One of the most critical challenges in international relations is the management of transboundary waterways. This is because transboundary waterways, by nature, challenge those whom are involuntary partners to cooperate jointly to manage a shared resource in which they very likely have perceived conflicting interest. Economic, environmental, cultural and security issues introduce challenges for all countries involved as each user has different needs from the same source. One country, for example, may see a transboundary river as purely a source of irrigation, while another may be dependent on the river for power and for industrial use, and still further down the river a country may depend on the river as their only source of drinking water and irrigation. The nature of transboundary waterways can make it problematic for states to act unilaterally because each country's' actions effect each other's shared resource directly and indirectly. Conversely, it can also make it difficult to act cooperatively, because it use of scarce resources such as water from a river are often perceived as a zero-sum. This is especially the case in the Eastern Nile Basin.

There are major disparities in contribution to watershed yield and national dependence on the watershed between the countries of the Nile Basin. At one extreme Egypt is dependent on the Nile for 99 percent of its renewable water supply, but contributes virtually nothing.¹ At the other extreme is Ethiopia contributes 85 percent of the water to the watershed and yet only utilizes

¹ Aquastat, "Irrigation in Africa Facts and Figures: Egypt," *Aquastat* (2006), 4.

approach to the basin's management in the post-colonial era. Despite the fact that throughout the river's long history this lack of cohesion has been the catalyst numerous diplomatic disputes and various minor conflicts, the Nile River has usually managed to offer enough water to sustain the major populations that depend on it. The Nile's sustainability is no longer certain as populations in Egypt, Sudan and Ethiopia are slated to increase significantly over the next century, putting an even more unsustainable demand on the river's sub-basin than we see today. Additionally, Ethiopia, the source of most of the Nile water, is seeking to develop their domestic water resources as a way to alleviate poverty and develop their struggling economy. Sudan and Egypt have deemed this a threat to their resource security as this disrupts the status quo that has allowed the downstream countries unrivaled access to the Nile. Without a path to a cooperative approach to basin management, Egypt and Ethiopia are on a collision course that Egypt may not be able to survive.

Faced with these political and resource security challenges, a new path for cooperation needs to be adopted. What method of cooperation should be adopted to ensure the river will be fairly used by all members? Additionally, what are the political determinants for cooperation to take place in the basin? Finally, what would a mutually beneficial relationship look like in the Eastern Nile Basin?

I contend developing a multinational regime based upon an organization concept⁵ offers a substantial opportunity for the countries of the Eastern Nile Basin to manage their shared resource collectively in a manner in which the countries will share the burden and payoff. While regimes do not necessarily agree upon outcome, they generally agree upon scenarios they wish to

⁵ Organizational concept: As discussed in *International Cooperation: Building for Natural Resources and the Environment* by Oran R. Young.

avoid.⁶ In this paper I will argue for a regime to be developed with the goal of avoiding unsustainable use of the Nile River. Yet it is important to recognize, the path to cooperation often is more challenging than the cooperation itself. I contend the primary three political determinants serve as prerequisites to cooperation in the basin. Firstly, Egypt and Sudan must concede that seeking a cooperative regime in the basin affords them more authority than they will hold devoid of a regime in place.⁷ Secondly, all of the countries of the Eastern Nile Basin need to accept that war is not an option to secure water security in the basin, and nationalist rhetoric only makes future cooperation on such a sensitive issue more difficult. Thirdly, governments will need to prepare their citizens for the challenges and benefits that cooperation will entail by adjusting domestic policies and utilizing domestic public diplomacy. To address the question of what a mutually beneficial regime will include, I will make a case for an organization to be based upon cooperation in the issues flexible water sharing, pollution controls and joint hydrological project development.

⁶ James E. Dougherty and Robert L. Pfaltzgraff, *Contending Theories of International Relations: A Comprehensive Survey*, Third ed. (New York: Harper & Row Publishers, 1990), 168.

⁷ This paper will adopt the definition of regimes by Oran R. Young who defines them as social institutions governing the actions of those involved in specifiable activities. Oran Young, *International Cooperation: Building Regimes for Natural Resources and the Environment* (Ithaca, New York: Cornell University Press, 1989), 12.

CHAPTER 2

THE CONCEPT OF INTERNATIONAL REGIMES

The 21st century world is more interconnected and interdependent than any time in history. As populations grow, new countries are born, armed conflict is becoming less of a viable option and globalization takes hold, international cooperation has become imperative to cope with the challenges that are associated with a more interconnected society. International regimes are a key function in facilitating international cooperation as they serve a number of roles in the international system, and the conceptual framework of regime theory is what this paper is built upon. Oran R. Young defines regimes as "social institutions governing the actions of those involved in specific activities or a set of activities". Within the social institution there are detailed or sometimes assumed norms, principles and decision-making actions that can follow a formal or informal format which come together to address an agreed upon issue. Young divides international institutions into two distinctive subsets: international orders and international regimes. International orders are larger more broad frameworks that govern over all members of the international society. The international economic order, for example, is an overarching framework that a number of smaller arrangements are within. International regimes, on the other hand, are much more specifically focused. They generally have commonly understood interests, activities and member states participate voluntarily.⁸ The International Commission for the Protection of the Rhine (ICPR) is an illustration of an international regime. The ICPR was

⁸ *ibid.*, 13-4

developed with the stated goal of combating pollution in the river.⁹ The regime is limited to the basin countries that share the basin and has a very precise aim which is to avoid polluting a river.

A regime's effectiveness is determined by their ability to exert pressure on their members to respect its outlined rights and conform to the regimes stated rules. Regimes by nature promote order to the activities it governs, and at their nucleus is its collection of rights and rules. Rights are anything the member of the regime is entitled to which are expected to be respected within the regime. A nation has the right to self-defense, a group may have the right to practice their respective religion freely or a riparian may have the right to utilize water in a river basin for example. Although rights may be outlined within a the context of an international regime, they are often violated.¹⁰

Rules are specific guides that outline the accepted practices and standards that regime members are expected to abide by. According to Young, any rule displays the following characteristics: an indication of the relevant subject group, a behavioral prescription and specific circumstances in which the rule is operative. Young also cites three types of rules: use rules, liability rules and procedural rules. Use rules are associated with safety rules, limitations on actions, or restrictions on use. This paper, for example, will call for the development of a basin management regime that will encompass use rules that put limitations on the amount of Nile water used by each country. Liability rules deal with the responsibility of the another member to compensate another member for injury they inflicted upon them. If a country excessively pollutes a river for example, they may be responsible for compensating those downstream by the

⁹ "EUROPEAN ECONOMIC COMMUNITY—FRANCE—FEDERAL REPUBLIC OF GERMANY—LUXEMBOURG—NETHERLANDS—SWITZERLAND: CONVENTION ON THE PROTECTION OF THE RHINE AGAINST CHEMICAL POLLUTION," *International Legal Materials* 16, no. 2 (-03-01, 1977), 242.

¹⁰ Young, *International Cooperation: Building Regimes for Natural Resources and the Enviroment*, 15

rules of the river management regime. Procedural rules are the rules that are followed to operate the regime or to handle dispute resolution.¹¹ A procedural rule may state that basin members meet on the first Friday of every month, or disputes must be filed within 60 days of the offense taking place. In many international regimes, rights and rules are accompanied by the use of regulations and carefully placed incentives by member states at local to alter behavior and promote compliance domestically. This can be in the form of tax subsidies as an incentive or strict fines for noncompliance as a deterrent.¹² In this paper I will propose Egyptian and Sudanese investment can incentivize efficient water use in Ethiopia.

When discussing regimes it is important to differentiate between an agreement and a regime. Robert O. Keohane defines agreements are often considered "one-shot" formal arrangements, while regimes facilitate continual discussion and agreements that are expected to endure shifts in politics or interests.¹³ Regimes can be developed as a result of an agreement or to enforce rules within an agreement, but the occurrence of an agreement does not necessitate the development of a regime. An agreement to share water from a river may need a regime to monitor use, but an agreement that demarcates borders between two countries will most likely not require a regime to monitor it after the border line is decided upon.¹⁴

Regimes are not conceived on their own accord. They often derived to observe agreements, but they can also originate from states' mutual desires to avoid or achieve outcomes or states' desires to gain power or control the narrative of an issue. Keohane contends regimes are derived from deliberate agreements among legally equal actors seeking outcomes that could not

¹¹ *ibid.*, 17

¹² *ibid.*, 17

¹³ Stephen D. Krasner, *International Regimes* (Ithaca, New York: Cornell University Press, 1983), 2.

¹⁴ Young, *International Cooperation: Building Regimes for Natural Resources and the Environment*, 24

be obtained by uncoordinated actions motivated by self-interest. This is considered the structural realist perspective.¹⁵ This paper adopts this position and argues that Egypt and Sudan should seek the development of a regime because the uncoordinated Eastern Nile Basin management is unsustainable, and even a suboptimal outcome produced by a regime is superior to a unilateral approach. .

The structural realist perspective of regimes is that they are born from states seeking to maximize

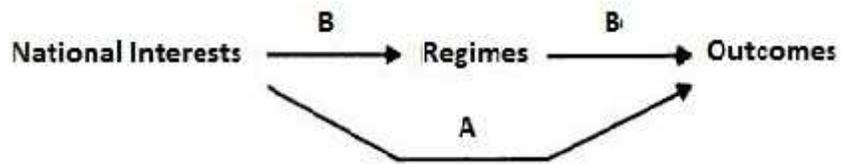


Figure 2: Structural Realist view of regimes (source: Stephen D. Krasner, *International Regimes* (Ithaca, New York: Cornell University Press, 1983), 8.)

their power and self-interests. In the figure above, two paths are offered to "outcomes". Path (A) is the standard path for states to pursue national interests as they are sovereign actors in the international arena. If a state can achieve their desired goal without a regime they will generally do so. Path (B), on the other hand, is the alternative route often chosen when path (A) is too costly monetarily or politically, or if it leads to less desirable outcomes.

Applying this to the case of the Eastern Nile Basin, "national interests" represents Egypt or Sudan's desire for water security. Path (A) would be the countries acting unilaterally to ensure water security by means of coercion, outright war, seeking water from alternative sources or by seeking a political solution. In the circumstance of the Eastern Nile Basin, path (A) is proving to be fruitless in achieving a desirable "outcome" or predictable level of water security for Egypt and Sudan. This paper argues path (B) offers the potential for an outcome more desirable than path (A) in this instance. It may not offer an optimal outcome, but will offer structured

¹⁵ Krasner, *International Regimes*, 7

predictability that will be more beneficial to Egypt and Sudan than their current situation. Moreover, because of the geographical makeup of the basin affords Egypt and Sudan little influence on how much water they actually receive under path (A), path (B) potentially offers the countries greater power and influence over the flows of the river which will be a maximization of their self-interests.

Regimes fall into two categories, institutions and organizations, according to Young. Institutions are defined as social structures with easily understood roles that are accompanied by rules or conventions that govern the relations among the those whom occupy the defined roles. The rules and rights form, what Young calls, the "superstructure" of the institutions as they link the actors. An electoral system is an example of an institution, as candidates interact with potential voters and campaign within a defined framework that prescribes when elections can be held, who can be a candidate and who is allowed to vote. Markets are another example. Buyers interact with sellers under defined and understood rules of exchange that form the superstructure of the specific market. Institutions lend organization, order and stability to international relations by setting up a regulated networks that serves as forums for state interaction even though they do not generally have to be material entities.¹⁶

Organizations also lend predictability and order to international relations, but are physical entities with headquarters, offices, staff and budgets. Because organizations are physical in nature, they have the ability to act in the legal arena. They can own property and enter into contracts. Organizations can also sue and be sued, and adopt political positions. Organizations exists within governments, between governments and in the private sector. The membership and participation in the organization is voluntary, and all members accept the organizations stated

¹⁶ Young, *International Cooperation: Building Regimes for Natural Resources and the Enviroment*, 31-2

rules and rights. Since organizations are "brick and mortar" regimes they also can perform key functions that are difficult for decentralized institutions like dispute resolution, collective decision making and data collection. Additionally, organizations can share the costs associated with performing their specific activities amongst its members. The United States Bureau of Land Management, the United Nations, the Nile Basin Initiative and the National Rifle Association are all considered organizations.¹⁷

This paper argues for the development of a regime organization to facilitate the cooperation between the countries of the Eastern Nile Basin. I contend that Egypt and Sudan should be seeking the development of this regime based upon the structural realist perspective that states naturally seek to increase their interest and power, and the regime offers the greatest opportunity to gain this power. Moreover, I argue Ethiopia stands to benefit significantly from the agreement, as it offers the country a forum to seek concessions from downstream countries for it to act in the their desired manner. All states stand to benefit from an organizational regime in the basin as it will provide a forum with functions that will provide order, stability, predictability and consistency to what has the potential of being a very chaotic situation.

¹⁷ *ibid.*, 32-50

CHAPTER 3

HISTORICAL BACKGROUND

To adequately understand a way to move forward in managing the Eastern Nile Basin in context, it is critical to understand history of the river and the politics that surround it. This section will begin with a brief history of the Nile's treaties which will be followed by a discussion of the role of the river plays in individual country, the international relations history of the three countries and conclude by discussing past and present cooperative regimes in the basin.

Overview

The size and scope of the Nile River are what make it the arguably the most difficult river system in the world to manage. Flowing through ten countries and for over 6,800 kilometers spanning through the north-east African region, the Nile river system spans more than 35 degrees of latitude and is the largest international river system in the world. The river has two main tributaries. The White Nile, fed by runoff from the Rwenzori Mountains, originates in Burundi. It offers a small, but reliable flow that travels through the Equatorial Lakes, and Sudd swamps of Southern Sudan before converging with its much larger partner tributary, the Blue Nile. The Blue Nile, the significantly larger; but less consistent of the two tributaries, contributes 86 percent of the Nile river's flow reaching Aswan. Originating in the Ethiopian highlands, the Blue Nile moves water from Lake Tana south, before moving west, then north towards Sudan to join the White Nile.¹⁸

The Nile Valley served as the home to some of the world's oldest civilizations and was once able to nourish all of those whom resided on its banks. Serving as the cradle of civilization,

¹⁸ Yacob Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics* (Zurich: Center for Security Studies, Swiss Federal Institute of Technology, 2007).

it has sustained its surrounding inhabitants for thousands of years. The Aksumite Empire of ancient Ethiopia, the early Sudanese State of Merowe and the Pharonic civilizations of Egypt were rooted deeply within the Basin. While Ethiopia has been able to develop without complete reliance the Nile because of inconsistent but ample rainfall, for Egypt and Sudan the river still represents the primary source of life as they are still at the mercy of the river's flow for their subsistence. The Nile provides irrigation for agriculture, drinking water, fish and electricity for millions who inhabit the Nile basin. For many countries in the Nile Basin, the River represents an opportunity to develop and expand their economy; the river's flow embodies the means for survival for the two most downstream countries, Egypt and Sudan.

While during the early 20th century Egypt enjoyed the benefits of being a colonist's most favored child, many of the upstream countries had been struggling for leftovers. Benefitting from the legacy of the colonial past has encouraged Egypt to adopt a primarily unilateral approach to Nile water management, while threatening and actively disrupting those who sought to alter the status quo. This method of Nile water management has benefited Egypt by allowing it to grow at an unrestricted level, while adopting measures discouraging development in other Nile Basin countries.

A history of the previous treaties on the river offers a clear picture of how Egypt came to hold its current position. Although the first bilateral agreements pertaining to Nile water rights between Nile Basin countries was not signed until 1959, several treaties were devised by colonial powers that recognized Egypt's concerns about Nile water. Italy and Britain agreed on the Anglo-Italian protocol of 1891 that prevented the construction of any new irrigation on the

tributary of the Nile, Atbara, which originates in Ethiopia.¹⁹ In an effort to further secure Nile river rights to Sudan and Egypt (under British control) an agreement was signed between Britain and Ethiopia signed in May of 1902, which is still in dispute today. The agreement of 1902 is one of the most contentious of the Nile river agreements as its language has been subject to multiple interpretations. While the primary goal of the treaty was to demarcate the border between Ethiopia and Sudan, article III of the agreement pertains to the Nile specifically. The dispute originates from the differently worded Amharic and English versions of the agreement. The newly independent Ethiopian government led by Haile Selassie I, would not permit anyone to build structures that would "completely block the passage of waters to the White Nile without securing a prior agreement with the Government of England." Egypt and Sudan, contend that this agreement forbids the construction of any projects that diminish the flow of the Nile without permission, and requires Ethiopia to seek their approval in the absence of the former colonists.²⁰ This has been claimed by Sudan and supported by Egypt whom has backed these claims with economic and military threats. Building from the agreement of 1902, an agreement cut from the same thread was reached between Congo and Britain restricting development along the White Nile which secured the free flow of Nile water to Sudan and Egypt.²¹

The Nile Waters agreement of 1929, established an exceptionally one-sided allocation of water rights for Egypt by allocating of 48 billion cubic meters of annually to the country and allocating an additional 4 billion to Sudan. The agreement, was only an exchange of notes between the British High Commission in Cairo and the Egyptian government, and did not

¹⁹ Ashok Swain, "Ethiopia, the Sudan, and Egypt: The Nile River Dispute," *The Journal of Modern African Studies* 35, no. 4 (-12-01, 1997), 676.

²⁰ Daniel Kendie, "Egypt and the Hydro-Politics of the Blue Nile River," *Northeast African Studies* 6, no. 1 (-01-01, 1999), 156.

²¹ *ibid.*, 157

involve any of countries outside of Egypt and British controlled Sudan.²² In addition the agreement stipulated “no works were to be constructed on the Nile or its tributaries or its equatorial lakes, so far as they were under British jurisdiction, which would alter the flows entering Egypt without prior approval. Ethiopia and the other counties along the Nile basin were not included in the agreement”.²³ Despite the fact the Nile Waters Agreement of 1929 didn’t involve any other stakeholders aside from the British and Egyptians, it represented the means of regulation on the river until the Nile Waters Agreement of 1959.

After the Egyptian Revolution of 1952, the local administration in the Sudan set in motion demands for the Nile Water Agreement of 1929 to be renegotiated, as it ultimately represented a unilateral one-side agreement that was negotiated by a colonial power and Sudan was hoping to gain independence. These demands became more boisterous as the Anglo-Egyptian agreement of 1953 allowed the Sudanese the opportunity to decide whether they wanted to become independent or unify with Egypt. Sudan overwhelmingly rejected the unification, electing to choose independence. Following the inauguration of Sudan’s first Prime Minister Ismail al-Azhari in 1956, a tenuous period ensued between the two countries as Azhari immediately called for a revision to the 1929 Nile Water Agreement. This was followed by the Sudanese government unilaterally declaring their non-adherence to the 1929 Nile Waters Agreement. This move motivated Egypt to move additional army units to the Egypt-Sudanese border as a show of force.²⁴

²² Swain, *Ethiopia, the Sudan, and Egypt: The Nile River Dispute*, 677

²³ Robert O. Collins, *The Waters of the Nile: Hydropolitics and the Jonglei Canal, 1900-1988* (Princeton: Markus Wiener Publishing, 1996).

²⁴ Swain, *Ethiopia, the Sudan, and Egypt: The Nile River Dispute*, 679

Tensions between Khartoum and Cairo diminished following a military takeover in Khartoum in 1958. The new regime headed by General Ibrahim Abboud had a much more favorable attitude towards Cairo, which was demonstrated by their willingness to enter in to a new Nile Water sharing agreement in 1959. In this agreement, Egypt gained Sudan's acceptance of the controversial Aswan High Dam project, and Egypt was only required to pay Sudan 15 million Egyptian pound as compensation for those who were forced to resettle due to the expansion of Lake Nasser which was to result from the project. The new agreement also offered minimal concessions to Sudan as Egypt was allocated 55.5 billion cubic meters of Nile water, while Sudan only received 18.5 billion with a further provision mandating the division of any new water sources. This simply represented an increase in both of their declared entitlements to the Nile's water, and a decline the amount of water that remained unallocated. This can be perceived as a very easy compromise for Egypt to make since the Nile River seemed to have a bottomless supply of water, none of which originates in either country. Furthering the new terms of cooperation between the two nations, in 1960 they signed a joint protocol establishing a cooperative regime organization, the Permanent Joint Technical Committee, to collaborate on further Nile projects.²⁵

Egypt and the Nile

Throughout history great waterways have played critical roles in the development of civilizations. Many civilizations owe their mere existence to a conveniently positioned waterway or strategically positioned port of call. Egypt and the civilizations that previously resided in its borders fall under this observation, as their existence and longevity as civilizations were deeply rooted in the Nile River. Egypt has always depended on the Nile as the country was even termed

²⁵ *ibid.*, 679

“the gift of the Nile” by the Greek Historian Herodotus.²⁶ When compared to its neighbors to the east and west, Saudi Arabia and Libya it is obvious the immense difference the river plays in Egypt’s development and existence.

Egypt's primary renewable fresh water source is the Nile River. From the Nile, Egypt is allocated 55.5 cubic kilometers of water per year based upon the previously mentioned Nile River Agreement from 1959, but often receives more as the country is the last before the Nile reaches the sea. Egypt also has a small amount of domestic renewable fresh water sources. It is estimated the country receives .5 cubic kilometers of surface fresh water from domestic resources and 1.3 cubic kilometers of fresh groundwater annually bringing the approximate average available total fresh water resources of the country to an estimated 57.3 cubic kilometers annually. Additionally the country treats domestic waste water which contributes approximately 3 cubic kilometers of fresh water and several desalinization plants on the Red Sea and Mediterranean coasts contributing another 100 million cubic meters primarily used by the resorts and hotels in the area.²⁷

Of Egypt's fresh water resources, 86 percent is dedicated to agriculture, 8 percent is used domestically and the remaining 6 percent is used for industry.²⁸ Fresh water is the represents a critical input in the Egyptian economy as the country's agricultural sector represents 13 percent of the gross domestic product, and one third of the entire country's employed workforce.²⁹ Although Egypt is self-sufficient in terms of most agricultural commodities with the exception of oils, cereals, animal feed and sugars, the country is still one of the world's largest food importers

²⁶ Salah Amer and Salah El-Din Amer, "Egypt and the Nile Basin," *Aquatic Sciences* 67, no. 1 (-03-01, 2005), 42.

²⁷ Aquastat, *Irrigation in Africa Facts and Figures: Egypt*, 3

²⁸ *ibid.*, 4

²⁹ CIA, *CIA World Fact Book: Egypt* (: Central Intelligence Agency, 2011).

as it has already utilized 100 percent of their available fresh water resources and agricultural land.³⁰ This poses a major challenge for the country as based upon current water and agricultural conditions, the country is unable to provide itself sufficient amounts of staple items. Importing at large percentage of staple food items leaves the country at the mercy of fluctuating international food markets to provide its citizens with basic items like bread and rice. It has also put significant strain on the government budgets of the Eastern Nile Basin as food subsidies and food aid are commonplace throughout the countries.

Hydropolitics have shaped Egypt's foreign policy because of food and water security concerns as the Nile River provides 96 percent of the country's renewable freshwater and is the most critical element of the country's sustainability.³¹ As the primary input for nearly every aspect of Egypt's development, the Nile is being put under increased pressure as demands for water are escalating to meet the needs of a growing population, increased food production, industrialization and other means of economic development. The pressure being put on this resource is so immense that resource security, in terms of the Nile River water, has elevated to an issue of national security for the country.³²

This elevation of the water security to national security issue is not new to Egypt as all of the countries previous leaders and colonizers have sought to control the Nile. Early in Gamal Abdel Nasser's tenure as leader of Egypt he claimed to be seeking to unify the Nile Valley by merging Sudan with Egypt, but this goal of seeking unity left many of the Nile Basin countries the impression that unity was aimed at coercing them to relinquish their newly gained sovereignty. Egypt's history of defending one-sided unilateral agreements regarding the Nile

³⁰ Aquastat, *Irrigation in Africa Facts and Figures: Egypt*, 2

³¹ Amer and Salah El-Din Amer, *Egypt and the Nile Basin*, 42

³² Kendie, *Egypt and the Hydro-Politics of the Blue Nile River*, 157

River while meddling in the domestic political affairs of other basin states has left many riparians weary of the country's intentions.

Efforts to secure Nile water were consistently a motive for Egypt to seek greater influence in the basin. Despite the fact Egypt could not control their upstream neighbors, they often could weaken their neighbors domestic stability make it difficult for them to change their utilization of the water of the Nile. Egypt's participation in the Ethiopia-Eritrean conflict is a fine example of this. The Arabs failed to claim Eritrea outright following the defeat of the Italians during World War II, but Nasser saw Eritreans as a weak point in Ethiopia's territorial armor, and sought to capitalize on it. During the conflict, Radio Cairo broadcasts were targeted Ethiopian Muslims in an effort to appeal to their religious beliefs by often reminding the Muslim Ethiopians where there "primary loyalties" should lie. Additionally, Egypt began offering scholarships to Eritrean Muslims at Al-Azhar University. As a consequence, Egypt became the center for Eritrean Student Union in the Middle East. In a further effort to undermine Ethiopia's government, in 1958 a small military training camp for Eritreans was opened near Alexandria. Many of Eritrea's future commanders received training there.³³

Egypt enjoyed increased influence in the Nile Basin as a direct result of their interference in the Ethiopian-Eritrean dispute. Just as Ethiopia was declaring Eritrea as its 14th province by dismantling Eritrea's UN-sponsored federal status, Egypt established an office in Cairo for what came to be known as the Eritrean Liberation Front (ELF) in 1960. Taking advantage of religious divisions, anti-Zionist and anti-colonial sentiment, Egypt, under Nasser's leadership, used propaganda religious symbols to influence regional policy and turn what was primarily an Ethiopian issue into an extension of the Arab-Israeli conflict. While elevating the Eritrean-

³³ *ibid.*, 154

Ethiopian conflict relevance in the region benefited Egypt in a number of ways, it has been argued Egypt's primary motivation was to promote enough insurrection inside Ethiopia divert Ethiopia's resources away from projects on the Nile. Egypt's actions during the Eritrean-Ethiopian conflict are considered to have contributed to the destabilizing of Ethiopia who were unable to take on any major Nile development projects during the 30 year conflict.³⁴

Anwar Sadat adopted a similar approach to the Nile as Nasser. Ethiopia was struck by excessive drought in the 1970s and 1980 and suffered a significant loss of human life and property loss. In an effort to mitigate the drought's damage, the Ethiopian government began to take out feasibility studies in the Lake Tana area in hopes to develop new irrigation projects. Egyptian President Anwar Sadat responded with by declaring: "Any action that would endanger the waters of the Blue Nile will be faced with a firm reaction on the part of Egypt, even if that action should lead to war." He continued by adding "As the Nile waters issue is one of life and death for my people, I feel I must urge the United States to speed up the delivery of the promised military aid so that Egypt might not be caught napping". This was statement was repeated by Egypt's Minister of Irrigation who stated: "Egypt would never permit Ethiopia to exploit the waters of the Blue Nile", and sought support from other Arab countries on the issue.³⁵

Despite threats from Egypt and the destabilizing effect of the Eritrean insurrection, Ethiopia began the first phase of the Lake Tana project in 1988. However, Egypt unveiled another tactic in its arsenal of methods to discourage Ethiopia's development off the Nile. Egypt blocked a necessary loan for the project from the African Development Bank claiming that the

³⁴ *ibid.*, 156

³⁵ *ibid.*, 157

Tana Beles project would consume excessive amounts of the Blue Nile water.³⁶ While this can be interpreted as another action of Egypt's policy to protect their access the Nile by weakening their upstream neighbors, one must take into consideration the drought conditions in East Africa during 1988. A consequence of the drought in Ethiopia's meager rainfall was the lowest water levels on record in Lake Aswan which threatened a complete stoppage of the turbines in the Aswan High Dam. In addition, the a United States Embassy report in April of the previous year painted a grim picture for Egypt's future as it claimed; "there will be insufficient water to sustain Egypt's population by the year 2000 unless drastic conservation and managements improvements are put into place in the next few years".³⁷

In contrast to Egypt's significant efforts to discourage Ethiopia's development of the Blue Nile, Egypt has been extremely proactive along the White Nile in an effort to increase the flow of the Nile. Following a bloodless coup in Khartoum in 1969, Jaafar Muhammad Nimeiri came to power in Sudan, but he subsequently faced coup attempts from pro-soviet Sudanse forces in 1971 and 1976. Recognizing the need for regional allies, and more importantly an option to make Sudan politically in debt to Egypt, Sadat came to the aid of the Nimeiri government militarily.³⁸ In return for Egypt's support, Sadat received a number of political concessions. The most notable concession being Sudan's support of Egypt signing the Camp David Accords in 1979, but the most crucial concession to the issue of the Nile was Egypt was given permission to construct the Jonglei Canal in 1976.³⁹

³⁶ *ibid.*, 158

³⁷ Cowell, A. Nile gives abundantly as doomsday recedes. *The New York Times* (1988, December 20).

³⁸ Swain, *Ethiopia, the Sudan, and Egypt: The Nile River Dispute*, 681

³⁹ Kendie, *Egypt and the Hydro-Politics of the Blue Nile River*. 158*ibid.*, 681*ibid.*, 681

The Jonglei Canal was designed to increase the White Nile's annual flow to Egypt by 3.8 billion cubic meters. This was to be done in multiple phases.

The first phase involved diverting part of the flow from the Bor to another tributary of the White Nile, the Sobat. This would decrease the amount of water that

flows to the Sudd Swamps, which is notorious for excessive evaporation. The second phase was to build drainage

mechanisms for the Machar Marshes on the Ethiopian-Sudanese border and the Bahr el-Ghazel in Sudan and dams at Lake Albert in Uganda and Lake Victoria.⁴⁰ While Egypt's Jonglei project received support from the Nimeiri

government, it received wide-spread criticism from those within and outside the Nile Basin. The canal was accused of

being beneficial to the north at the expense of the south. It was claimed that if completed the project would have a negative impact on 40,000 pastoralist whose animals graze in the area, in addition to having a substantial environmental impact on the region. This criticism did not discourage Egypt as its concern rested solely on securing the valuable water from the White Nile to augment it what it currently receives, and doing so expediently before political conditions change again in the region as they so often do. In 1978 a French company began work on the Canal, but was only able to complete 250 of the planned 360 kilometers of the project as a series

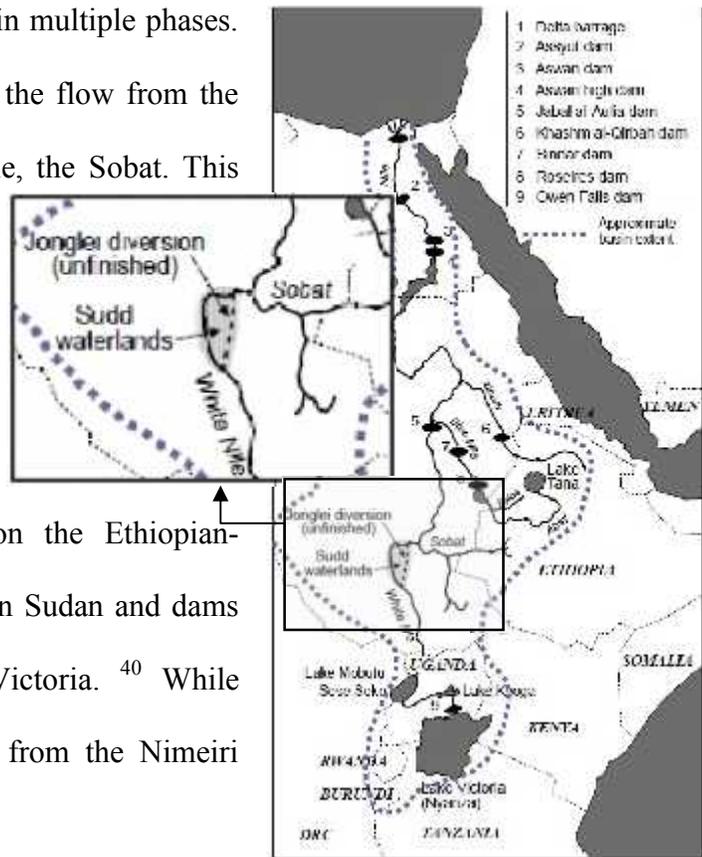


Figure 3: The Jonglei Canal (source: waterwiki.net)

⁴⁰ P. Howell, "The Impact of the Jonglei Canal in the Sudan," *The Geographical Journal* 149, no. 3 (-11-01, 1983), 286-9.

of attacks from the Sudanese People's Liberation Army (SPLA) caused work to be suspended in 1984 due to repeated SPLA attacks.⁴¹ While Egypt would still have liked to see the projects completed, the Sudanese civil war made the project impossible to accomplish. Changes in the political climate between Sudan and Egypt, and the secession of Southern Sudan, which holds reservations on the project because it will dry grazing and agricultural land, make this project highly unlikely to be resumed.⁴²

As a response to the grim situation Egypt faces with regards to water quality and quantity, the country has launched a National Water Resources Plan (NWRP). The overall policy objective is to develop all available non-conventional and conventional water resources to meet the needs of the country. Focusing on three primary aspects; demand management, resource development and environmental protection, the plan will require a significant shift in the countries resource management paradigms. The NWRP is addressing the water demand management by: optimizing use of available resources, minimizing water loss, improving irrigation systems and cropping patterns and reusing agricultural drainage and treated waste water. This is coupled with developing a multidisciplinary dialogue to increase environmental awareness, enhance public and private stakeholder participation and incorporating water quality into the water quantity discussion. In an effort to increase the water supply, the plan calls for greater cooperation among Nile Basin countries. Examples of this include helping reduce water loss from evaporation in swamp area and the continuation of the Jonglei Canal.⁴³

⁴¹ Swain, *Ethiopia, the Sudan, and Egypt: The Nile River Dispute*, 683

⁴² Tribune, S. Jonglei canal project needs to be revised, south Sudan says. *Sudan Tribune*. (2009, August 8).

⁴³ Amer and Salah El-Din Amer, *Egypt and the Nile Basin*, 44

Although water scarcity concerns have driven the Egyptian government to threaten Ethiopia not to use Nile water to develop their agriculture sector, it has not deterred them from expanding their agricultural schemes far into the country's vast deserts. Desert reclamation efforts have been underway for over the last half of a century in an effort to curb unemployment, population density and increase the country's food production. The Southern Valley Development Project has been the largest and most controversial of the land reclamation projects to date. The Egyptian Government is constructing a large irrigation canal and is constructing several pumping stations that will transport water from Lake Nasser to new agricultural developments in the Toshka Depression in southern Egypt. The goal of the Southern Valley Development Project, also known as the Toshka Project and the New Valley Project, is to reclaim up to 336,000 hectares of desert land and establish new communities in the area that will reduce population pressure in the Nile Valley and Delta.⁴⁴

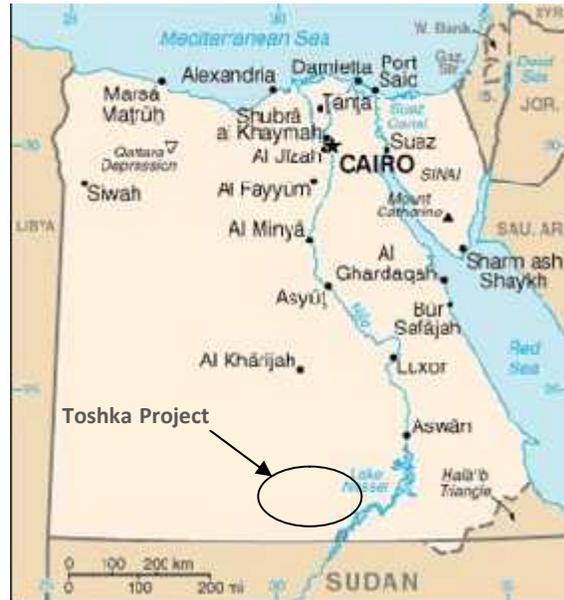


Figure 4: The Toshka Project (source: U.S. Central Intelligence Agency Fact Book https://www.cia.gov/library/publications/the-world-factbook/maps/maptemplate_eg.html)

The Egyptian Government has argued this project will not require the country to exceed their annual water allocation of 55 billion cubic meters, but there is little evidence that this would be the case as the country already utilizes its full quota and is believed to often exceed it. The project has received significant criticism from those upstream whom argue Egypt in the world should not be seeking to use some of the world's driest desert for agricultural purposes. Ethiopian

⁴⁴ D. Wichelns, "Moving Water to Move People - Evaluating Success of the Toshka Project in Egypt," *Water International* 28, no. 1 (-03-01, 2003), 52.

Prime Minister Meles has been vocal in his criticism of Egypt's reclamation projects. When discussing Toshka he was quoted as saying, "While Egypt is taking the Nile water to transform the Sahara Desert into something green, we in Ethiopia, who are the source of 85% of that water, are denied the possibility of using it to feed ourselves. And we are being forced to beg for food every year."⁴⁵

Events of the last decade have shifted the balance of power in the basin. Egypt was once in a position of power in the region and countries found it difficult to challenge projects like Toshka, today the country finds itself in a much more complex position as much has changed politically in the region. The consistent authoritarian government of Hosni Mubarak has fallen. A more stable Ethiopia and the other states of the Nile Basin no longer see Egypt as the military threat it once was, the Nile Basin Initiative has gained widespread support by many of Egypt's upstream neighbors. Sudan, Egypt's most reliable ally is slated to divide in July complicating basin hydro-politics further. Egypt, Sudan and Ethiopia's populations are growing at record levels and Ethiopia is building multiple dams on the Blue Nile. Egypt's non-decision making approach is looking less like a viable option as downstream countries are becoming more emboldened to act without Egypt's approval.

Recognizing the need to reform the country's domestic water sector, the Egyptian government has released a National Water Resource Plan (NWRP) in 2000, and a revised version for 2005 to address the country's water issues. This plan lays out in great detail the country's concerns with regard to water scarcity issues and Nile water utilization, and outlines a strategy for the country to adopt in an effort to address the scarcity concerns. The country is applying an Integrated Water Resource Management (IWRM) strategy to its water sector. The

⁴⁵ Mike Thompson, "Nile Restrictions Anger Ethiopia," *BBC News*, February 3, 2005, 2005.

plan defines IWRM as "a process which promotes the coordinated development and management of water land and other related sources, in order to maximize the resultant social welfare in an equitable manner without compromising the sustainability of vital ecosystems". This plan is designed to move away from the traditional central planning system of the Egyptian water sector to a comprehensive approach that will involve all stakeholders in the sector.⁴⁶

The NWRP describes eight "challenges for Egypt" that it will try to improve by 2017:⁴⁷

1. *Securing water for the people.*
2. *Securing water for food production.*
3. *Securing water for industries service and employment.*
4. *Developing a strong institutional framework.*
5. *Creating popular awareness and understanding.*
6. *Protecting and restoration of vital ecosystems.*
7. *Cooperation with Nile Basin countries.*
8. *Stimulating the political will to act.*

The country recognizes the challenges it faces addressing these concerns, and the NWRP goes farther than any previous plan to meet these challenges. The NWRP calls for much stricter pollution controls in the country. It encourages fining polluters, and offering incentives to industries who do not pollute. It calls for a public disclosure pollution control plan for industries in which they would be rated by their emissions and all factories would receive publically published cleanliness ratings. To address domestic waste water the NWRP plans to triple the amount of wastewater treated by 2017.⁴⁸

⁴⁶ Ministry of Water Resources and Irrigation: Planning Sector, *National Water Resources Plan for Egypt-2017* (Cairo, Egypt: Arab Republic of Egypt, 2005), 30.

⁴⁷ *ibid.*, 30-2

⁴⁸ *ibid.*, 174-5

To increase water supply the plan discusses a number of goals including: desalinizing salt water and brackish groundwater, develop deep ground water resources in the Western Desert, investigate using brackish water in agriculture and developing small-scale rain harvesting where it is possible. In addition, the report recommends working with other riparians to develop ways to increase the Nile's supply.⁴⁹

The NWRP offers Egypt a strategy to address the water it has, but getting increasing the countries supply of Nile water poses a much larger problem. Egypt has been strident technical and financial supporters of any projects that will increase the flow of the Nile, but have been consistently opposed to any disruption of the current water allocation system. This paper contends time has run out for the country and the longer the country maintains an uncooperative position, the more it stands to lose when an agreement is eventually reached. This position has rapidly gained momentum within Egypt's post-Mubarak interim government. Some Egyptians blame the predicament the country finds itself in squarely on the failed diplomatic policies of the Mubarak regime. The Egyptian government has been more actively discussing a shift in their Nile River policy, but whether it reflects a true shift in policy remains to be seen. The former deputy minister of irrigation and former chairman of the National Water Research Centre has been quoted saying, "When the system changed, it was natural for the new people to come in with a different vision." The Arab Water Council has taken this position a step further calling for mutually beneficial cooperation akin to what is argued for in this paper. Safwat Abdel-Dayem, secretary general of the Arab Water Council contended in a May interview that, "There is so

⁴⁹ *ibid.*, 151

much more to gain from mutual cooperation. If Nile Basin states work together, we can truly push African development forward."⁵⁰

Ethiopia and the Nile

While Egypt is the last in line to receive Nile water, Ethiopia has the luxury of being the primary water source of much of east Africa, but is far from realizing its full potential. With 12 basins, 9 of which cross international borders, producing 123 billion cubic meters of water per year Ethiopia has been acknowledged as “Africa’s water tower”. Of Ethiopia’s 12 river basins, 3 are part of the Nile River system: the Abbay also known as the Blue Nile, Baro-Akobo also

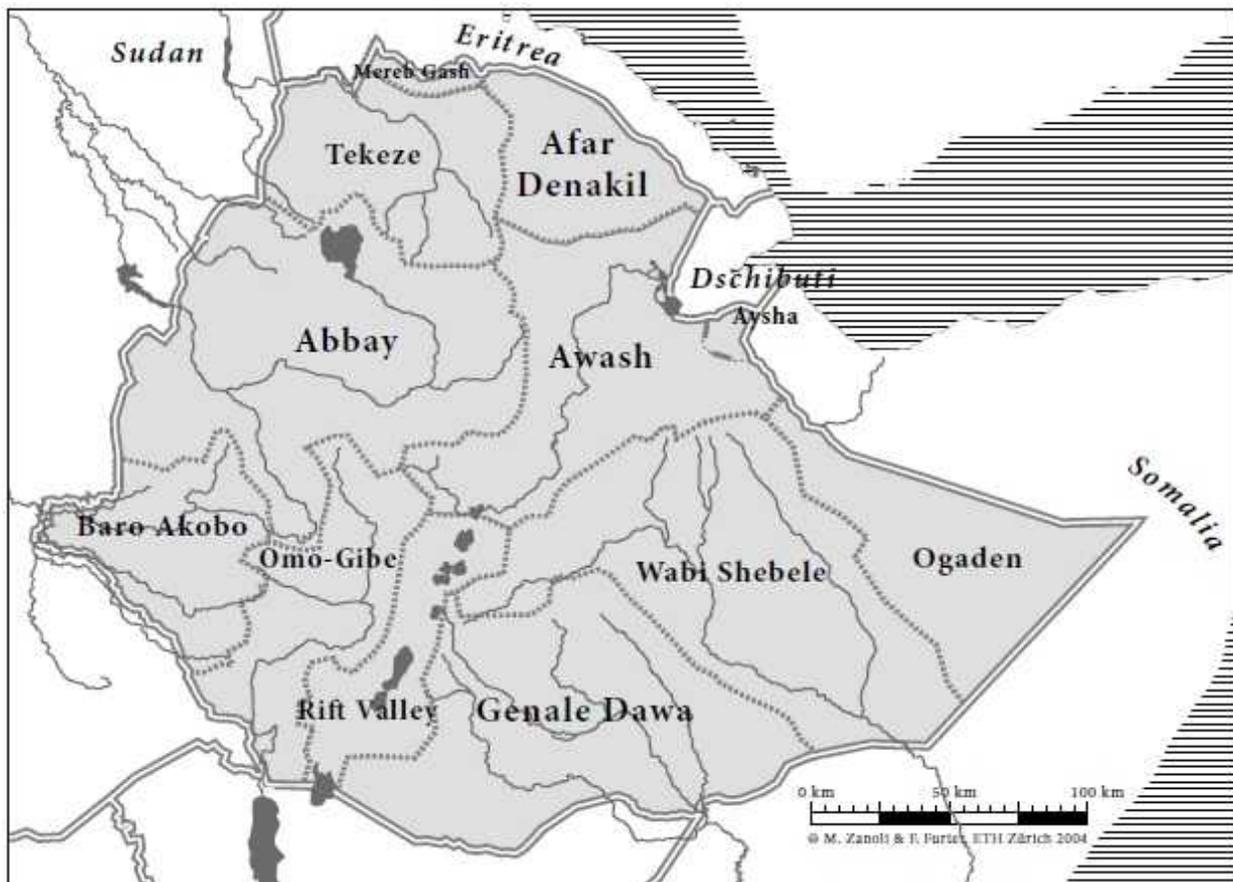


Figure 5: The Ethiopian river basins (Source: Yacob Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics* . 108.)

⁵⁰ David Clarke, "Analysis-Political Change in Egypt to Boost Nile Cooperation," *Reuters Africa*, May 12, 2011, 2011.

known as the Sobat and the Atbara also known as the Tekeze. Of the Nile River water that reaches Egypt, 86 percent originates from these three basins. The three Ethiopian Nile River sub-basins constitute 68 percent of the country's available water resources, most of which goes unutilized as the country has only been able to develop 5 percent of their surface water resources. This lack of utilization has left the country more prone to drought caused famine as little water is stored for dry years.⁵¹

The Blue Nile, also known as the Abbay River, originates on Ethiopia's northwestern plateau. It has countless headways and tributaries including Lake Tana and the rivers Guder, Fincha, Didessa, Dabus, Jamma, Birr, Muger, Wolaka, Bashilo, Beles, Rahad and Dinder. The catchment area, also known as the area drained by the river, has an annual flow of 52.62 cubic kilometers and encompasses 324,500 square kilometers. The dramatic variation in runoff from the Ethiopian Plateau is based upon seasonal precipitation. August is generally the month that sees the most significant runoff, as much as 60 times greater than its minimal runoff in February, and because of the topographical nature of the basin the plateaus and surrounding areas experience a high degree of annual soil erosion. The seasonal soil erosion causes land degradation in the upper basin and heavy silt accumulation in the downstream plains, reservoirs and banks of Sudan and Egypt. It has been estimated that Ethiopia loses more than 400 million cubic meters topsoil annually due to the erosion.⁵² This poses a significant challenge for the developing agricultural sector in the country, and has motivated the country to build more dams to try better manage the rate of runoff.

⁵¹Aquastat, *Irrigation in Africa in Figures: Ethiopia*, 16

⁵²International Bank for Reconstruction and Development/The World Bank, *Ethiopia - Managing Water Resources to Maximize Sustainable Growth: Water Resources Assistance Strategy* (Washington DC: World Bank Group, 2006), 11.

The Atbara River, also known as the Tekeze, works its way from south to north more than 800 kilometers while at one section demarcation the border between Ethiopia and Eritrea. Being fed by tributaries Angarab and Guang, it represents the most northern tributary of the Nile as it joins the main river north of Khartoum. The Atbara contributes 8.2 cubic kilometers of water to the total flow of the Nile. Like the Abbay, the Atbara experiences a high degree of soil erosion and is believed to lose 120 million cubic meters of topsoil annually.⁵³

The Sobat system, also known as the Baro-Akobo, originates in Ethiopia's western highlands and is at elevations of between 2000-3500 meters above sea level. It covers a 380 kilometer area between Ethiopia and Sudan. Receiving water from three main tributaries, the Gilo, Alwiro and Pibor, the Sobat system carries 23.24 cubic kilometers of water annually contributing significantly to the main Nile's flow.⁵⁴

Since early in the time of Haile Selassie's rule of Ethiopia, the government had seen their water resources as a critical component to sustainable economic development. The country's water resources were looked upon as a means for not only mitigating poverty but feeding the Ethiopian people, but internal and external conflicts often stood in the way of developing these resources. It wasn't until the 1950's that the country began laying out a series of 5 year plans for strategic water resource management. The first and second strategic development plans were published in 1956 and 1962 and emphasized the development of the hydroelectric power in the country. The third five year plan, published in 1968 during the Eritrean War of Independence acknowledged the Ethiopia's inability to shoulder the high costs associated with the development

⁵³ Yacob Arsano, "Ethiopia and the Eastern Nile Basin," *Aquatic Sciences* 67, no. 1 (-03-01, 2005), 17-8.

⁵⁴ *ibid.*, 17-8

of large projects in deep gorges and steered the focus to building numerous smaller more affordable irrigation projects to control erosion and research into future projects.⁵⁵

Ethiopia experienced an era of Military Socialist rule between following the long reign of Haile Selassie. During this time the country established the Water Technology Institute and the Ethiopian Water Valleys Development Study Authority. The country also expanded their meteorological capabilities in an effort to bolster their water management potential. Utilizing the newly formed agencies, the government developed The Ten Year Perspective Plan which outlined the country's water resource development and management plans for the next decade and beyond in 1984. The plan called for over \$1.5 billion in spending on water sector development, of which 42.5 percent was to be dedicated to medium and large scale projects.⁵⁶

A study conducted in 2001 outlined the country's hydroelectric potential. Ethiopia's country's main Nile tributaries have an astonishing hydroelectric potential of 102,710 gigawatt hours per year, and the country has an overall 144,710 gigawatt hour per year potential.⁵⁷ Additionally, Ethiopia has a comparative advantage over all of their regional neighbors in the hydroelectric sector because their existing natural declinations in elevation, and they don't face the evaporation challenges of Egypt and Sudan. This reaffirmed the country's belief that the country could harness their domestic water resources as an economic driver and World Bank support for major hydrological projects.⁵⁸

The Abbay basin is the largest of Ethiopia's three Nile sub-basins and offers the greatest yield in potential hydroelectric and irrigation potential, but has remained underutilized because

⁵⁵ *ibid.*, 17

⁵⁶ *ibid.*, 17

⁵⁷ *ibid.*, 17

⁵⁸ International Bank for Reconstruction and Development/The World Bank, *Ethiopia - Managing Water Resources to Maximize Sustainable Growth: Water Resources Assistance Strategy*, xxiv

of financial and political constraints. The 2001 study of Ethiopia's watershed unveiled the true potential of this sub-basin. The Abbay has an irrigation potential of 711,000 hectares, of which only 30,000 have been developed. Of the 30,000 hectares 23,800 hectares are used in small scale irrigation schemes and the remaining 6,200 hectares are used for large scale sugar cane farming. The hydroelectric potential of the Abbay has also not been utilized as of yet. Of the 75,550 gigawatt hours per year of potential, only 200 megawatts have been harnessed. Development of the Abbay basin will be critical to Ethiopia's future as the basin is believed to already have over 20 million inhabitants and expected to exceed 30 million by 2020.⁵⁹

The same 2001 study unveiled the prospective of the The Baro-Akobo has the second largest potential of the three Nile River sub-basins in Ethiopia. The Baro-Akobo has 483,000 hectares of long-term irrigation potential following the building of dams and infrastructure. Of the 483,000, 123,300 are ready to be utilized in the near future. The basin study also revealed the potential for a mineral industry to be developed in the sub-basin. In terms of hydroelectric capability, the river has the potential to accommodate as many as 14 dams and produce 1,500 megawatts of electricity. The estimated cost of investment in the Baro-Akobo to reach full capacity was estimated to be in the range of \$5.255 over the span of 30-50 years.⁶⁰

The Atbara is the smallest of Ethiopia's Nile River sub-basins, but still offers considerable yields if its full potential is met. Similar to the Baro-Akobo, according to the 2001 study, the Atbara could accommodate 14 hydroelectric dams, but with a greater megawatt output of 4,230 megawatts. Ethiopia finished the Tekeze Dam in the sub-basin in 2009. The dam was considered Ethiopia's largest public works project to date, which is expected to produce 300

⁵⁹ Arsano, *Ethiopia and the Eastern Nile Basin*, 17-8

⁶⁰ *ibid.*, 17-8

megawatts and carried a price tag of \$350 million.⁶¹ The Atbara basin could also be developed to produce 302,000 hectares of irrigated land. The Atbara also has the potential for a mining industry. The study estimated it would cost \$25.4 billion dollars over 30-50 years to fully develop the basin. The high cost can be attributed to the depth of the canyon the river lies in addition to the river's remote location.⁶²

Because the Ethiopian government invested the time and resources in completing an inventory of their domestic water resources over the previous decade, it has been able to move towards developing and implementing a 15-year Water Sector Development Plan (WSDP). The priorities of this plan included rapid expansion of agricultural irrigation, hydroelectric power and increases water capacity for industrial purposes. In 2002, the Ethiopian government held a three week seminar to outline the development strategy. In identifying domestic constraints the government faced in increasing their water capacity the factors identified three main factors. The first was a lack of knowledge on the best methods to maximize their resources. The second was the lack of finances or economic scarcity. The third was a lack of organizational capacity to carry out the projects necessary to reach the outlined goals. When identifying external constraints they identified three factors as well. The first identified was the limitations of previous development because of the prior appropriation claims by downstream countries Egypt and Sudan. The second international constraint outlined was a consequence of the first. The Ethiopian government claims that downstream countries are more wealthy and have always been focused on maximizing their water resources and while concurrently pressuring Ethiopia to not develop. The Third external constraint the country faced was a absence in external support international

⁶¹ Staff, "Tekeze Project Inaugurated in Ethiopia," Global Trade Media, <http://www.waterpowermagazine.com/story.asp?storyCode=2054758> (accessed May 30, 2011,

⁶² Arsano, *Ethiopia and the Eastern Nile Basin*, 17-8-8

institutions to develop their domestic water resources that other countries like Egypt enjoyed. This was partially the fault of Egypt who was instrumental in discouraging this funding.⁶³

The Ethiopian 2002 WSDP set ambitious targets to reach by 2016 with a price tag of more than \$7.44 billion.⁶⁴ The policy hope to provide 76 percent of the country access to improved drinking water and sanitation facilities by 2016. With rural access alone improving from 23 percent in 2001 to 70 percent by 2016.⁶⁵ The plan calls for aggressive Hydroelectric development that will generate a electricity surplus for export. The government projects it will invest nearly \$2 billion between 2001 and 2016 on building hydroelectric plants.⁶⁶ The plan will also implement a reorganization of the country's water management structure, and the development of new institutions to better manage specific areas of the water sector.⁶⁷

The most threatening aspect of the WSDP to downstream states is the plan for a nine fold increase in irrigated agriculture programs in the country. The WSDP calls for an increase in large and medium scale irrigation projects from 13,000 hectares in 2001 to 246,000 hectares in 2016.⁶⁸ This represents a major shift in the country's agricultural practices.

Under Ethiopia's current agricultural makeup, rainfall is the primary determinant for the country's annual development. It is estimated that Ethiopia's lack of ability to adapt to their hydrological cycle has cost the country's gross domestic product 38 percent annually and increases poverty 25 percent over a 12 year period.⁶⁹ Much of this inability to adapt can be

⁶³ *ibid.*, 18-9

⁶⁴ Ministry of Water Resources, *Water Sector Development Program: Main Report* (Addis Ababa: Federal Democratic Republic of Ethiopia, 2002), 163.

⁶⁵ *ibid.*, 42

⁶⁶ *ibid.*, 88

⁶⁷ *ibid.*, 132

⁶⁸ *ibid.*, 49

⁶⁹ World Water Assessment Program, *Water in a Changing World* (London, Paris: UNESCO Publishing, 2009), 82.

associated with the poverty that has resulted from years of war in addition to Egyptian opposition to Ethiopian agricultural development. More than three quarters of the country's agricultural sector has been dependant on rainfall. As a consequence, on average Ethiopian farmers only achieve approximately 35 percent of their yield potential.⁷⁰ The inability to maximize yields has led to high food prices domestically, a dependence on imported food products and ultimately famine as a food is scarce in years with diminished rainfall.

Although Ethiopia has invested heavily in the unilateral development of their water resources in recent years, they have also been the most proactive in seeking a new agreement for cooperative development of the Nile Basin. Ethiopia has long been calling for this issue to be addressed in their complaints about the Nile being largely monopolized by Egypt and Sudan. In 1998 the Prime Minister of Ethiopia was quoted reiterating their position saying: "... for an amicable utilization of the Nile waters, the basin countries must enter into an agreement ... A water utilization agreement will have to take into account the wishes of all basin countries... The new agreement must be based on the perception that the Nile waters are the collective property of all riparian nations...".⁷¹ While Egypt does not physically control the river, until recently it controlled the dialogue surrounding the river and influenced the funding sources for large projects like the World Bank and African Development Bank.

In the 21st century, Ethiopia been more proactive than ever in seeking cooperation. This is partially because they recognize that a decline in Egyptian influence amongst basin states has left an opening for a regional shift of power, and also because the country is actively seeking investment in their mega-dam projects. Ethiopia has been the most vocal critic of Egypt's

⁷⁰ *ibid.*, 108

⁷¹ Arsano, *Ethiopia and the Eastern Nile Basin*, 17

dominance of the Nile politics and a major proponent of the Nile Basin Initiative as a way to redistribute power in the basin. Ethiopia has been by far the most willing advocate for developing a cooperative regime in the Eastern Nile Sub-basin, and because it is ultimately the source of the Egypt and Sudan's prized fresh water, is the most important player in achieving this goal.

Sudan and the Nile Basin

Sudan lies in the heart of Africa and finds itself in the precarious position of being between two the two most powerful players in the Nile Basin. The northern half of the mostly flat country is either semi-arid desert or desert with the Sahara Desert encompassing most of it. The country experiences almost no rainfall north of the capital Khartoum and only about 200 mm in the center of the country. In the southern part of the country the rainfall is not much more significant and averages around 700 m annually.⁷² Because of extreme heat in much of the country and a lack of precipitation the Nile River is of critical importance to the country's water supply. Additionally, because the agricultural sector serves as a significant proportion of gross domestic product and by far the country's largest single employer the ability for the



Figure 6: Sudan Map (source: http://www.nationsonline.org/maps/sudan_map.jpg)

⁷² Aquastat, "Irrigation in Africa in Figures: Sudan," *Aquastat* (2006), 2.

country to access the Nile River water is paramount to the country's survival, stability and growth.

Sudan has a unique relationship with the Nile River as over 70 percent of the country lies within the Nile Basin. Although 10 countries are part of the Nile Basin, approximately 63 percent of the Entire Basin area is in Sudan. Additionally, the Nile's main tributaries converge inside the country and exit the country north towards Egypt as one single river. Sudan is also considered a minor source of the Nile, as the Bahr el Ghazal, Bahr el Jebel and Pibor Basins all contribute a small amount to the river in the country's south. Sudan also plays a role as a large drainage basin for the river as it receives much of the debris, silt and other sediment flowing down from the Ethiopian Highlands by the way of floods. Sudan also had the potential to increase the Nile's flow by way of the Jonglei Canal project. A prized project of the Egyptian government that was never able to be completed to because of the internal conflicts in Sudan.⁷³

There are five operating dams in Sudan (The Sinnar, The Jabal Awlia, The Roseires, The Khashm al-Gerba and the Merowe), and more in consideration for development. The Sinnar was built on the Blue Nile in 1926 to irrigate the Gezira Scheme, a large agricultural project between the Blue and White Nile. The Jabal Awlia Dam was constructed 1937 to support the Aswan Dam in Egypt. It is located about 50 km southwest of Khartoum on the White Nile. This dam was funded by Egypt and operated by Egypt until 1977, when the Aswan High Dam was fully operational. The Roseires Dam was built in 1950 on the Blue Nile. It represents a significant source of electricity to Sudan and also helps manage the irrigation for the Gezira Scheme. The Khashm al-Gerba was built in 1964 on the Atbara and helps irrigate the al-Garba agricultural

⁷³ *ibid.*, 1-2; Hamad, *Sudan and the Nile Basin*, 1-2

scheme.⁷⁴ The Merowe Dam is Sudan's newest and largest dam. Finished in 2009, the dam was built in the 3th cataract north of Khartoum and has the electrical capacity to of 1,250 megawatts.⁷⁵

Sudan's water resources are few and far between as the Nile represents the country's primary water resource and in terms of sheer quantity dwarfs their other sources . The average flow of the all the Nile's tributaries that converge in Khartoum is approximately 93 cubic kilometers of water annually. From which Sudan is allocated 18.5 cubic kilometers annually regardless of the flow. In actuality the amount of water lost in Sudan is much higher than the 18.5 cubic kilometers allotted to the country. The actual the amount of water that crosses into Sudanese borders from outside countries averages about 120 cubic kilometers annually. Sudan then adds another 17 cubic kilometers from domestic sources to make a total of approximately 137 cubic kilometers annually. However, because of the country's immense size and high temperatures a significant portion of the water is lost to evaporation and minor diversions before it even reaches central Sudan which only receives about 93 cubic kilometers. This is the reason Egypt and Northern Sudan sought to build the Jonglei Canal to mitigate the evaporation loss from the Sudd Swamps. This flow diminishes even further between Khartoum and Aswan to an average of 84 cubic kilometers annually. Over the years the measurement at Aswan has varied considerably year over year. In 1913, for example, the flow was measured at 51 cubic

⁷⁴ Staff, "Dams in Sudan," Sudan Online, <http://www.sol-sd.com/news/123/ARTICLE/2157/2007-05-06.html> (accessed June 5, 2011, 2011).

⁷⁵ Staff, "Merowe Dam, Sudan," internationalrivers.org, <http://www.internationalrivers.org/africa/merowe-dam-sudan> (accessed June 5, 2011, 2011).

kilometers, while in 1879 it was measured at 139 cubic kilometers.⁷⁶ The discrepancy in the measurements is in direct correlation to the variations in rainfall in the Ethiopian Highlands.⁷⁷

Based upon the Nile Waters Agreement of 1959, Sudan's annual water allocation of water from the Nile averages 22 percent of the Nile water that passes through the country to reach Aswan. It is estimated this water could irrigate 1.7 million hectares of land which is only 5 percent of the country's potential agricultural land.⁷⁸ Combined with domestic water resources and sparse precipitation, Sudan is only able to utilize approximately 10 percent of its irrigable land. Although Sudan has not managed to maximize their agricultural potential, agriculture still represents 96 percent of the country's water use.⁷⁹ The agricultural capacity of the country is critical as it accounts for 90 percent of Sudan's non-oil export revenue and accounts and 80 percent of available employment in a country in which it is estimated more than half the population lives on less than one dollar per day.⁸⁰ Additionally, Arab countries have also taken a keen interest in the Sudanese agricultural sector. Saudi Arabia, the United Arab Emirates and Qatar have all invested significantly in the country eyeing it as a potential bread basket for the Arab world that will help offset their rising food prices.⁸¹

Water scarcity issues are a hindrance to the maximization of Sudan's agriculture sector, but water poverty issues pose a much greater challenge to the country's human capital development. It is estimated that if all Sudan's fresh water was allocated for human consumption; the country is just above having the 1000 cubic meters of renewable fresh water per capita annually that is the threshold for chronic water scarcity. According to United Nations

⁷⁶ *ibid.*, 29

⁷⁷ Aquastat, *Irrigation in Africa in Figures: Sudan*, 4

⁷⁸ Hamad, *Sudan and the Nile Basin*, 30

⁷⁹ Aquastat, *Irrigation in Africa in Figures: Sudan*, 6

⁸⁰ *ibid.*, 3

⁸¹ Stephen Williams, "Arab World Looks to Sudan as Bread Basket," *African Business*, no. 350 (-02-28, 2009), 34.

Food and Agriculture statistics, the country as of 2005 had only 1187 cubic meters annually water per capita for the country's population of nearly 40 million.⁸² With Sudan slated to divide in July of 2011 and the populations becoming increasingly urbanized, its fresh water per capita rates will change dramatically in the coming years. This is an issue poses a tremendous challenge for each of the countries in the Eastern Nile Basin as they each face record population growth rates and an increased standard of living which is will require greater water consumption.

Sudan's relationship with the Nile River has been mutually beneficial, but being such a large part of the Nile River Basin can be tenuous as annual floods can be unpredictable. The normal annual flood period of the Blue Nile is from July to September. The total average flow of the Blue Nile floods from Ethiopia to Sudan can vary significantly from year to year, but averages 34 cubic kilometers per year. The Atbara River to the North of the Blue Nile has an average flow of 9.5 cubic kilometers annually. While these numbers represent the average, they fail to reflect the actual variation. For example, 44.1 cubic kilometers came from the Blue Nile into the same region in 1998 flood cycle. In that same year, the Atbara more than doubled its average bringing 21.7 cubic kilometers of water. Furthermore, between 1994 and 2004 six high floods were experienced. As a consequence, Sudan lost numerous crops, homes, schools and people. Alternatively, the agricultural sector benefits from the new silt deposits that accompany major flooding, as it makes for very fertile soil.⁸³

To arrive at moderate average annual measurements of the Nile River's flow when the river has years where it unpredictably drastically surpasses them such as in 1998, the river must

⁸² Aquastat, *Irrigation in Africa in Figures: Sudan*, 4⁸² CIA, "Sudan," *The World Factbook Country Profile* (-01-01, 1998), 439.

⁸³ Hamad, *Sudan and the Nile Basin*, 30

also have years with very little flow. The 20th century has offered not only some of the highest flow years on record, but an even greater number of the lowest years on record which is troubling to all three countries of the basin. Measurement records of the Nile date back thousands of years, yet three of the four lowest years were in the 20th century. While the average of Nile water to reach Aswan from Khartoum is 84 cubic kilometers annually, this number is extremely misleading and may be no longer relevant. During the period from 1972 to 1989, the mean fell to 77.2 cubic kilometers of water annually. The five year period from 1985 to 1990 had a staggering average of 68.4 cubic kilometers. The five year period from 1942 to 1947 averaged only 76.9 cubic kilometers annually.⁸⁴ While these variations sound like small reductions from the 84 cubic kilometer average, they represent more than a 10 percent reduction in supply in an already scarce environment. Extended periods of drought pose a significant challenge to Sudan because of its heavy economic dependence of the Nile.

None the less, Sudan has much more flexibility than Egypt in terms of Nile water, and moving forward this will be beneficial to the Sudanese government. Although the country's economy is very dependent on the water from the Nile, unlike Egypt, the country has yet to utilize all of the water resources available to it will be able to manage a reduction in flow much easier. As of 2000, Sudan was only utilizing 58 percent of their total fresh water resources in contrast to Egypt which uses 100 percent.⁸⁵ Much of this is due to the fact that Egypt withdrawals nearly twice as much water as Sudan for agriculture and livestock.⁸⁶ But this can also be attributed to the fact that rates of domestic freshwater access are much higher in Egypt. This is primarily due to a lack of investment in the water resources and sanitation sectors and an

⁸⁴ P. P. Howell and J. A. Allan, *The Nile: Sharing a Scarce Resource* (Cambridge: Cambridge University Press, 1994), 44-6.

⁸⁵ Aquastat, *Irrigation in Africa in Figures: Sudan*, 6, *ibid*.

⁸⁶ Aquastat, *Irrigation in Africa Facts and Figures: Egypt.3.*, Aquastat, *Irrigation in Africa in Figures: Sudan*. 6.

overall higher standard of living in Egypt. Egypt, for example, uses three times more water for domestic purposes than Sudan. This is because 98 percent of Egyptians have access to improved drinking water sources, as opposed to 69 percent of Sudanese.⁸⁷ Even though the lack access to improved drinking water may not be beneficial to the Sudanese citizen whom need to meet their basic drinking and sanitation needs, it offers the Sudanese government flexibility to adapt to water supply fluctuations without diminishing existing services which could lead to instability.

The inevitability of unpredictable flooding in the Nile Basin has encouraged cooperation between Sudan and their upstream neighbor Ethiopia. The two countries developed an advanced flood warning system for the region and have cooperated on flood mitigation measures.⁸⁸ This paper contends flood mitigation through jointly-invested and managed dam projects in Ethiopia offers common ground for future cooperation in which a the development of a cooperative regime in the Eastern Nile Basin can facilitate. Additionally, increasing the water storage capacity in Ethiopia (where water loss through evaporation is less of a concern), will better prepare the basin states for prolonged droughts.

The Sudan's flexibility coupled with their necessity to cooperate with Ethiopia to manage the annual floods make them an ideal candidate for cooperation in the Eastern Nile Basin. The country not only has the flexibility to contribute to the relationship by the way of water or other natural resources which they are abundant, but they also stand to gain considerably as controlling the annual floods will allow significant predictability to the agricultural sector. Because Sudan stands to gain significantly by acting cooperatively as opposed to unilaterally, the country is an ideal candidate for a Eastern Nile Basin cooperative regime.

⁸⁷ Aquastat, *Irrigation in Africa Facts and Figures: Egypt*, Aquastat, *Irrigation in Africa in Figures: Sudan*

⁸⁸ *ibid.*, 30

The Complex History of Conflict and Cooperation the Eastern Nile Basin

The Nile Basin has had a complex history of colonization, civil wars and cross-border interference. The Eastern Nile Sub-basin was the focal point of much of this, as it has been prized by colonizers and post-colonist because of its strategic location and abundant resources. To understand how to move forward in developing a cooperative regime in the basin it is vital to have a complete understanding of the history of cooperation and conflict in the sub-basin as it is what has formed the complex relationships we see today.

Egypt-Ethiopia Relations

While Egypt and Ethiopia don't share a common culture, climate, economy or even a common border, the countries are bound together tighter than possibly any two countries in the world because of the Nile River. Over the previous half century Egypt's diplomatic relations with Ethiopia has been plagued by cross border meddling, inflammatory rhetoric and misunderstandings. In recent years Ethiopia has taken a much more hostile position in regards to their claim over the Nile water as Egypt's has lost much of its perceived power in the region. This relationship will be the most important, yet most challenging to strengthen, as it is between the most Nile dependent and financially richest of the three countries and the financially poorest of the three and most water rich.

Looking back over the previous 50 years offers a clearer picture of the complexities of Egypt's relationship with Ethiopia. As discussed previously, in the late 1950s and early 1960s when Ethiopia was maneuvering to reincorporate Eritrea to their empire, Egypt under President Nasser sought to support the Eritrean rebels by opening a small military training camp in Egypt for Eritreans opposed to Ethiopian rule. Additionally, Egypt permitted Eritrean rebels to broadcast from Radio Cairo attempting to destabilize the Haile Selassie government. Egypt also

allowed the Eritrean Liberation Front (ELF) headquarters in Cairo, and promoted support for the Eritreans among the the Arab League. Although Egypt was keenly interested in undermining the pro-American and pro-Israeli government of Haile Selassie to deter western influence in the region, Nasser was more interested diverting Ethiopia's attention away from efforts to develop Nile water projects.⁸⁹

Egypt's interference in Ethiopian affairs was not limited to Eritrea. Egypt also has a long history of participation in Muslim Somalia, which was also a member of the Arab League although is not always considered an Arab country. During the sporadic conflicts involving Ethiopia and Somalia in the 1960's and 1970's, Egypt allied itself with Somalia and provided military training and weapons to the country. In 1978 alone, Egypt has been reported to have given millions of dollars Russian military equipment to Somalia. While the countries stated position was to support their Islamic brothers, it is widely believed Egypt's aim was to weaken on Ethiopia to diminish their ability to utilize the Nile, and act as a counter-balance to Egypt on issues involving the Nile.⁹⁰ This past has not been not been forgotten by current Ethiopian leaders as one can argue Egyptian meddling may have cost Ethiopia decades of economic and political development.

Egypt's policy towards Ethiopia has become more nuanced since the 1980's, as Egypt has made a concerted effort to upgrade their relations with their upstream neighbor. Although Egypt has moved forward on a number of positive initiatives to aid in development of their upstream countries, including Ethiopia, they have usually been perceived as being motivated by Egypt wanting increase their own share of Nile water. This combined with a history of meddling in

⁸⁹ Kendie, *Egypt and the Hydro-Politics of the Blue Nile River*, 156

⁹⁰ Daniel Kendie, "Toward Northeast African Cooperation: Resolving the Ethiopia-Somalia Disputes," *Northeast African Studies* 10, no. 2 (-01-01, 2003), 19-23.

foreign affairs has left Ethiopia with a deep suspicion of Egyptian intentions, but this has not deterred Ethiopia from accepting aid from Egypt. In the 21st century has sought to engage in a diplomatic offensive in Ethiopia providing food aid three times in 2008 alone to drought stricken Ethiopia.⁹¹ The country also has provided assistance in the areas such as health, crime prevention, educational scholarships and training in various fields. Ethiopian Prime Minister Dr. Ahmed Meles has expressed satisfaction with cooperation in the Nile Basin Initiative and the development of bilateral relations between the two countries publically, and both countries have touted their cooperation on trade.⁹² Egyptian experts have also played a role in developing Ethiopia's engineering designs for a various water development projects for rivers both outside the Nile Basin.⁹³

While the recent cooperation has been beneficial to both sides, it has yet to eliminate Ethiopia's apprehensions regarding Egypt's Nile water policies, and their stubbornness on allocation negotiations with Addis Ababa. Egypt has not only made it perfectly clear that its water allowance from the 1959 treaty is unchallengeable, but that it needs more water now and in the future. Egypt wants this further water to come from upstream projects like the, now unlikely, Jonglei Canal in southern Sudan and improved water management practices in from countries on both the White and Blue Nile including Ethiopia.⁹⁴ Egypt's former Water Resources and Irrigation Minister and current President of the Arab Water Council Mahmoud Abu Zeid claims that there are a number of upstream projects being planned to enhance the cubic meters annually

⁹¹ Magdi Radi, *Mubarak Orders Food Aid to Ethiopia* (Cairo: Egyptian State Information Service, 2008).

⁹² ESIS, *PM, His Ethiopian Counterpart Discuss Means of Boosting the Egyptian-Ethiopian Relations* (Cairo: Egypt State Information Service, 2009).

⁹³ Arsano, *Ethiopia and the Eastern Nile Basin*, 21

⁹⁴ Amer and Salah El-Din Amer, *Egypt and the Nile Basin*, 44

to the Nile.⁹⁵ While improved management and water resources conservation in upstream countries would be a beneficial to all involved, Egypt's unwillingness to share in the benefits has left Ethiopia less than motivated to offer significant concession to the country.

Egypt has maintained the position that they need the entirety of their allocation based on the 1959 agreement plus additional supplies to meet the demands from their rapidly expanding population. Ethiopia counters this by alleging its population is comparable to that of Egypt's and growing even more rapidly.⁹⁶ Moreover, Ethiopia is sees their food production sector as underperforming which is leading to an increased importation of food and widespread famine, and perceives the new Egyptian projects that turn desert into centers of agricultural production as counterproductive.⁹⁷ Ethiopian officials have made this point time and again but Egypt has yet to waiver significantly. Prime Minister Meles articulated the upstream countries disdain for Egypt's objections to other riparian countries using Nile water for large-scale irrigation projects and Egypt's long-term opposition to any international funding for large scale Ethiopian irrigation programs.⁹⁸ Of Ethiopia's irrigable land only approximately 2.5 percent has been developed.⁹⁹

Although Egypt has resisted large-scale irrigation development in Ethiopia, they have been slightly more understanding about Ethiopia's hydropower potential. This is because apart from for evaporation of water in a dam's reservoir, hydroelectric dams do not necessarily represent a significant water loss for Egypt since water must pass through hydroelectric dams to generate power. Ethiopia's Nile Basin has the potential to generate an estimated 102,710

⁹⁵ Egyptian Council for Foreign Affairs, "Egypt's Water Status and Needs" (Cairo, Egyptian Council for Foreign Affairs, March 6, 2010, 2010).

⁹⁶ Arsano, *Ethiopia and the Eastern Nile Basin*, 17

⁹⁷ Ana Cascão, "Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?" *Water Alternatives* 2, no. 2 (-06-01, 2009), 249.

⁹⁸ Mike Thompson, "Nile Restrictions Anger Ethiopia," *BBC News*, February 3, 2005, 2005.

⁹⁹ Aquastat, *Irrigation in Africa in Figures: Ethiopia*, 8

gigawatt hours of electricity annually, and the country has exploited only a small percentage of this potential. In addition to obtaining electricity generated in Ethiopia, Egypt and Sudan could benefit from water storage in the Ethiopian highlands where the evaporation rate is significantly less than in Sudan or Egypt.¹⁰⁰

There has been a long history of negative relations between Egypt and Ethiopia, but there is significant prospect for cooperation as each has things the other country needs or can benefit from. Ethiopia could benefit significantly from Egyptian funding and expertise, and Egypt could benefit greatly from electricity generated in Ethiopia and of course water from the country. The prospect for cooperation is bolstered further by the scarcity issues which will undoubtedly force both parties to the bargaining table to develop a framework for long-term cooperation as this will be in the countries' self-interest and critical to Egypt's self-preservation. Based upon the structural realist perspective on the concept of international regimes this paper subscribes to, entering into a cooperative regime is the logical next step for these countries, as it will provide the most optimal outcome for the both Egypt and Ethiopia.

Sudan-Ethiopian Relations

Like the relationship between Egypt and Ethiopia, Sudan and Ethiopia also share a history of conflict and interstate meddling, but there is a much stronger relationship of cooperation between the two countries. Ethiopia share Sudan's largest border spanning nearly 1,000 miles on Sudan's eastern side. Along this border there has been an extensive history of conflict. There were the battles of the 17th and 18th centuries between the Funj Kingdom in Sudan and Ethiopian emperors. There were numerous border conflicts as the Egyptians sought to extend their authority into Ethiopia throughout Egyptian-Ottoman rule in Sudan in the 19th century.

¹⁰⁰ Tesfa-alem Tekle, "Ethiopia, Egypt, Sudan Discuss Nile Projects," *Sudan Tribune* (June 22, 2008, 2008).

Subsequent to the emergence of Mahdist in Sudan near the end of the 19th century, the two countries sheltered each other's rebels. Mahdist forces managed to infiltrate as far as Gondar in the late 19th century. Sudan then fell under the control of an Anglo-Egyptian control in 1899 and the subsequent Ethiopian-British negotiations resulted in a 1902 treaty that established the border between Ethiopia and Sudan. This 1902 agreement stretched Ethiopia's rule in deeper into the Nile Valley.¹⁰¹

Like the previous centuries, the 20th century was one of conflict, but also of cooperation between the two countries. The early 20th century in prior to the Italian invasion in 1936 was committed to controlling the newly demarcated border between Ethiopia and Sudan (under British auspice) which was done cooperatively. Italy tried without success to extend Ethiopia's western boundary into Sudan during its brief occupation but was largely unsuccessful. Sudanese troops played an important role in the liberation of Ethiopia, as they accompanied Haile Selassie aided by British forces as they advanced towards Addis Ababa. Although Italy's defeat spelled the end of slavery in the Ethiopia-Sudanese border region, it failed settle a host of other border issues between Ethiopia and Sudan.¹⁰² Relations between the two countries ebbed and flowed considerably between cooperation and conflict from the time of Sudanese independence in 1956 to Ethiopia's revolution in 1974 because of deep suspicion of the other side's intentions. From 1974 until the 1989 Sudanese coup, relations between Sudan and Ethiopia were soured further as which led to Sudan supporting Eritrean and later Tigrayan rebels trying to topple Ethiopia's

¹⁰¹ I. Seri-Hersch, "'Transborder' Exchanges of People, Things, and Representations: Revisiting the Conflict between Mahdist Sudan and Christian Ethiopia, 1885-1889," *The International Journal of African Historical Studies* 43, no. 1 (-01-01, 2010), 1.

¹⁰² Alfredo González-Ruibal, "Fascist Colonialism: The Archaeology of Italian Outposts in Western Ethiopia (1936–41)," *International Journal of Historical Archaeology* 14, no. 4 (-12-01, 2010), 553-6.

communist government while Ethiopia eventually supported the SPLA rebels in southern Sudan.¹⁰³

Following its military coup in 1989, Sudan initially sought to strengthen relations with Ethiopia. However this effort failed, but the eventual overthrow of Mengistu Haile Mariam in 1991, resulted in a normalization of relations between the countries. This fragile friendship was short lived as Islamic fundamentalist elements in the Sudanese government sought to expand their religion throughout the region, which included Ethiopia. This was the point when Sudan began to support Ethiopian dissident groups and Ethiopia answered by resuming their support for the SPLA. By 1995, Sudan was accusing Ethiopia of sending troops to assist the SPLA in attacking Sudanese border villages.¹⁰⁴

Relations reached their lowest point following assassination attempt on Mubarak in Addis Ababa in 1995. Ethiopia alleged Sudan was behind the attempt and then joined with Uganda, Eritrea and the U.S. to apply diplomatic pressure to Sudan.¹⁰⁵ The Poor relationship between the countries continued until the eruption of conflict involving Eritrea and Ethiopia in May of 1998. In the following months, Ethiopia decided that it was in there best interest to normalize relations with Sudan so that it could focus its attention on the more pressing issue of Eritrea. Ethiopia followed this decision by significantly diminished their aid to the SPLA, and the countries restored regular economic relations thereafter with the Sudanese leader Omar al-Bashir making a diplomatic visit to Addis Ababa in November 1999.¹⁰⁶

¹⁰³ Robert Collins, "Civil Wars in the Sudan," *History Compass* 5, no. 6 (-11-01, 2007), 1778.

¹⁰⁴ ALICE IN GAMBELLA, "Sudan Rebels Find New Blood in Ethiopia," *The Guardian (London)* (-01-23, 1997), 014.

¹⁰⁵ "Mubarak Blames Sudanese Radical Says Muslim Leaders Behind Assassination Attempt in Ethiopia," *The Sacramento Bee* (-06-28, 1995), A.10.

¹⁰⁶ "Ethiopian PM Lauds Bilateral Cooperation with Sudan," *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-04-21, 2009).

Following the normalization of relations, the countries found other ways to work together in a beneficial manner. Ethiopia, Sudan along with Yemen joined forces at the beginning of 2003 forming a regional coalition to combat the growing terrorism problem in the Horn of Africa.¹⁰⁷ Additionally, following Ethiopia's closing of their border with rival Eritrea; land-locked Ethiopia sought an alternative route to the sea, and saw Port Sudan as a viable option. As a result the two countries increased cooperation along Ethiopia's northwestern border with Sudan allowing Ethiopia sea access.¹⁰⁸ Sudan also began selling oil to Ethiopia and is now the country's primary supplier.¹⁰⁹ There has also been collaboration on other fronts between the two countries. They began laying a fiber optic lines in 2005 between the countries in 2005, and in 2006 began a studying a way to link their energy and electric power sectors. This cooperation led to Ethiopia exporting electricity to Sudan as of late 2010.¹¹⁰

The Ethiopian-Sudanese dialogue regarding the Nile has ranged between conflict and collaboration over recent decades, but recently has shifted towards the latter.¹¹¹ After the change of Ethiopia's government in 1991, the two countries initialed an agreement to explore cooperation on the Blue Nile River. Although this never amounted to reallocation, the idea of losing its primary ally on the issue alarmed Egypt none the less.¹¹² This paper contends there are far more reasons for Sudan and Ethiopia to seek a cooperative regime to manage the Eastern Nile Basin than to work unilaterally. This is also a position taken by other experts in the field. John Waterbury argued has argued there is a compelling argument for strong cooperation between the

¹⁰⁷ Staff, "Ethio-Yemen Cooperation Enters New Stage: Ethiopian PM," *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-07-22, 2003), 1.

¹⁰⁸ Staff, "Ethiopia, Sudan Sign Cooperation Accords," *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-05-02, 2001), 1.

¹⁰⁹ BBC, "Sudan Said to be Ethiopia's Sole Oil Supplier," *BBC Monitoring International Reports* (-01-01, 2010).ibid.

¹¹⁰ BBC Staff, "Sudan, Ethiopia to Link Electricity Networks," *BBC Monitoring International Reports* (-01-01, 2009).

¹¹¹ Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*, 228

¹¹² Ashok Swain, "International Laws and Disputes in the Nile River" (Bergen, Norway, February 9, 2007, 2007).

sides. Waterbury contends that cooperation with Ethiopia offers greater benefits than with Egypt to the north as flow regulation in Ethiopia would benefit Sudan directly. Jack Kalpakian of Al-Akhawayn University in Morocco agrees with Waterbury on this and wrote that "Sudan's interests would have probably been served by helping itself to the water or reaching some accommodation with Ethiopia" as opposed to the 1959 water agreement which is in use today.¹¹³ According Yacob Arsano, Sudan is in favor of upstream-downstream cooperation in Nile basin development to maximize comparative advantage as well as flood and silt control. He also argues that although Sudan has historically sided more closely with Egypt on the issues regarding the Nile, but there has been a resurgence of Sudanese voices arguing it would be beneficial for Sudan to work more closely with Ethiopia.¹¹⁴

Both countries have a number of positions in common regarding the river and also have already developed a strong base for future cooperation. Both Ethiopia and Sudan have reservations regarding the terms of the outdated 1959 water allocation agreement between Egypt and Sudan. Both countries also share the concern that vast new irrigation projects in Egypt will necessitate an unreasonable quantity of additional water.¹¹⁵ Sudan and Ethiopia already cooperate on sharing hydroelectric power, which Ethiopia holds the comparative advantage over Egypt and Sudan in. Ethiopia is also much more efficient country to store water for future downstream use because the evaporation is considerably less than in Sudan and Egypt.

This paper contends, like the Egypt-Ethiopian relationship, both Sudan and Ethiopia have much to offer each other in a relationship of increased cooperation. Sudan has energy resource in the form of petrol, Ethiopia has energy in the form of electricity. Sudan has money and Ethiopia

¹¹³ Jack Kalpakian, *Identity, Conflict and Cooperation in International River Systems* (Surrey: Ashgate, 2004), 50.

¹¹⁴ Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*, 228

¹¹⁵ John Waterbury, *The Nile Basin: National Determinants of Collective Action* (New Haven: Yale, 2002), 84.

has water. Sudan needs flood mitigations and Ethiopia want to harness its water behind dams. Developing a regime to manage this relationship will serve the self-interests of these two countries better than by working autonomously, by allowing Sudan greater input in the way Ethiopia executes their Nile management strategy and allowing Ethiopia a forum to seek funding for their hydrological projects.

Egypt-Sudan Relations

The Egypt-Sudan relationship has a history of invasion, intimidation, cooperation and confrontation, yet the countries have generally been in lockstep with regards to the Nile over the past half century. This can be attributed to the fact the countries share similar colonial history and culture, and also because the countries share similar water scarcity challenges due to geography. Recent developments in the Nile Basin, like the advent of Nile Basin Initiative and Ethiopia's resurgence, have encouraged Sudan to reassess their loyalties as a stronger relationship with Ethiopia offers a number of benefits.¹¹⁶ Moving forward Egypt may need to find a way to match those benefits, or they may lose their most steadfast ally in the Nile Basin. Looking at the history of the Egypt-Sudan relationship explains why the countries have such a tenuous relationship, and why the countries have been generally agreement on Nile issues.

Modern relations between Egypt and Sudan began in 1820, which also marked the beginning of the Egyptian invasion of the country. The Turkish Viceroy of the Ottoman Empire's Sultan, Muhammad Ali, established autonomous control of Egypt, and saw Sudan as a ideal starting point to expand his new empire. Ali's army, comprised of troops from various areas in the Ottoman empire led by his third son (also named Muhammad), launched an invasion on Sudan in 1820, and met little resistance throughout the country. Although Egypt was the source

¹¹⁶Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*, 228

of the invasion, Sudanese considered the 64 years of Egyptian rule as being Turkish rule. This was because since medieval times Egypt was ruled by a multi-cultured Turkish speaking elite, and throughout this time Egyptian occupation, Egyptian Arabs held very few political or military positions in the Sudan. Additionally, language of the Sudanese government under Egyptian control was Turkish until the mid-nineteenth century.¹¹⁷

Egyptian rule of Sudan ended in 1885 when the British aided Egyptians (who was already under British control since 1882) were unable to crush a Mahdist rebellion in the country. Sudan's independence did not last long as Egyptian rule returned 14 years later in the mold of the Anglo-Egyptian Condominium from 1899-1955. British invasion of Sudan was not only an effort to reclaim territory lost during the Mahdist rebellion, but also to secure more Nile water for a bustling and strategically important Cairo. Although the British were successful in conquering Sudan, British public opinion was not supportive of the country taking on another colony. To alleviate these concerns an agreement was arranged in 1899 establishing Anglo-Egyptian rule. Under this system, Sudan was to be administered by a governor-general chosen by Egypt with British approval. All governor-generals of Sudan were consequently British, who rather than reported to the colonial office in London, reported to the British Foreign office in Cairo.¹¹⁸

During the Anglo-Egyptian condominium, the Gezira Scheme was developed in Sudan in the early 1920's, despite the objections of newly independent Egypt.¹¹⁹ The Gezira Scheme is positioned south of Khartoum between the Blue and White Niles which makes it ideal for irrigation, and is one of the largest agricultural projects in the world. At the time of its establishment in 1925, the total original area of the Scheme was about 1.135 million feddans

¹¹⁷ Robert O. Collins, *A History of Modern Sudan*, First ed. (Cambridge: Cambridge University Press, 2008), 10.

¹¹⁸ *ibid.*, 33

¹¹⁹ Egypt gained independence from the United Kingdom on February 28, 1922

which was much larger than the 300,000 feddens Egypt asked the project be limited to. In the early 1960s, the original area was extended to the southwest when Sudan added the Managil Extension which nearly doubled the area of the project to 2.1 million feddans.¹²⁰ This project was important to the British who would be receiving cotton at low prices, and it revolutionized the Sudanese economy and still represents a significant employer in the country. Egypt, on the other hand, was apprehensive about the project as it requires copious amounts of Nile water and it exceeded their requested 300,000 feddan size limit. The Jabal Awlia Dam was built in by Egypt in Sudan to store water for Egypt's use in an effort to alleviate some of their concern. This dam remained in Egyptian control until 1977 when the Aswan High Dam project was complete.¹²¹

As discussed earlier in this chapter, Egypt worked hard to exert influence over developments in its southern neighbor. This has been the case since Egypt's initial invasion of the country and continued well into the Anglo-Egyptian Condominium. Even in the early 1950's when Sudanese politicians sought to also gain independence for their country, Egypt actively discouraged the British to grant the country independence, and even campaigned within Sudan to rejoin the two countries.¹²² Tensions between the two countries increased just after Sudan became independent because in 1956 Egypt withdrew from helping Sudan build a reservoir on the Blue Nile at Roseires in protest to Sudanese objections of the Aswan High Dam project.

¹²⁰ A. M. Eldaw, *The Gezira Scheme: Perspectives for Sustainable Development* (Bonn: German Development Institute, 2004), 10.

¹²¹ Okbazghi Yohannes, "Water Resources and Inter-Riparian Relations in the Nile Basin," (2008).

¹²² Ahmed Abushouk, "The Anglo-Egyptian Sudan: From Collaboration Mechanism to Party Politics, 1898-1956," *Journal of Imperial and Commonwealth History* 38, no. 2 (-01-01, 2010), 222-4.

Sudan responded by declaring its non-compliance to the 1929 Nile agreement. Gamal Nasser countered by deploying Egyptian military units to the Sudanese border.¹²³

The Sudanese position towards Egypt began to soften following a military led coup in Khartoum in 1958. This led to new cooperation between the two countries and the 1959 Nile River agreement which led to new water sharing allocations, and also led to Sudan and Egypt agreeing to allow each other to build their prized dam projects. This agreement empowered Sudan in the Nile Basin by making it the only other country with set allocation measurements, and gave it incentive to protect the 1929 and 1959 agreements. Moreover, both countries agreed to not negotiate unilaterally with a third party on issues regarding the Nile which bound the two countries even closer together on the Nile issue. It also led to the Permanent Joint Technical Committee being established in 1960. This organization that was meant to tackle the water challenges the countries face and serve as the negotiator for the countries in issues that involve a third party.¹²⁴ The fact that the Nile flows through Sudan accentuates the importance of the Egypt-Sudan relationship, yet it also adds complications. Although Egypt and Sudan agreed in 1959 on an allocation of Nile water, Sudan remains uneasy about the outcome of the agreement, and faces new challenges with regards to the agreement after the country partitions in July of 2011. None the less, as of June 2011, the country has agreed to "continue joint coordination before consulting with any third party on the Nile water issue", according to Egyptian State Information Services.¹²⁵

¹²³ Ashok Swain, "Ethiopia, the Sudan, and Egypt: The Nile River Dispute," *The Journal of Modern African Studies* 35, no. 4 (-12-01, 1997), 679.

¹²⁴ *ibid.*, 679

¹²⁵ ESIS, "Egypt, Sudan Agree to Coordinate on Nile Water before Consulting Third Party," Egyptian State Information Services, <http://www.sis.gov.eg/En/Story.aspx?sid=56037> (accessed June 11, 2011, 2011).

All of the disputes between these two countries do not all revolve around the Nile. There is a disputed area known as the Halaib Triangle 790-mile long Egyptian-Sudanese border. Both countries have claimed ownership of the territory since independence. Cairo insists that the border follows the 22nd parallel based upon the 1899 Anglo-Egyptian Treaty. Khartoum argues that amendments to the treaty in 1902 and 1907 created an administrative border above the 22nd parallel. After Sudanese politicians visited the area to campaign in 1958, President Nasser gave Sudan an ultimatum demanding the removal of all Sudanese administrators and law enforcement from the disputed region. Tensions flared up repeatedly over the disputed land, and Egypt forcibly annexed it in 1992 after Sudan gave exploration rights to a Canadian oil company. Although some Sudanese saw this as an act of war, the Sudanese government was content considering the land illegally occupied. In 2000, Sudan withdrew its troops from the area, leaving Egyptian forces solely in control, but there has been sporadic skirmishes between the sides in the region.¹²⁶The area is still in dispute as of 2011.

Relations between the two countries reached their lowest point in June 1995 when Egypt and Ethiopia accused authorities in Sudan with participation in a plot to assassinate Egyptian President Mubarak as he arrived in Addis Ababa for an Organization of African Unity meeting. This was followed by a skirmish between border guards in the Halaib Triangle, and Sudanese President Bashir accusing Egypt of conspiring to overthrow his country's government. President Mubarak denied the charge but insisted Egypt was capable of overthrowing the Bashir regime "in ten days." Mubarak added: "We are not being asked to intervene militarily because that would lead to deaths among the Sudanese, something we don't want because we think of

¹²⁶ Rongxing Guo, *Territorial Disputes and Resource Management: A Global Handbook* (Hauppauge, New York: Nova Science Publishing, 2007), 132-3.

Sudanese like Egyptians."¹²⁷ Tensions cooled between the countries by the end of 1999, and President Bashir visited Egypt and both leaders agreed to normalize diplomatic relations.¹²⁸ Bashir returned to Cairo in 2002 when they stressed their brotherly ties and put in motion actions to expand cooperation on a variety of practical issues, including increased trade.¹²⁹

Egypt was adamantly against South Sudan independence. According to a leaked diplomatic dispatch from February 9, 2010, Egypt's "top priority" in Africa was Sudanese unity. Egypt perceives the partition of Sudan as a threat to Egypt's access to the Nile and would increase Egypt's refugee population. The dispatch continues by revealing the government of Egypt has been "hedging its bets" by promising the South Sudan considerable amounts of aid and development funding.¹³⁰ This leaked diplomatic dispatch has proven to be accurate as once it became apparent the Comprehensive Peace Agreement (CPA) between the southerners and Khartoum was becoming a reality, Egypt did more than simple hedge their bets by establishing a consulate in Juba. The country has also agreed to provide two power plants for lighting the cities of Wau and Juba and plans to open a branch of the University of Alexandria in Juba.¹³¹

The examination of the Sudan-Egypt relations demonstrates the complexities faced in the Eastern Nile Basin. On one hand, you have two countries with a long history of suspicion of the other's intentions. On the other hand, you have two countries who have been generally unified

¹²⁷ Staff, "

Border Clashes Follow Attempt to Kill Mubarak," *The Independent on Sunday*, June 25, 1995.

¹²⁸ Staff, "Sudanese FM: Sudan, Egypt Plan to Normalize Relations," *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-10-10, 1998), 1.

¹²⁹ Staff, "Sudanese President Concludes Visit to Egypt," *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-05-15, 2002), 1.

¹³⁰ U.S. Embassy Cairo, Anonymous Leaked Diplomatic Dispatch Intended for Briefing of Admiral Mike Mullen, Chairman of the Joint Chiefs of Staff, Cairo, Egypt, February 10, 2010.

¹³¹ ESIS, "Egypt Establishes Two Power Stations in South Sudan," Egyptian State Information Service, <http://www.sis.gov.eg/En/Story.aspx?sid=16132> (accessed June 11, 2011).; ESIS, "Mubarak: Egypt to Provide all Assistance to Advance the Peace Process in South Sudan," Egyptian State Information Service, <http://www.sis.gov.eg/En/Story.aspx?sid=25276> (accessed June 11, 2011).

when it comes to an issue that is dearest to both, the Nile River. Moving forward, this relationship may change as Sudan has been more actively engaged with Ethiopia and may find that a stronger bond with Ethiopia offers more benefits in the long term than the relationship Egypt offers. While by no means do I suspect Sudan will break ranks with Egypt in regards to the Nile Basin Initiative Cooperative Framework Agreement, there is potential for the country to negotiate with Ethiopia unilaterally to ensure their domestic water security, which would be a violation of the 1959 agreement. If this were to happen, Egypt would find itself in a much weaker position in the Nile River discussion. Based upon this potential outcome, this paper argues Egypt should be actively engaged in facilitating the development of the cooperative regime. I contend if Egypt waits too long, Sudan and Ethiopia may find it more beneficial to develop a cooperative between themselves and exclude Egypt entirely.

The Sudanese Partition

The anticipated independence of South Sudan is the latest development that adds further weight to the argument the 1929 and 1959 Nile agreements are no longer relevant, and puts added pressure on Sudan and Egypt to pursue cooperation on the Nile issue. The division will have significant ramifications on the water management issues in the Nile Basin, as it adds another country to the complex negotiation process. Although the new country is not considered to be part of the Eastern Nile Basin and only has the White Nile within its borders, it will be a key player in the future of Nile Basin negotiation. As a result, Southern Sudan has been aggressively courted by basin states. Egypt has been actively courting Africa's newest



Figure 6: The Sudanese partition (source: <http://media.economist.com/images/ga/2007w36/SudanMap.gif>)

country, which will become independent in July of 2011, offering the government assistance by the way of electricity, education and health projects according to Paul Mayom Akech, Southern Sudan's minister for water and irrigation.¹³² Acquiring South Sudan as an ally will benefit both Egypt and Sudan in future Nile Basin Initiative negotiations by adding a fourth country to the group not signing the Cooperative Framework Agreement (CFA) that now includes the Democratic Republic of Congo, Egypt and Sudan (for more information on the Nile Basin Initiative, see chapter 4).

¹³² Associated Press, "Egypt's Prime Minister, Seeking a Nile River Ally, Visits Southern Sudan, Offers Aid Projects," *The Washington Post*, March 28, 2011, 2011.

Egypt and Sudan's interest in the Southern Sudan's positions concerning the Cooperative Framework Agreement run deep as the both the countries have a deep vested interest in maintaining the status quo with regards to allocation and need allies to work in their favor. Southern Sudan allying themselves with the upstream states would makes it exceedingly unlikely it would sign the Cooperative Framework Agreement. Although there are now six other nations in the Nile Basin that have signed the CFA which allow the CFA to be ratified, suffering the loss of South Sudan's support would be considerable because it represents a major potential upstream partner, and the country that will demarcate the midpoint between White Nile basin's net water contributors and net water consumers. If Egyptian and Sudanese lobbying loses to upstream states also vying for South Sudan's support for the CFA, the best Egypt and Sudan could hope for is South Sudan acting as a bridge between the upstream providers of the Nile waters and the downstream recipients. However, if economic assistance from the basin's two richest countries begins to significantly influence South Sudanese domestic politics, it becomes more unlikely that South Sudan would endanger Egyptian and Sudanese aid by signing the CFA.

Egypt's desire to gain influence in South Sudan goes far beyond the CFA. Egypt has still seeking to increase the flow of the Nile and still hopes of completing the Jonglei Canal project in which it has already invested heavily. The completion of this project represents a significant increase in the amount of water available to Sudan and Egypt. The 360 kilometer canal will allow water from the White Nile to bypass the Sudd Swamps, where evaporation leads to significant water loss increasing the annual flow of the White Nile significantly.¹³³ Early

¹³³ Waterbury, *The Nile Basin: National Determinants of Collective Action*, 144

indications are that the Southern Sudanese government remains in weary of the project as it will have major environmental, social and economic ramifications on the country.¹³⁴

Ultimately, the division of Sudan represents possibly the most definitive reason why the 1929 and 1959 Nile Water Agreements are no longer applicable. Egypt has maintained the position that the division of Sudan does not alter the water agreements and Sudan will simply have to find a way to divide their previously allotted share between the North and South according to Egypt's Minister of Irrigation and Water Resources, Mohamed Nasr Eddin Allam.¹³⁵ Sudan army spokesperson, Khaled al-Sawarmi echoed this position by saying " Even if south Sudan separated and became an independent state...it will be met with the same issues as Sudan, including debts, policies and protocols."¹³⁶ While both Egyptians and Northern Sudanese governments have offered little reservation in taking adopting this position, the negotiations between North and Sudan have not taken place regarding this issue, therefore there is no way to predict the outcome.

The partition of Sudan only further intensifies the argument for a the development of an Eastern Nile Basin cooperative regime. At best, Egypt and Sudan can hope for southern Sudan will become another ally to offset the rising tide of upstream states seeking to utilize their own domestic water resources, but based upon the current conflicts between the north and South Sudan over other resources, it is hard to perceive the country aligning its water policies with the north. Developing a cooperative regime between Egypt, North Sudan and Ethiopia is necessary for Egypt and North Sudan's self-preservation, and it makes the partition of Sudan much less of

¹³⁴ Staff, "Jonglei Canal Project Needs to be Revised, South Sudan Says," *Sudan Tribune*, August 8, 2009, 2009.

¹³⁵ MENA, "Egypt: Sudan Breakup Will Not Affect our Share of Nile," *Al Masry Al Youm*, January 11, 2011, 2011.

¹³⁶ MENA, "South Sudan Secession Will Not Impact Nile Sharing, Says Sudan Army Official," *Al Masry Al Youm*, January 11, 2011, 2011.

an issue since the countries will not need to look to the Nile Basin Initiative regime to determine their water security.

The Pressure on the Nile

As discussed throughout this paper, the countries of the Eastern Nile Sub-basin are facing challenges not before experienced in the region or the world for that matter. While populations have expanded rapidly at other times in history, this has never happened at a time when the countries were also facing limits and scarcity of natural resources. When one adds abject poverty to an environment of extreme population growth and scarcity of the most essential resource to life, inaction is a recipe for disaster. To further my argument for increased cooperation in the Eastern Nile Basin and to explain the urgency for it, this section will focus existing challenge of scarcity and population growth faced by Egypt, Sudan and Ethiopia.

Population Growth

No issue is going to prove to be more challenging for the countries than feeding and managing their ever-expanding populations. According to the United Nations *World Population Prospects* report for 2008, over the past 60 years populations throughout Africa have seen dramatic population growth which is certain to continue. Egypt, which has reaped the greatest benefits of the current water sharing agreement in the Nile Basin and is most reliant on the Nile, has seen a population increase of nearly a four-fold increase in its population. Egypt went from a mere 22 million people in 1950 to an astounding 83 million people in 2009.¹³⁷ Sudan has also witnessed similar growth. In 1950 the country had a manageable 9 million people, by 1950 that

¹³⁷ United Nations, "World Population Prospects: The Revision 2008." March 11, 2009. <http://esa.un.org/UNPP/p2k0data.asp> (accessed December 3, 2010)

population also quadrupled to over 42 million people.¹³⁸ Ethiopia, possibly the most important country in this discussion because it is the source of much of the water in question, also saw a similar four-fold increase for the same time period with the population expanding from over 18 million in 1950 to more than 82 million in 2009.¹³⁹ It is no wonder the Nile has been stretched to its limits with such unrestricted population growth.

While these growth numbers express the each countries increasing demand on the Nile's flow, the population growth estimates for the near future clearly demonstrate the dire situation that these countries face. Egypt for example, is expected to grow by another 10 million over the next 5 years alone and by 2025 the country is expected to have well over 100 million residents which represent a 25 percent increase in just 15 years.¹⁴⁰ Sudan, although having the smallest population of the three countries is expecting similar growth percentage-wise. Sudan is expected to grow by more than 5 million over the next five years and 15 million over the next 15 years.¹⁴¹ The most significant growth of the three countries will take place in Ethiopia which will see an increase nearly equal to both Sudan and Egypt combined. In the next five years the country is anticipated to see a 14 million person increase, but by 2025 the country is expected to experience a border-busting 37 million person increase and will overtake Egypt as the most populous of the three countries in the sub-basin with nearly 120 million residents.¹⁴² This kind of population growth could easily serve as a justification for Ethiopia's desire to harness more of the Nile, and also straightforwardly demonstrates Egypt and Sudan's tendency to see Ethiopia as a threat.

¹³⁸ United Nations, "World Population Prospects: The Revision 2008." March 11, 2009. <http://esa.un.org/UNPP/p2k0data.asp> (accessed December 3, 2010).

¹³⁹ United Nations, "World Population Prospects: The Revision 2008." March 11, 2009. <http://esa.un.org/UNPP/p2k0data.asp> (accessed December 3, 2010).

¹⁴⁰ United Nations, "World Population Prospects: The 2008 Revision," (2008). *ibid.*; *ibid.*

¹⁴¹ *ibid.* Maha El Dahan, "

Egypt's Water Needs to Surpass Resources by 2017," *Reuters*, 2009.

¹⁴² United Nations, *World Population Prospects: The 2008 Revision*

The estimates of the next 40 years are an even more alarming signal of the need for a comprehensive agreement between the countries, the long term estimates paint a incredibly grim picture for the region even if an agreement is agreed upon. According to the United Nations *World Population Prospects* report for 2008, the combined population of Egypt, Sudan and Ethiopia is expected to double by 2050 which will put an unfathomable demand on an already over stressed resource. Egypt, which has very little in terms of domestic water resources and certainly not enough domestic resources to even meet a significant percentage of its domestic demand, is anticipated to have a population of nearly 130 million people.¹⁴³ Sudan, which has limited domestic water resources as well, is expected to have 75 million residents by 2050.¹⁴⁴ Ethiopia, which is the source of the Blue Nile and but has sporadic rainfall, is expected to have 173 million people, which is nearly the current population of the three countries combined.¹⁴⁵

In total the three countries are expected to have more than 375 million residents all requiring clean drinking water, water to develop food sources, water for sanitation and water for industrial and economic development. Without the development of long term comprehensive resource management regime in the Eastern Nile Basin in the near future, the river faces certain peril as each country unilaterally takes measures in an attempt to secure their own future Nile access which may ultimately diminish the resources of those downstream.

Water Scarcity

Water scarcity is primarily a consequence of rapid population growth in the eastern Nile Basin over the last 50 years, but also can be attributed to poverty as scarce resources poorly utilized can easily exacerbate a situation. Water scarcity too often associated with how much

¹⁴³ *ibid.*

¹⁴⁴ *ibid.*

¹⁴⁵ *ibid.*

water humans have to drink, but fresh water in the eastern Nile Basin is critical in a number of facets of daily life. For Egypt, Ethiopia and Sudan, the vast majority of fresh water consumed is used in agriculture, but the water is also utilized to the countries in other ways including navigation, hydroelectricity, fishing and wildlife habitat. As the challenge of water poverty looms over all three countries, scarce resource management through a regime organization is the best method to ensure the survival of all three countries.

Within the concept of water scarcity, there have been two universally accepted types of scarcity: economic scarcity and physical scarcity. Economic scarcity occurs in situations in which there has been a lack of investment in water resource management or deficiency of human capacity to match the increasing demand on water. A significant amount of the economic scarcity occurs due to the way institutions function, favoring one group greater than others, taking a more of a policy approach of inaction with the less favored groups. In the agricultural sector economic scarcity can lead to inefficient water management and unrealized yield potential. Common symptoms of economic water scarcity may comprise of minimal or no infrastructure development so that people struggle to get enough water for agriculture or drinking. It may also include discriminatory distribution of water although infrastructure exists for equitable allocation.¹⁴⁶

Physical scarcity occurs when existing resources are inadequate to satisfy all demands, including the bare minimum environmental flow requirements. Arid regions like Egypt and Sudan are most frequently associated with this type water scarcity, but with unrestricted population growth even countries that have sufficient water resources to support a modest

¹⁴⁶ Comprehensive Assessment Secretariat, *Water for Food, Water for Life: Insights from the Comprehensive Assessment of Water Management in Agriculture* (Colombo, Sri Lanka: International Water Management Institute, 2006), 7.

population can find themselves in a situation of scarcity .¹⁴⁷ This was the case in years past as Egypt was able to grow unrestrained based upon the assumption the Nile River would continue to flow unobstructed. Ethiopia may fall into this category in the future as their population expands while they do not have the water resources to meet the food demands of its people. This is caused by overdevelopment of existing water resources, usually for irrigation and sometimes industry. Under artificially created scarcity, water resources get overcommitted to an assortment of users, and there not enough water to meet demands placed on the resource. Egypt, for example, is still growing at record rates, although it has already utilized 100 percent of their agricultural land and fresh water resources.

Physical water scarcity can cause severe environmental degradation including river dehydration and pollution, declining groundwater supplies. Globally, approximately 900 million people live in river basins in which physical scarcity of water is absolute, and another 700 million live where the threshold of water resources is fast approaching physical scarcity. Egypt, Sudan fall into the previous and Ethiopia the latter. There are several factors that drive river basins to the brink of scarcity. Water rights, for example, are unclear which allows

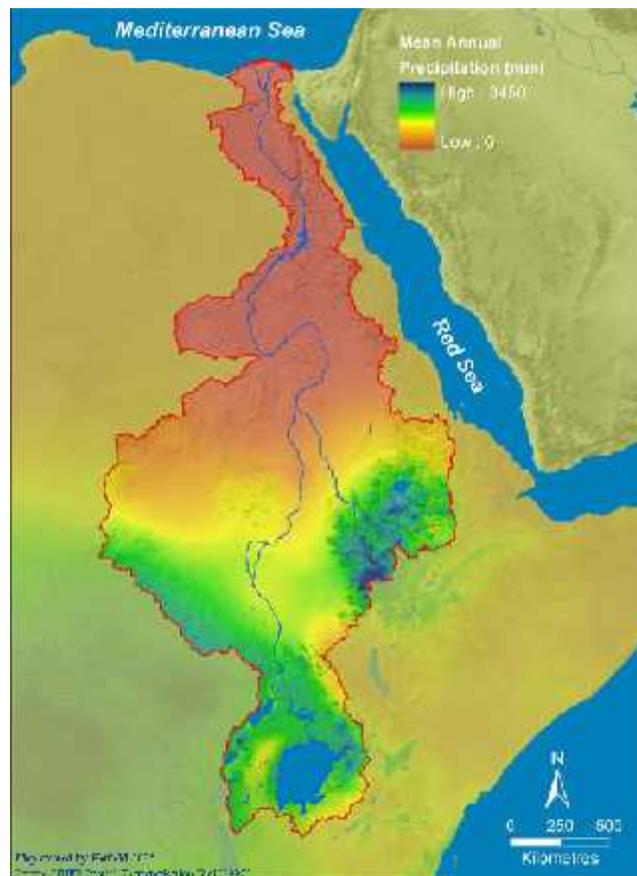


Figure 7: Eastern Nile Basin rainfall: The dark green represents a high level of annual rainfall, while the red colored areas represent little to no rainfall. (source: United Nations Environment Program)

¹⁴⁷ *ibid.*, 7

undeterred usage of shared water resources without consideration for those downstream. Countries with shared water resources fail to work collaboratively to manage the resource. Territorial sovereignty ideology may drive countries to maximize available resources with the goal of development.¹⁴⁸ Although it may be helpful in the short term, intentions such as to investing in water for poverty alleviation at the national level can lead to a river basin's drying up. Egypt's desire to farm the desert, for example, only adds more stress to their already strained river by inefficiently attempting to grow more food and create jobs. In the Nile Basin the dominant short-term domestic political concerns have consistently taken primacy over long-term social and environmental concerns in regards to fresh water resource management. This paper contends long-term cooperative planning will need to be the preferred method in the future in downstream countries can hope to achieve water security.

In terms of physical scarcity of fresh water, all three of the countries have cause to be concerned. Countries that have less than 1000 cubic meters of fresh water per capita are considered to be experiencing water scarcity.¹⁴⁹ Based upon that threshold, Ethiopia is the only country not considered to be close to suffering from physical scarcity according to United Nations Food and Agriculture Organization (FAO) data. As of 2005, Ethiopia has 1,658 cubic meters of fresh water available per capita domestically.¹⁵⁰ While this translates to a lack of physical scarcity for the country, the country suffers greatly in the field of economic scarcity as according to data from 2002, only 22 percent of the country's population has access to improved drinking water sources.¹⁵¹ Sudan fares much worse than Ethiopia with respect to scarcity.

¹⁴⁸ *ibid.*, 7

¹⁴⁹ Farzaneh Roudi-Fahimi, Liz Creel and Roger-Mark De Souza, *Finding the Balance: Population and Water Scarcity in the Middle East and North Africa* (Washington DC: Population Reference Bureau, 2002), 1.

¹⁵⁰ Aquastat, *Irrigation in Africa in Figures: Ethiopia*, 4

¹⁵¹ *ibid.*, 1

According to the 2005 FAO statistics, Sudan only has 1187 cubic kilometers of fresh water per capita domestically.¹⁵² Sudan fares much better than Ethiopia with respect to access to improved drinking water sources as 69 percent of the population has access.¹⁵³ This can be attributed to the fact that Sudan has half to population of Ethiopia and a larger percentage of the country's population lives in urban areas, as opposed to Ethiopia who has a primarily rural population. It is also important to consider following the divide of Sudan these statistics may change significantly as much of the country's water resources are in the southern portion of the country. Egypt face the greatest challenge of the three countries regardless of whether they retain the rights to 86 percent of the Nile or not. According to the FAO statistics, the country has a just 1008 cubic meters per capita of fresh water per capita domestically and is totally dependent on the Nile.¹⁵⁴ However, in contrast to Ethiopia and Sudan, 98 percent of Egypt's population has access to improved drinking water sources.¹⁵⁵ Like Sudan, this can be attributed to a primarily urban population.

While these numbers are staggering by themselves, when assessed in tandem with the population projections, they make a sound argument for the need for a comprehensive eastern Nile Basin management regime. Each of these countries has a potential for famine that cannot be ignored. Additionally, each country's economic future is very much dependent of the river. The Nile is the primary employer for Sudan and Egypt, and Ethiopia is planning to make it the country's principal income generator by the way of Hydroelectricity. This paper contends that if a regime organization is designed around the concept of Egypt and Sudan helping Ethiopia meet

¹⁵² World Bank, "Renewable Internal Freshwater Resources Per Capita (Cubic Meters)," *World Development Indicators* (2011).

¹⁵³ Aquastat, *Irrigation in Africa in Figures: Sudan*, 1

¹⁵⁴ World Bank, *Renewable Internal Freshwater Resources Per Capita (Cubic Meters)*

¹⁵⁵ Aquastat, *Irrigation in Africa Facts and Figures: Egypt*, 1

its economic scarcity challenges and Ethiopia helping them meet their physical scarcity challenges. This will give every country incentive to be efficient in their water use and help each other be more efficient because it is in each country's own self-interest.

CHAPTER 4

COOPERATION AND THE NILE BASIN INITIATIVE

Early Post-colonial Nile Cooperation

The Eastern Nile River Basin represents the 3 largest countries on the Nile River that have the most at stake in negotiating future cooperation in river management. With each country having unique concerns, cultures and politics, reaching consensus on any issue can be considered a step forward. Although there has been a lack of cooperation on tackling the largest issue between the three countries, water sharing, there has been a history of regimes managing the Eastern Nile Basin in one form or another prior to the Nile Basin Initiative which offers a basis to work from in developing a new river management regime for the Eastern Nile Basin.

The Permanent Joint Technical Commission for Nile Waters (PJTC) was the first example of multi-national cooperation in management of the Nile Basin following the 1959 agreement between Egypt and Sudan. This was a two member regime organization representing the most reliant and most downstream countries of the Nile River. The PJTC was supported by the United Nations Development Program, and regular quarterly meetings were rotated between Khartoum and Cairo.¹⁵⁶ The PJTC has performed a number of tasks, but has three principal functions. The first function is to act as the monitors of the water allocation ensuring there is uniformity in the measurement process. Waterbury alleges the PJTC has fallen far short in this regard. He claims the Egyptian Engineers based in Sudan have been much more active in controlling this process than the Sudanese based at Aswan. This allegation is not unfounded as there has been a history of the PJTC looking the other way or being outright complicit as Egypt has overdrawn their 1959 agreed upon allocation. Between 1980 and the severe drought year of

¹⁵⁶ Waterbury, *The Nile Basin: National Determinants of Collective Action*, 133-4

1986 for example, Egypt released 12 cubic kilometers beyond their quota, while demanding Ethiopia not exploit water from the Nile. It is important to point out that as the last country on the Nile, Egypt is far from in physical control of the river, but the country was able to assert influence over river use in other ways as discussed in previous chapters. Additionally, the PJTC also had the responsibility of negotiation of allocation in the instance of a prolonged drought where the amount of water in the Nile was expected to be unable to meet the 1959 allocations. Although there were instances of extreme drought in the 1980s where the PJTC faced short term droughts, Egypt and Sudan adjusted their agricultural plans respectively and the commission has not been forced to perform this task.¹⁵⁷ The PJTC's second function is to play a supervisory role for joint engineering studies and the development of water supply enhancement projects. To monitor their progress they installed 130 gauging stations along the Nile River and its tributaries. In an effort to maximize the Nile's yield, the group made sought to minimize evaporation loss along the river and while simultaneously enhancing the storage capacity for the two countries. This involved storage projects on the Albert and Victoria Niles as well as the massive Jonglei Canal project in southern Sudan.¹⁵⁸ In addition, the PJTC's third task was to represent both Sudan and Egypt in negotiations with third parties.¹⁵⁹

Spearheaded by Egypt's seeking to engage upstream countries while attempting to control the dialogue, a new regime was created in 1967 to survey the Nile known as the Hydro-Meteorological Survey Project (HYDROMET). Financed primarily by the United Nations Development Program, HYDROMET 's objective was to collect and examine hydrological data from the Equatorial Lakes and rivers along the Western Nile Basin. HYDROMET led to the

¹⁵⁷ *ibid.*, 132-3

¹⁵⁸ Amer and Salah El-Din Amer, *Egypt and the Nile Basin*, 31

¹⁵⁹ Waterbury, *The Nile Basin: National Determinants of Collective Action*, 134

development of three mathematical models that helped basin countries understand and manage the river's flow. Although the research area did not encompass the eastern Nile basin, it benefitted both Egypt and Sudan as all the data collected was shared with all members. The HYDROMET project represents a successful example of technical cooperation between multiple countries in the Nile Basin, but it received objections from Ethiopia, who was excluded from the project.¹⁶⁰

In 1992 the successor of HYDROMET, TECCONILE was born. The Technical Committee for Cooperation and Integrated Development and Environmental Protection of the Nile Waters (TECCONILE), a regime organization, was formed upon the request of Egypt and included Sudan, Rwanda, Uganda and the Democratic Republic of Congo. Ethiopia, Eritrea, Kenya and Tanzania all had objections to shortcomings in the organization and chose participate only as observers. Financially supported by the Canadian International Development Agency, the committee formed what was termed the Nile River Basin Action Plan (NBRAP). The plan five main categories: integrated water resources planning and management, capacity building, training regional co-operation and environmental protection and enhancement. The NRBAP was prepared within this framework in 1995 and included 22 technical assistance and capacity building projects, with an estimated cost of US\$100 million.¹⁶¹ TECCONILE was dissolved in 1999 to make way for the Nile Basin Initiative.¹⁶²

¹⁶⁰ Swain, *Ethiopia, the Sudan, and Egypt: The Nile River Dispute*, 690; Waterbury, *The Nile Basin: National Determinants of Collective Action*, 77

¹⁶¹ AbdelFattah Metawie, "History of Co-Operation in the Nile Basin," *International Journal of Water Resources Development* 20, no. 1 (-03-01, 2004), 54.

¹⁶² Waterbury, *The Nile Basin: National Determinants of Collective Action*, 77-9

The Nile Basin Initiative

In 1999 the cooperative regime formerly known as TECCONILE found new life with a new and more expansive mission as the Nile Basin Initiative (NBI). The NBI is meant to be a regional partnership of all ten Nile basin countries with the aim of long-term management and development of Nile waters. The initiative developed a basin-wide framework, which is guided by the countries' shared vision "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources." The NBI is taking two approaches to basin management. The first, focuses on the development of the river as a resource for efficient use with the goal of economic development by all member states. The second focuses on developing a legal framework for managing the river cooperatively to maximize "equitable utilization of, and benefit from, the common Nile Basin water resources."¹⁶³

. Ten countries make up the NBI membership: Burundi, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Uganda and United Republic of Tanzania, with Eritrea as the only non-member of the NBI, but acts as an observer. Within the NBI group there is two strategy tracks: Eastern Nile Subsidiary Action Program (ENSAP) and Nile Equatorial Lakes Subsidiary Action Program (NELSAP).¹⁶⁴

The NBI has received wide-ranging monetary support from a number of European nations, the European Commission and the World Bank. The core costs of the NBI Secretariat, Advisory Committee and Council of Ministers is supplied by the basin countries by the way of annual dues. Contributions and annual dues are managed by the World Bank in the Nile Basin

¹⁶³ Staff, "About the Nile Basin Initiative," Nile Basin Initiative, http://www.nilebasin.org/newsite/index.php?option=com_content&view=section&id=5&layout=blog&Itemid=68&lang=en (accessed June 2, 2011, 2011).

¹⁶⁴ Metawie, *History of Co-Operation in the Nile Basin*, 57-61

Trust Fund (NBTF).¹⁶⁵ Within the NBI group a panel of experts was assembled by each country nominating three experts. The role of the panel of experts whose is to propose a framework for basin-wide cooperation with comprehensible objectives, actions, and institutional framework that would lead to equitable allocation and use of the Nile.¹⁶⁶

To develop a *cooperative framework* each of the nine NBI countries engaged in negotiations. The outcome was composed of fifteen general principles and thirty-nine articles. Consensus has been reached on All the principles and articles except Article 14 on water security. Article 14 states:

*Having due regard for the provisions of Articles 4 and 5, Nile Basin States recognize the vital importance of water security to each of them. The states also recognize that cooperative management and development of the waters of the Nile River system will facilitate achievement of water security and other benefits. Nile Basin States therefore agree, in a spirit of cooperation, (a) To work together to ensure that all states achieve and sustain water security. (b) Not to significantly affect the water security of any other Nile Basin state.*¹⁶⁷

Egypt and Sudan perceive sub-article (b) this as a direct threat to their position as the current beneficiaries of the 1959 agreement because it allocates an distressing amount of discretion to the upstream countries, who make up the majority of the panel of experts, in terms their own interpretation of "water security". The original 1929 agreements intended to divide Nile's water between Egypt and the Sudan and held a clause that upstream states could not

¹⁶⁵ Staff, *About the Nile Basin Initiative*

¹⁶⁶ Dr Ahmed El Mufti, *The Success of the Impossible Negotiations about the Waters of the Nile: 1891-2007* (: Khartoum International Centre for Human Rights, 2007), 17.

¹⁶⁷ Ayebare, *Issue Brief: A Political Storm Over the Nile*, 3-4

construct any irrigation or hydroelectric projects on the Nile or its tributaries or associated lakes if the structure or project would have any diminishing or delaying effect on the water reaching Egypt. Egypt's and Sudan contend these previous agreements are binding on all Nile River basin countries and under international law and must be taken into consideration.¹⁶⁸ Egypt and Sudan wanted sub-article 14b to be amended to say "Not adversely affect the water security and current uses and rights of any other basin state."¹⁶⁹

The seven upstream countries equate retaining the status quo on current uses and rights is tantamount to accepting the provisions of the 1929 and 1959 agreements that were one of the primary motivations for developing the Comprehensive Framework Agreement (CFA) in the first place. They contend that an allocation of 55.5 billion cubic meters of Nile water to Egypt and 18.5 billion cubic meters to Sudan is unsustainable and does not take into account the needs of the upstream nations.¹⁷⁰ Additionally, it is argued an estimated 10 billion cubic meters is lost through evaporation in Lake Nasser which was a creation of Egypt.¹⁷¹

Egypt and Sudan have maintained the stance that upper Nile countries did not need water from the Nile for irrigation because they receive ample rainfall, this has proven to not always be true in recent years as droughts in Ethiopia adequately demonstrated the need for Nile water utilization. Moreover, Egypt's unwillingness to negotiate and stubbornness regarding the issue has unified upstream countries, Ethiopia in particular, in opposition to Egyptian military and economic threats.¹⁷² At their meeting in May 2009 The Council of Ministers of Water from the nine Nile Basin Initiative countries, resolved to eliminate Article 14(b), the article in question,

¹⁶⁸ BBC, "East Africa Seeks More Nile Water from Egypt," *BBC News*, May 14, 2010, 2010.

¹⁶⁹ Ayebare, *Issue Brief: A Political Storm Over the Nile*, 4

¹⁷⁰ *ibid.*

¹⁷¹ Bloomberg, "Congo, Burundi to Join Nile Agreement Opposed by Egypt," *Al Masry Al Youm*, January 20th, 2011.

¹⁷² BBC, *East Africa Seeks More Nile Water from Egypt*

from the body of the draft Cooperative Framework Agreement and save it for later negotiations as a way to resolve the deadlock. However, this decision was eventually rejected by Egypt and Sudan, who hoped to carry on discussions to arrive at an alternative formulation for the article.¹⁷³

A follow-up meeting was held in July of 2009 in Alexandria Egypt to address the objections Sudan and Egypt voiced in the May meeting. An agreement was made to allow six additional months for discussion among the Nile River basin countries with the hope of working out a way to alleviate the apprehension expressed by Egypt and Sudan. A Joint Committee met three times ahead of the Sharm el-Sheikh ministerial meeting scheduled for April 2010, but it was unsuccessful in breaking the deadlock. Attendees of the Sharm el-Sheikh meeting pushed for the signing of the CFA to go ahead. This faced opposition from Egypt and Sudan who claimed the action was a violation of the NBI rules of procedure, which necessitate that all decisions should be reached by consensus. They alleged that any action taken without unanimity could not be approved under the NBI framework. This was rebuked by seven states who responded by declaring that no individual country had veto power over the negotiations, and Uganda, Ethiopia, Rwanda, and Tanzania proceeded to sign the CFA on May 14, 2010.¹⁷⁴ Kenya followed suit signing the CFA on May 19th.¹⁷⁵ The CFA needs six signatories to be ratified and Burundi became the sixth on February in 2011 directly following the fall of Egyptian dictator Hosni Mubarak whom had refused to sign the CFA.¹⁷⁶ The Democratic Republic of Congo (DRC) was

¹⁷³ *ibid.*; Ayebare, *Issue Brief: A Political Storm Over the Nile*, 4

¹⁷⁴ BBC, *East Africa Seeks More Nile Water from Egypt*

¹⁷⁵ Walter Menya, "Kenya Signs Nile Basin Pact," *Daily Nation*, May 19, 2010.

¹⁷⁶ Ahkmed Osman, "To Egypt's Chagrin, Burundi Joins Controversial Nile Basin Pact," *Al Masry Al Youm*, January 3, 2011.

widely expected to join the other upstream countries, but announced it would not sign in April of 2011.¹⁷⁷

The benefit of the Basin Initiative is that it increases the ability for Nile Basin countries to cooperate in managing and developing the basin. It also offers a level of predictability to the international relations on the river which in turn fosters a sentiment of security among the member states and investors in the region. Moreover, as stressed throughout this paper, when cooperation is realized, even when it is born from self-interests, states will be compelled to form cooperative regimes to facilitate further cooperation.¹⁷⁸ This has been demonstrated in the past with evolution of other Nile River cooperative regimes such as the PJTC, HYDROMET and TECCONILE.

However, while the Nile Basin Initiative offers a forum for basin wide issues to be addressed, and will serve as a basis for a permanent river basin management regime which is beneficial for all the members, it is understandable why Egypt and Sudan, the two countries most Nile dependant the on Nile water, have been unwilling to concede authority to the "panel of experts" outlined in the CFA to make decisions water security issues that may only affect only the three countries in many instances. Considering over 80 percent of the water Egypt and Sudan are dependent on comes from Ethiopia, it simply would not be a prudent decision politically to bestow an unnecessary amount of negotiating power on six other countries. This paper posits, it is not in Egypt, Sudan or even Ethiopia's self-interest to adopt this regime as the regulator if their collective Nile Water use. It would only complicate further negotiation between the countries as each would also be seeking to leverage other NBI member countries for support. The failure of

¹⁷⁷Staff, "Congo Confirms it Will Not Sign Entebbe Nile Water Agreement," *Al Masry Al Youm*, April 4, 2011, 2011.

¹⁷⁸ S. Dinar, "Scarcity and Cooperation Along International Rivers," *Global Environmental Politics* 9, no. 1 (-02-01, 2009), 109.

the CFA to bring Egypt and Sudan aboard only demonstrates further why an Eastern Nile Basin cooperative regime needs to be developed to address the issues unique to the sub-basin.

CHAPTER 5

THE DETERMINANTS FOR COOPERATION IN THE EASTERN NILE BASIN

The path to cooperation is difficult in international relations. Countries' governments must find a way to achieve goals in the international arena, while accommodating the demands of a domestic population. This path is rarely easy and always takes time to generate support. The NBI, for example, took 12 years to develop a cooperative framework that could get enough signatures for ratification. In the Eastern Nile Basin finding this elusive balance is further complicated by the challenges of population growth, extreme scarcity and poverty. Although the nationalist rhetoric regarding to the Nile espoused by leaders like Anwar Sadat had once offered reassurance to those dependant on the river, these words have only made the inevitable cooperation more difficult to reach in the future. If these countries are to advance toward a relationship of *positive interdependence*, there will need to be a concerted effort by the countries on a domestic and international level. This section of this paper will explain and analyze what this paper deems the key determinants of cooperation for the countries of the Eastern Nile Basin:

1. *Acknowledge that the benefits to cooperation outweigh those associated with a unilateral approach.*
2. *Recognize that armed conflict is not a solution to the water scarcity issues.*
3. *Involve participation of their citizenry in the decision-making process.*

The Benefits of Cooperation

To understand why the countries of the Eastern Nile Basin should seek a cooperative regime to manage the Eastern Nile Basin based for their own self-interest and self-preservation

as opposed to the current unilateral approach, one needs to look no further than the population and scarcity statistics outlined in the later sections. But this data only explains a portion of the reasoning why cooperation should take precedence as regional political conditions also play a significant role. Population, scarcity and poverty data are essential factors to take into account when assessing the value of cooperation over unilateral action, but it only rationalizes a fraction of the international relations process in the Eastern Nile Sub-basin as the balance of power accounts for much of the motivations in international relations. Over the last decade a major shift in the balance of power within the greater Nile Basin which has had a significant impact on the eastern sub-basin.

Egypt was long considered to have asymmetrical power in the Nile Basin which allowed the country to control much of the development along the river. This position is now threatened as major political shifts have taken place in the region over the previous decade throughout the region and Egypt has experienced major political changes domestically leaving Ethiopia the opportunity to gain regional prominence. The elements that define asymmetrical control can be broken down into three dimensions defined by Zeitoun and Warner: *material power, bargaining power and ideational power*.¹⁷⁹

The first dimension is *material power* which relates to the country's level of economic development, political stability, military might and access to external funding sources. Egypt still has the most diverse and robust economy of the Nile Basin, but now faces political uncertainty after the overthrow of the long-standing Mubarak regime in February of 2011. None the less, Egypt still receives significant international financial support from outside donors as the country

¹⁷⁹ Ana Elisa Cascão, "Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?" *Water Alternatives* 2, no. 2 (06, 2009), 248, <http://search.ebscohost.com/login.aspx?direct=true&db=eih&AN=41976668&site=ehost-live>.

maintains close ties with many European and Middle East countries. Egypt also remains a strong military force, but not as feared as it once was. Ethiopian Prime Minister Meles openly challenged Egypt in this regard claiming no country has invaded his country and "has lived to tell the story".¹⁸⁰

Previously, Egypt held the greatest bargaining power of the riparian states of the Nile Basin. The term *bargaining power* refers to the country's ability to control the agenda of politics and the way in which issues are addressed or not addressed.¹⁸¹ Prior to the development of the NBI and the CFA, Egypt has been able to direct the international hydrogeopolitics of the Nile Basin. By using the 1959 Nile Waters Agreement as a precursor for negotiations, the country was able to demarcate boundaries for the agenda. Additionally, the country would use bargaining tools such as aid packages and political leverage with international institutions to achieve desirable outcomes. Egypt no longer holds this position as they have lost control of the Nile Basin discourse and no longer hold the most influence over riparian states. Moreover, the injection of funding from outside countries like China has made Egypt's financial influence within the basin less significant. This paper argues that moving forward Ethiopia now holds the bargaining power of the Nile Basin as they are the source of 85 percent of the Nile water downstream riparians depend on and currently steer the narrative.

The third dimension of asymmetric power relations, *ideational power* refers to a country's ability to control the conversation and influence the perception of the discourse. Egypt has dominated this dimension by continually arguing in favor of their "historic rights" and their

¹⁸⁰ Barry Malone, "Ethiopian PM Warns Egypt Off Nile War," *Reuters*, November 23, 2010, 2010.

¹⁸¹ Cascão, *Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?*, 248

absolute dependency on the Nile River.¹⁸² By using the loudest voice to promote a set of ideas favorable to their own positions, Egypt had been able to guide the hydropolitical relations in region. This once successful approach has not proven to be effective in the 21st century as the majority of the NBI member states have elected to sign the CFA despite the objections of Egypt, and the country has been hastily seeking to improve ties in the basin.¹⁸³

A combination of stronger material, bargaining and ideational power allowed Egypt to reign as the asymmetric power of the Nile Basin, but the hegemonic control of the Nile bestowed upon Egypt in Africa's colonial era no longer holds the weight it once did. Elisa Cascao offers a logical rationalization for this in her article *Changing Power Relations in the Nile River Basin: Unilateralism vs. Cooperation*. She attributes the shift to two key factors. First, Nile Basin states have achieved greater political and economic stability. Second, riparian nations are now have an improved pool of funding sources and no longer are dependent on the traditional international institutions.

Ethiopia for example, was once considered to be a non-factor in Nile River hydropolitics despite being the source of 85 percent of the entire river's water. Until the 1990's, the country focused very little energy or capital on developing the river as the country suffered from long-term internal conflicts, a lack financial resources and weak domestic institutions. The coming to power of Prime Minister Meles Zenawi marked a turning point for the country as he worked to stabilize the country's economy and put the Nile issue in the front and center of Ethiopian politics. Under Meles projects on the Nile began to be built unilaterally and received financial support from China who was also becoming an active player in funding Africa's projects.

¹⁸² Thompson, *Nile Restrictions Anger Ethiopia*

¹⁸³ Clarke,

ANALYSIS-Political Change in Egypt to Boost Nile Cooperation

Ethiopia also joined the NBI with expectation that the negotiations will bring about new funding sources for joint development projects in Ethiopian Highlands and a new legal agreement for the basin.¹⁸⁴ Egypt in contrast has become less stable politically and economically. The country's president was overthrown and replaced by an interim government led by the military. While the country still receives significant financial support from abroad, the country's instability and uncertain future has made potential donors wary.¹⁸⁵ Ethiopia now enjoys sizeable influence in the basin that stands represents a threat to Egypt's historical hegemonic influence. Ethiopia's rise to prominence validates Cascao's assertions and represents a considerable shift in the power relations in the Nile Basin.

Since upstream countries have achieved a greater level of stability, Egypt and Sudan will need to reassess their approach to ensuring water security. There was a period of time when military threats from Egypt could deter upstream countries like Ethiopia from developing their water resources. This has proven to no longer be the case. As discussed in chapter 1, Egypt and Sudan now must decide whether they should continue holding on to the agreements from an era when Egypt was the hegemonic power of the basin and take on all the resource security uncertainties and high costs that accompany that approach, or whether they should seek the alternative path of cooperation through regime participation, in the NBI or otherwise.

This paper contends cooperation is in the self-interests of the countries of the Eastern Nile Basin. Developing a cooperative regime to manage the basin is the most certain method to offer resource security for all three countries, and offers a forum for joint development that can gain support from organizations like the World Bank and the IMF. Additionally, by creating a

¹⁸⁴ Casção, *Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?*, 253-6

¹⁸⁵ Vivian Salama and Mariam Fam, "

Egypt's Foreign Minister Calls on Donors to Provide Economic Assistance," *Bloomberg*, February 15, 2011.

regime based on joint management of the basin, Egypt and Sudan will have input on how Ethiopia develops their domestic water resources, Ethiopia will have input on how water sharing will be decided and all countries will have an interest in each other being efficient. Whether countries are motivated to cooperate for the sake of benefitting the entire basin or solely for self-interest, it offers the best and most cost effective option for ensuring water security in the Nile Basin.

The Implausibility of Water Wars

There has been increased conversation about the potential of conflict over water in recent years. While I acknowledge there is the potential for interstate "water wars" in various areas around the world, I contend the Eastern Nile Basin is not one of these areas. I argue acknowledging this fact makes cooperation much easier, and no longer a matter of if a state should cooperate, but how and when the state will cooperate.

Water is the quintessential source of life, and therefore must be considered an issue of human security and national security. The issues of national interest and territorial sovereignty are at the core entire discussion of the Nile issue. As populations grow and scarcity increases, these issues will take center stage in the form of national security concerns. This paper takes the same position as Yacob Arsano on this issue, that until these core issue of allocation is addressed any progress on the smaller areas will be unremarkable. Different countries have different levels of dependence on the Nile. Arsano states, "holding on to mutually exclusive positions by upstream and downstream states can only be maintained as a 'zero sum game'". He continues by maintaining the zero sum assessments made by riparian neighbors has significant regional security implications, and has the potential to increase tensions in all countries in the Nile

Basin.¹⁸⁶ This opinion is shared by Asit K. Biswas. He argues that as water shortages increase in severity in individual nations, internal political pressure is certain to force the hands of governments. Governments will have no choice but to respond by applying more political pressure externally to the upstream sources.¹⁸⁷

While increases in food prices offer a formidable challenge to any government, an increase in the price of water, an input to production of nearly everything and the most essential item to human survival, may be nearly impossible to implement without severe opposition from all interested parties domestically. The only alternative to asking your domestic populace to decrease demand or pay more for water for downstream countries like Sudan and Egypt is to apply pressure on those upstream to use less through cooperation or coercion. This idea is what 1995 prompted World bank Vice President Ismail Serageldin to argue that wars of the 21st century will be fought over water instead of oil.¹⁸⁸

Proponents of the idea of "water wars" believe the potential for conflict is amplified when domestic economics force governments to make difficult decisions, and scarcity becomes an issue of life or death. All three of the countries in question face some level of water scarcity, whether economic or physical, and based upon the most current population projections of the eastern Nile Basin countries Ethiopia, Sudan and Ethiopia, the issue of scarcity is slated to reach the potential of life or death unless cooperative sustainable management of the Nile River is undertaken. While economic scarcity issues can be addressed domestically with investment, physical scarcity, like that faced by Sudan and Egypt cannot be fixed with money. Without other

¹⁸⁶ Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*, 81

¹⁸⁷ Asit Biswas, "Management of International Waters: Opportunities and Constraints," *International Journal of Water Resources Development* 15, no. 4 (-12-01, 1999), 432.

¹⁸⁸ Wendy Barnaby, "Do Nations Go to War Over Water?" *Nature*, 282.

sources of water, some believe, Egypt and Sudan may be forced into conflict as a matter of survival.

Several scenarios can be constructed that demonstrate an increased in the likelihood of amplified tensions and conflicts between the countries of the East Nile Basin. The weight of ambiguity that surrounds the weakness of the current arrangements and the absence of a comprehensive water agreement that addresses 21st century issues offer enough to realize the potential of conflict. But when one takes into account the total costs, monetarily and otherwise, that would be required to truly secure the resource in question, the Blue Nile, it seems highly unlikely.

The potential for water wars hasn't eased tensions concerning the issue. There has already been an increase in antagonism early in the 21st century as Ethiopia has been making its position known that they would like to utilize more of their water resources. Egypt and Sudan, have significant interest in maintaining the status quo as they are arid desert countries who have become accustom to the water resources they currently have access to. In total the flow of the Nile river that travels through Sudan and Egypt is estimated at 84 billion cubic meters with 85 percent originating in Ethiopia. Based upon the 1959 agreement, Egypt is entitled to 55.5 billion cubic meters of this water and Sudan is allocated 18.5 billion respectively. This only leaves 10 billion cubic meters of water unallocated for those upstream.¹⁸⁹ When evaporation and seepage are taken into consideration this leaves a little to be allocated to Ethiopia. Therefore, any adjustment in the allocation represents a zero-sum loss of Egypt and Sudan, and a potential threat to their resource and national security.

¹⁸⁹ Swain, *International Laws and Disputes in the Nile River*, 679

While this rhetoric may have political benefits domestically as it plays to the nationalist sentiment within their own borders, it ultimately sets the politician up for political failure in the long run as the barriers to "water wars" become more apparent. It is very easy to say they can secure water through war, but it is nearly impossible to execute in the era 21st century warfare and politics. Understanding the futility of the concept of water wars in the Eastern Nile Sub-basin will be a major step forward in navigating the process of developing a cooperative regime between Egypt, Sudan and Ethiopia.

Addressing Domestic Politics

Whereas this paper focuses on the international aspect, one must remember that all politics are inherently local. Within the eastern Nile Basin there are a number of different political and cultural challenges that each country must address domestically before any of these governments would be able to act in the international arena. This is the case on most any aspect of foreign policy, and is amplified in the eastern Nile Basin as a consequence of the River has being the subject of threatening rhetoric between the three countries throughout history. To move toward a cooperative relationship in the basin, it is critical that a national dialogue is developed that explains the choices each country has and rationalizes the need for a new long-term cooperative approach in managing the Nile Basin. This may also require countries to reassess the social contract the governments have with their citizens. This discussion of this is critical in gaining domestic support for international action.

Nationalist overtones have haunted the Nile River conversation over the previous half century. In some instances, this issue is has been exacerbated even further by the method of governance in the countries. Egypt is an authoritarian state that has only had 3 presidents over the past 50 years. Hostile rhetoric has been a tool used by the Egyptian government since

independence to engender nationalist sentiments. Each Egyptian leader has had the challenge of balancing social stability with fiscal and political responsibility. Consenting to any regime or agreement that would diminish the already scarce water resources in the country has the potential of disrupting the careful juggling act performed by the Egyptian government. The government would have to ask the citizens to either pay more for their food and water or consume less. Either scenario has the potential for disaster as few factors can mobilize a population quicker than hunger or thirst, and a diminishing supply of water effects both. The Egyptian government is all too familiar with the consequences of shortages and severe price escalations in the country. In 1977 as the country was forced to take on a belt-tightening measure demanded by the International Monetary Fund who was troubled by the countries subsidy expenditures. In order for the IMF to continue lending to the country, it forced Egypt to raise prices on subsidized bread and other commodities. The populist reaction was swift and devastating. Widespread rioting took place and 70 people were killed in Cairo alone. As a consequence, the price increases were rescinded and the IMF infused \$150 million into the country in hopes of restoring order.¹⁹⁰

The most recent uprising that led to Egypt's most recent President Hosni Mubarak stepping down was in large part initially a consequence of economic problems within the country.¹⁹¹ Rising prices on staple foods that have been experienced throughout the world coupled with the high unemployment has led by regular protests in Egypt long prior to the January Revolution and after.¹⁹² The protests are driven by the inherent expectation by the citizen that the government was to regulate of food prices as part of the social contract. This contract has been a fixture of many authoritarian ruled countries that have experienced protests

¹⁹⁰ John Salevurakis, "Bread Subsidies in Egypt: Choosing Social Stability Or Fiscal Responsibility," *The Review of Radical Political Economics* 40, no. 1 (-03-01, 2008), 44-5.

¹⁹¹ Dina Zayed, "Egypt's Online Movement Takes to the Streets," *Reuters*, January 27, 2011.

¹⁹² Timothy Phelps, "Egypt's Poor Grow More Hungry," *The Telegraph Herald (1935)* (-02-20, 2011), A.6.

in 2011. As a consequence of this “so long as there is food on the table, you don’t worry about politics” *quid pro quo* implicit agreement, the Egyptian government has found it very difficult politically to ask an already impoverished population for greater sacrifice by the way of monetary contributions or less consumption. Moreover, for countries as impoverished as Egypt, the subsidies on food and fuel have proven to be unsustainable as the country has been running serious budget deficits and experiencing increased inflation, none the less these subsidies have proven to be mandatory to ensure stability under the current social contract.¹⁹³

Moving forward, the unsustainable social contract that allowed Nasser, Sadat and Mubarak to maintain order and retain power will need to be addressed. Whoever eventually leads the country will have to address these economic issues while simultaneously having a very public discussion about the country’s very real water scarcity issues. This appears to be a daunting task for even the most charismatic leader in a robust economy, let alone a mediocre leader in a global depression, but this paper contends the country has no other viable option if it hopes to maintain any semblance of resource security in the 21st century and beyond. Additionally, if democratic principles take hold in Egypt, the new ruler will have the mandate of the people that elected him which may make it less problematic to request short term sacrifice in exchange for long term gains.

Egypt is not alone in its concerns about rising prices and calls for greater sacrifice from its citizens leading to instability in the Eastern Nile Basin. The Sudanese government has a different social contract with its people, but the threat of even less water from the Nile will challenge the Sudan’s authoritarian government to balance, domestic politics and economic

¹⁹³ Ibrahim Saif, "The Food Price Crisis in the Arab Countries: Short Term Responses to a Lasting Challenge," *Middle East Program* (2008), 3.

stability. Akin to Egypt to the North, Sudan has also had history of unrest related to food prices, and¹⁹⁴ experienced protests in early 2011,¹⁹⁵ but the fragile state is also slated to divide into two countries in July of 2011 which will put more uncertainty on Sudan's access to water from the White Nile.¹⁹⁶ While the concept of agreeing to less Nile water may seem unappealing, Sudan differs from Egypt in ways that make it more likely for them to be willing to enter a new agreement regarding water sharing. Most notably, Sudan currently only utilizes approximately 60 percent of their available renewable water resources.¹⁹⁷ While much of this is because of underinvestment in infrastructure, it nevertheless gives the government time to adapt to the new water resource conditions. Egypt, in comparison, utilizes all of their available renewable water resources which means they would have to adapt more quickly.¹⁹⁸ Another benefit Sudan has over Egypt is the fact they generate large revenues as an oil exporting country, while Egypt's oil supply is primarily for domestic consumption. Sudan's revenue from oil can be used to either mitigate the effects of a potentially smaller Nile water allocation, or purchase a larger share of water allocation from Egypt or Ethiopia if a water market was to be developed.

Unlike Egypt and Sudan, Ethiopia's discussion with its citizens will not be about sacrificing use of water in the near term for future security because the country's role in a cooperative regime with Egypt and Sudan will not require significant sacrifice. Because Ethiopia is the source of the water, and is now able to find funding to develop their domestic resources, the country enjoys a considerable amount of resource security in comparison to Sudan and Egypt.

¹⁹⁴ "Price Increases in Sudan Trigger Riot," *The Washington Post* (-10-06, 1987), a.25.

¹⁹⁵ Alan Boswell, "Youth Protests in Sudan Struggle Amid State Crackdown," *Knight-Ridder/Tribune News Service* (-02-07, 2011).

¹⁹⁶ Alan Boswell, "Anger Sweeps North as Sudan Announces Split," *Calgary Herald* (-01-31, 2011), A.7. "Voters Back Sudan Split," *Belfast Telegraph* (-02-08, 2011), 22.

¹⁹⁷ Aquastat, *Irrigation in Africa in Figures: Sudan*, 4

¹⁹⁸ Aquastat, *Irrigation in Africa Facts and Figures: Egypt*, 3

Ethiopia's goal for redefining their social contract lies withy on eliminating the threat of famine and reducing the country's dependence on food aid. Since the 1970s, three severe droughts have gripped East Africa. Two of these droughts resulted in widespread famine that contributed to political instability. Famine as a result of failed policy, war and drought has stunted Ethiopia's economic growth and contributed to the downfall of leaders including Mengistu Haile Mariam and Haile Salassie.¹⁹⁹ Twelve million Ethiopians still rely on food aid and the number is expected to increase as staple food prices continue to rise globally.²⁰⁰ In an effort to avoid a similar perils caused by high food prices and famine in Egypt and Sudan, Prime Minister Meles Zenawi has announced price controls on staple foods.²⁰¹ Subsidizing prices may provide short term relief to Ethiopians, but the government will need to convince the citizens on a longer term plan to diminish the countries dependency on food aid. As discussed by John Waterbury in his book *The Nile: National Determinants for Collective Action*, there is no easy way to solve the Ethiopia's food problems. It will take time and significant investment. Just as important, it will also require the government to encourage farmers to adopt new farming methods that produce larger yields than the rain-fed irrigation approach in use today.²⁰²

The Ethiopian government also will need to address many of the social and environmental ailments which result from the various dam projects it has taken on. Dams alter hydrological processes, threaten fisheries and transform ecosystems. The Ethiopian government has been accused of ignoring many of the adverse effects of dam construction pushing forward

¹⁹⁹ "ETHIOPIA: Mengistu Convicted of Genocide," *Africa Research Bulletin.Political, Social and Cultural Series* 43, no. 12 (-01-01, 2007), 16903C.; Washington Service, "Haile Selassie Implicated in Famine Deaths," *The Washington Post* (-08-29, 1974), A15.

²⁰⁰ Mary Fitzgerald, "Ethiopia's Regime Remains Heavily Dependent on Foreign Aid," *Ethiopian Review*, January 25, 2010, 2010.

²⁰¹ William Davidson, "

Ethiopia Caps Food Prices to Combat Inflation," , <http://www.ethiopian-news.com/ethiopia-caps-food-prices-to-combat-inflation/> (accessed June 1, 2011, 2011).

²⁰² Waterbury, *The Nile Basin: National Determinants of Collective Action*, 101-4

with projects regardless of the consequences. Large dam projects have the danger of being perceived as benefiting the urban population while destroying the way of life for the rural poor. In a country where more than 80 percent of the population can be considered rural poor, disregarding the adverse effects of large scale hydrological projects has the potential of turning the majority of the population against dam projects. The government will need to clearly demonstrate the benefits of dam projects to all Ethiopians, and actively seek to offset harm done by dams with clear and tangible benefits for the rural poor.

CHAPTER 6

THE EASTERN NILE BASIN REGIME ORGANIZATION

Discussing the potential for cooperation is rather useless exercise in academia unless one can develop a clear concept of what the cooperation should entail. This section offers a vision of what a cooperative organization in the Eastern Nile Basin might look like. By developing a cooperative regime based upon flexible water allocation, pollution controls and joint hydroelectricity investment, a relationship maximizing comparative advantage can be developed. This will allow each country to act in their own self-interest in a regime that is mutually beneficial.

Flexible Water Sharing

This chapter proposes a method of sharing the water of the eastern Nile Basin utilizing a flexible approach that will be contingent on tangible available resources and non-water transfers as opposed to arbitrary measurements. While this idea may not be popular among Egypt, the primary beneficiary of the current arrangement, this is an important aspect of any future water agreement between the three countries. This method not only addresses the future needs of each of the countries, but it does it in a flexible manner that broadens the resource management burden to each member of the regime.

International water basins cover 47 percent of the globe's land area and 60 percent of the total land area in Asia, Africa and South America. Whether it be a river or lake basin, these shared water resources are often critical for the survival and economic development of the basin inhabitants. As demand grows for this fresh water because of population growth and other reasons, conflicts over allocation of the shared resource are bound to surface. The Eastern Nile Basin is facing these conflicts and a new method of allocating the Nile water will need to be

agreed upon ultimately if the countries of the eastern Nile Basin, Egypt, Sudan and Ethiopia are enter into a cooperative regime to manage the basin. This chapter will focus on the aspect of water allocation and will propose a possible solution to this issue.

From the desalination facility near the Morales Dam on the Colorado River that is shared between the United States and Mexico, to the diversion plans of the Mekong River that is shared by Laos and Thailand to the Dutch's complaints of upstream pollution on the Rhine, there has been a long history of controversy over international river management throughout the world. From these various disputes, numerous agreements, frameworks for agreements and cooperative regimes have been developed using various principles of diplomacy and international law to resolve international water disputes. Unfortunately, these arrangements rarely address the issue of allocation in a concrete manner as this is often the most difficult issue to address. The Law on Non-Navigational Uses of International Water Courses, for example, offers a framework for allocation and management of shared waters among the users on the basis of equitable and reasonable utilization.²⁰³ However, the concept of equitable and reasonable utilization is highly subjective and impossible to apply except for in extreme circumstances. Additionally, this notion fails to address areas, in which river flows are seasonal, have extreme variation or where each member of the basin experiences some level of scarcity, which is the case of the Eastern Nile Basin.

At the center of the discussion about water allocation of the eastern Nile Basin is Ethiopia, who represents the source of the billions cubic meters of runoff or 86 percent of the entire flow annually on average to Egypt. This water originates primarily from the Abbay with a

²⁰³ United Nations, *Convention on the Law of the Non-Navigational Uses of International Watercourses*, Vol. 49 (New York, 2007).

significant contribution from the Baro-Akobo and a lesser contribution from the Atbara River. Under the current 1959 Nile Waters Agreement, Egypt is entitled to 55.5 billion cubic kilometers of water annually and Sudan 18.5 billion cubic kilometers respectively from the Nile River (measured at Aswan). This leaves only a small portion of water unallocated for Ethiopian utilization. This status quo based on the 1959 agreement has been contentious in years past, but was manageable due to Ethiopia's lack of a strong economic position to develop their domestic water resources. Moreover, over the previous 50 years populations of the three countries have grown exacerbating the issue further by putting substantial pressure on an already scarce resource.

The allocation measurements from the 1959 Nile Water Agreement were based on an 84 cubic kilometer annual average. While 84 cubic kilometers of water is the average annual amount of runoff into the eastern Nile Basin, the number is misleading and the actual rainfall that is the source of this runoff can vary significantly from year to year. In fact, during the 20th century the flows varied from a high of 120 billion cubic kilometers in 1916 to a low of a mere 42 billion cubic kilometers in 1984. As a result, Ethiopia has experienced at least five major droughts since 1980, and as climate change becomes a larger issue, there is potentially for more droughts in the country. Because of the 1959 agreement's preferential treatment of Egypt, Ethiopia has been pressured to shoulder the burden of drought conditions as Egypt and Sudan have demanded Ethiopia offer reassurances that the downstream countries will receive their allocations. As a result, Ethiopia experienced serious famine in the 1970's and 1980's, although

they had much of the water resources necessary to develop the agricultural production necessary to meet the minimum food demands of their people within their own borders.²⁰⁴

Any future regime will have to address this inequity in allotment to the Nile water by recognizing the variability of rainfall in to the Nile's primary source. The current 1959 agreement's measurements of water are based upon measurements taken at Aswan .Using the measurement of the sum of the precipitation at the source of the Blue Nile in the Ethiopian Highlands and cross referencing it with the data from the numerous measuring stations throughout the eastern Nile Basin, a precise measurement can be arrived upon which can be used as the number to divide among the countries. Because each country has or will have ample dam storage, the allocation measurement can be stored for allocation for the following year which will allow countries to prepare accordingly.

One approach that can be taken to address the allocation problem is to take the measurement of the annual flow and divide it by the population of the member countries. For example, if the total population of Egypt is 82 million, Sudan is 42 million and Ethiopia is 81 million for 2011, then for 2012 Egypt would be entitled to 40 percent, Sudan 20.5 percent and Ethiopia 39.5 percent of the total flow. On a year with 84 cubic kilometers of water available Egypt would receive 33.6 billion cubic kilometers, Sudan would be allotted 17.2 and Ethiopia would be allotted 33.2 respectively. While this may be the most ideal arrangement for any of the countries it would be possibly the fairest way to approach the issue. It is also important to note that this does not account for the water from the White Nile which sends another 12 billion cubic kilometers from south of Sudan to Egypt. This method may also be the most effective as each of

²⁰⁴ Collins, *The Waters of the Nile: Hydropolitics and the Jonglei Canal, 1900-1988*, 401-3

the countries have outside water sources that are autonomous of this arrangement and each country's populations are expected to grow at similar rates over the next half century.

Another approach would be to take the calculations another step further. By taking into account the fact that Ethiopia's future of agricultural production may have the best potential in the Ethiopian Highlands that are primarily rain fed, a greater allocation might be assessed to Sudan and Egypt.²⁰⁵ Rainfall would still be the primary determinant, but this method would also take into account a country's agricultural potential which may be more of an agreeable approach to the downstream countries.

While the argument is made for a liberal institutional approach to sharing what is quickly becoming a scarce resource, this paper does contend the realist perspective must be observed in when addressing the zero sum aspect of water sharing. For this I side with Legro and Moravcsik who, when discussing three state negotiations, argues "the only way to redistribute resources is, to threaten punishment or to offer a side payment".²⁰⁶ This concept is not only accurate but could be mutually beneficially in the circumstance of the eastern Nile Basin. Because countries may have a desire for more water than their allotment in a particular year, a function should also be placed into the regime that would allow countries to exchange allotment for compensation developing a water market. This would benefit Ethiopia because revenue from Egypt, who currently has the highest water demand and highest GDP of the three countries and Sudan who also has a much higher GDP, will allow Ethiopia to develop their domestic economy. Additionally, creating a water market between the countries will encourage conservation across the all of the countries as ultimately countries will be paying others not to consume.

²⁰⁵ Waterbury, *The Nile Basin: National Determinants of Collective Action*, 87

²⁰⁶ JW Legro, "Is Anybody Still a Realist?" *International Security* 24, no. 2 (-01-01, 1999), 17.

Flexible water sharing combined with water markets to manage demand offers the basin members a number of benefits. By creating a system to reallocate water that shifts based upon available water, the issue of fairness can be removed from the discussion once the allocation formula is agreed upon as annual rainfall will be the determinant. Each country will have a clear understanding of how much water they are entitled to, and will be able to plan accordingly. If coupled with co-managed water storage in Ethiopia, the system will be able to efficiently store water from high precipitation years which can be released in low precipitation years to offer a potentially more consistent source of water than exists today. Using water markets will also encourage countries to conserve water, to save or earn the country money. While the flexible water sharing model may not be what downstream countries Egypt and Sudan want to see, it will offer the countries great water security than both the NBI and the status quo, and should be considered when developing an Eastern Nile Basin Cooperative Regime.

Pollution Controls

Although the amount of water allotted to each member state of an international river basin is very important, the quality of the water can often take precedence. If the source of water has high levels of contamination, the quality of water can be degraded or deemed completely unusable without expensive treatments not readily available in the developing world. Aside from the navigational benefit, having unusable water is functionally equivalent to having no water at all. Addressing quality of water issues and pollution controls will be very important in any future eastern Nile Basin management agreement as the quality of water is equally as important as the quantity. In addition, the issue of increased water quality is directly related to the water issue, because increased quality, ultimately translates to increased supply for all countries. Mahmoud Abu Zeid, president of the Arab Water Council and a former minister of water for Egypt worded

it this way; "Water is a basic right for every human being and, once we all agree that it is a basic right, we all should work to providing this basic right in a decent way. I mean better quality, good quantity and so on."²⁰⁷

In international law there have been various definitions for pollution, but the one this paper adopts is from Article 9 of the Helsinki Rules which defines water pollution as any detrimental change resulting from human conduct in the natural composition, content, or quality of the waters of an international drainage basin.²⁰⁸ This can include industrial waste, agricultural runoff as well as untreated sewage reaching the river.

Because of the unilateral approach that has been taken in regards to eastern Nile River basin management, the quality of the water in the river has been in decline. There has yet to be a cooperative framework that efficiently enforces pollution controls along the Nile Basin, and this has allowed various pollutants to be emitted into the river with little or no consideration for those downstream or the downstream ecosystems. Although there has not been significant cooperation on this front, of the three issues discussed in this paper (allocation, pollution and hydroelectric), this may be the easiest on to find cooperation as there is much room for improvement. In Egypt for example, only 60 percent of human waste enters a sewage system and receives any kind of treatment. In villages, it can be less than 40 percent. Water pollution is blamed for the deaths of approximately 17,000 children due to dysentery alone.²⁰⁹ While Egypt has developed a "substantial body of environmental and environmentally related laws", they have failed to assert

²⁰⁷ Elizabeth Arrott, "Nile States Work to Improve Quantity, Quality of Waters," *Voi*, September 1, 2010.

²⁰⁸ Dante A. Caponera, *Principles of Water Law and Administration: National and International* (Brookfield: A.A. Balkema Publishers, 1992), 219.

²⁰⁹ Arrott, *Nile States Work to Improve Quantity, Quality of Waters*

any authority behind them according to a 2006 World Bank Report.²¹⁰ A failure to enforce pollution controls and treat domestic wastewater on the Nile in Egypt has led to a high level of contaminants entering the river, and speculation of the proliferation cancer causing agents in the river.²¹¹

Sudan also has a dismal record in pollution mitigation on the Nile. It has been reported that Oil production in Sudan is polluting water, spreading disease and posing a threat to one of the world's largest inland wetlands.²¹² In the Gash and Nyala regions of the country Industrial wastes, agricultural chemicals and human waste have caused a deterioration in the water quality. This is especially the case during the low flow periods in which the river is unable to dilute the contaminants.²¹³ This pollution is cause for concern, but the Nile in this region still meets the international water quality standards. This is not the case for many of the thousands of irrigation canals in the country. The slow moving water in theses highly polluted canals are prime breeding ground for water-borne disease such as malaria and bilharzias.²¹⁴

Upstream country Ethiopia faces similar challenges to water quality. The Ethiopian Ministry of Water and Energy describes their coverage of sewage treatment in the country as being at a “low level”.²¹⁵ As the country develops further it will be important that it grows in a manner that takes into consideration the needs of their downstream neighbors. Ethiopia has abundant water, but three quarters of its population lack fresh water or clean water due to bad

²¹⁰ Water, Environment, Social and Rural Development Department, *Project Appraisal on a Proposed Loan in the Amount of \$20 Million to the Arab Republic of Egypt for a Second Pollution Abatement Project* (: World Bank, 2006).

²¹¹ Sarah El Mashed, "Environmental Breaches could Lie Behind Cancer Increase," *Al Masry Al Youm*, January 26, 2011, 2011.

²¹² Ingrid Formanek and David Mc Kenzie, *Pollution Fears Taint Sudan's Oil Promise* (Atlanta: CNN, 2009).

²¹³ Hamad, *Sudan and the Nile Basin*, 31

²¹⁴ *ibid.*, 31

²¹⁵ Ministry of Water and Energy, *Existing Water Quality Situation in Ethiopia* (Addis Ababa: Federal Democratic Republic of Ethiopia, 2010).

administration and the lack of financial resources.²¹⁶ This also leads to an excessive amount of human waste entering into the Nile. Currently this pollution is diluted, but as populations double and access to sanitation services increase the river will have a much more difficult time water down the waste.

There are numerous cooperative frameworks that can be drawn upon in the area of multinational river basin pollution control. The *Danube River Protection Convention* (DRPC) offers a modern example of multinational pollution controls for a river basin. Cooperation on the Danube is significant because it is the world's most international river basins with 19 member countries, 15 of which participate in the directive.²¹⁷ Article 16 of the document sets out an aggressive, but obtainable, strategy for limiting the discharge of pollutants into the Danube River by calling for short term and long term reforms to be implemented. For example, it calls for stopping all discharges of untreated wastewater from towns with populations exceeding 10,000 inhabitants and from all major industrial installations and to amplify their efficiency and level of water treatment by 2015. Additionally, The agreement seeks to entirely phase out the discharge of substances which have been identified as being the greatest threat to the aquatic ecosystems in the entire Danube basin.²¹⁸

For multiple countries to agree to aspire to diminish pollution discharges from their perspective countries is admirable, but too often these promises go unfulfilled. The *Water Framework Directive* for the Danube serves as a reasonable outline for the eastern Nile Basin countries to pursue, but it could benefit from the reporting rules of its parent framework, *The*

²¹⁶ Arrott, *Nile States Work to Improve Quantity, Quality of Waters*

²¹⁷ Ursula Schmedtje,

Development of the Danube River Basin District Management Plan - Strategy for Coordination in a Large International River Basin (Vienna: International Commission for the Protection of the Danube River, 2005), 2.

²¹⁸ ICPDR Pressures and Measures Expert Group, "ICPDR Issue Paper on Hazardous Substances Pollution in the Danube River Basin." *International Commission for the Protection of the Danube* 7 (2007): 5-6.

European Union Water Framework Directive which requires countries to carefully monitor and report progress on pollution reductions to the regime. Mandatory reporting requirements should be an important aspect of any agreement. Multiple articles of the European Union Framework requires all member countries provide data on pollution controls and reductions in pollution annually or bi-annually.²¹⁹ Honest and accurate reporting will foster trust between the countries and reassure each other that they are all working to preserve the shared resource. In addition, the EU framework calls upon all members to ensure that pricing policies are in place that promote conservancy amongst users. While the framework does not outline specific penalties, it discusses the issue by citing, "Member States shall determine penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties thus provided for shall be effective, proportionate and dissuasive."²²⁰

Contamination management should be considered mandatory component of any cooperative regime. As stated previously, quality of water goes hand in hand with quantity, and potentially the most efficient way to increase the Eastern Nile Basin water supply is by increasing the quality of the water.

Joint Hydroelectric Investment

Hydroelectricity development should be critical component to an Eastern Nile Basin regime, as hydroelectric projects have becoming increasingly popular on in the basin, as countries are seeking to combat domestic electricity shortages. Both Sudan and Egypt have plans to build multiple dams over the next two decades, and it is critical that the countries work in concert to maximize their resources, and to mitigate the negative effects of the projects.

²¹⁹ European Parliament and the Council of the European Union, "DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL," *Official Journal of the European Communities* (October 23, 2000), .

²²⁰ *ibid.*, Article 23

Furthermore, hydroelectric dams also serve as water storage which will be an important part of a flexible water sharing system, and also serve as sites of potential joint investment.

The potential for development of hydroelectric power in the eastern Nile Basin is vast and the majority of this potential lies within Ethiopia's borders. Ethiopia's great differences in altitude offer some of the earth's most prime real estate for hydroelectric generation and give it a comparative advantage in hydroelectric generation over other countries in the Nile Basin. By some estimates, because of the high volume of water surging to the lowlands, the country's potential to produce hydropower is only second in Africa only to the Democratic Republic of Congo. Despite the fact Ethiopia has such a potential for hydroelectric generation, until recently, the country has done little to develop their hydro power resources. This has meant that in rural areas of the country where much of the population lives, only 2 percent of households have access to electricity, and blackouts are common in the country's capital Addis Ababa.²²¹

All three countries in the eastern Nile Basin have a need for electricity, and Ethiopia has a need for investment in their hydroelectric sector. Joint investment in mega-dam projects has the greatest potential for being a catalyst for the development of a comprehensive river basin management regime. Along the three primary sub-basins in Ethiopia of the eastern Nile Basin, there is a combined total potential for 102,710 gigawatt hours per year of hydroelectric power. As of now less than 5 percent of this potential is realized, but Ethiopia is seeking to change this in the 21st century.²²² The country has set out a strategy to boost the country's energy development by 15 fold in a decade by the way of hydroelectric production. However, this ramp up in production is not solely for domestic consumption, as Ethiopia is treating its hydroelectric

²²¹ Xan Rice, "Ethiopia's Rush to Build Mega Dams Sparks Protests," *The Guardian*, March 25, 2010, 2010.

²²² Arsano, *Ethiopia and the Eastern Nile Basin*, 17

resources like other countries treat their mineral wealth; as a valuable source of foreign currency.²²³ Transitioning Ethiopia from Africa's "water tower" to Africa's power plant is the ultimate goal of this strategy and transmission lines are already being built to their neighbors.²²⁴ But the Ethiopian government faces significant challenges if this vision is to be realized. With multi-billion dollar price tags for most of these mega-dam projects, financing for these projects has proven to be a challenge. This has caused the Ethiopian government to begin projects before securing funding while seeking multiple external funding sources to ensure the project's completion. In years past Egypt has been an ardent opponent of Ethiopia expanding their hydroelectric infrastructure and often stood between Ethiopia and potential funding. However, countries like China have been replacing international organizations as primary infrastructure financiers, and Egypt no longer has the ability to stand between Ethiopia and potential external financing.

Financing agreements provide an opening for new channels of cooperation between Ethiopia, Sudan and Egypt. Although Egypt and Sudan are far from rich countries, their countries gross domestic product dwarfs that of Ethiopia, and they can offer funding sources for Ethiopia's power projects that ultimately will benefit all three countries. Additionally, financial arrangements including joint ownership of new projects on in the Eastern Nile Basin can prove to be a true win-win for all three parties for various reasons. The first reason is that all three countries have a considerable need to increase their electricity capacity as it is often tied to economic growth. If the countries can cooperatively develop and manage hydroelectric projects in Ethiopia, which has a significant comparative advantage in hydroelectric generation, they can increase the electricity capacity of all the countries. Secondly large reservoirs in Ethiopia can

²²³ Rice, *Ethiopia's Rush to Build Mega Dams Sparks Protests*

²²⁴ *ibid.*

benefit Egypt and Sudan because they reduce excessive evaporation and silt accumulation in downstream reservoirs. Storage canals in Ethiopia also help prevent catastrophic flooding in Sudan and help implement a flexible water sharing scheme. Thirdly, incentivizing Ethiopia to prioritize water for hydroelectric production as opposed to agriculture sector has a direct benefit on downstream countries as water must flow through dams to generate power. Moreover, countries those with strong economic ties are traditionally much less likely to go to war.

Egypt has in fact come around to the idea of working cooperatively with Ethiopia in the development of dam projects. In February of 2010, Minister of Water Resources and Irrigation Mohamed Allam announced that Egypt had agreed to build a number of small dams in Ethiopia with the intention of generating electricity.²²⁵ Albeit on a small scale, this represents a way forward cooperatively on this issue that can be mutually beneficial.

While Egyptian and Sudanese reservations to Ethiopian mega-dam projects are real, they are no longer in a position to stop the progress of these projects, and Ethiopia no longer feels the need to appease Egyptian demands. Ethiopian Water and Energy Minister Alemayehu Tegenu told a news conference, "Those bent on deterring the development of the Nile have not yet changed their obstructionist ways. Alas, Ethiopia's resolve has now reached a point of no return."²²⁶ Changes in the balance of power in the Eastern Nile Basin have benefitted a more stable Ethiopia and other upstream countries. Moving forward Egypt and Sudan will need to work cooperatively with their upstream neighbors because they are no longer the most influential player in the Nile Basin. Moreover, as external donors like China playing a larger role than

²²⁵ Metwali Salem, "Egypt to Build Dams in Ethiopia," *AI*, February 21, 2010, 2010.

²²⁶ Barry Malone, "Ethiopia to Defy Egypt and Build Huge Nile Dam," *Reuters UK*, March 30, 2011.

international institutions in funding these projects, regional political and environmental issues have become a less of importance.

The Great Millennium Dam offers the most considerable opportunity to date for the countries to develop a mega-project cooperatively. The Great Millennium Dam is slated to be built along the Blue Nile 40 kilometers from the Sudanese border. This dam is expected to generate more than two and a half times the power generated by the Aswan High Dam of Egypt and hold a reservoir almost twice the size of Lake Tana. The dam is also in a very narrow and deep gorge which will minimize potential evaporation to levels much lower than that of the Aswan High Dam or Jebel Aulia dam in Sudan. This dam could be beneficial for all three countries as a secondary storage site for Nile water, and it will significantly help Sudan in flood prevention. Ethiopia has been actively seeking partner in funding the project but have yet to find a partner and blames Egypt for pressuring donor countries not to lend.²²⁷ It is being built by an Italian company an estimated cost of \$4.76 billion dollars which is approximately 95 percent Ethiopia's annual budget.²²⁸

Ethiopia's Prime Minister Meles Zenawi has openly declared Ethiopia's willingness to work cooperatively on Nile River dams. When discussing Egyptian opposition to the Millennium Dam he was very clear on the issue saying "If there is a reconsideration, there will be time to consider many issues, including possibly joint ownership of the project itself. We are open to such ideas."²²⁹ Egypt and Sudan should take advantage of this opportunity considering Ethiopia has been adamant guaranteeing the project will be built regardless of the funding source. Joint-

²²⁷ The Ethiopian News Agency, *Construction of Great Millennium Nile Dam Project to be Launched Soon : Ministry* (Addis Ababa: Government of Ethiopia).; Malone, *Ethiopian PM Warns Egypt Off Nile War*

²²⁸ Lauren van der Westhuizen, "Italy's Salini to Build \$4.8 Billion Ethiopia Nile Dam, Addis Fortune Says," *Bloomberg*, April 5, 2011.

²²⁹ Peter Heinlein, "Ethiopia Offers Olive Branch in Nile Water Sharing Dispute," *Voice of America*, March 31, 2011.

ownership offers a “win-win” scenario as each country will have a vested interest in the success of the project and a role the decision making in regards to the use of the water. Additionally, success with this project will lead to future joint development projects.

CHAPTER 7

CONCLUSION

The premise of this thesis is that cooperation between the countries of the Eastern Nile Sub-basin is possible, necessary, and (if it is done correctly) can enhance the welfare and security of the countries involved. I argue that developing a cooperative regime to manage the Eastern Nile Basin based on flexible water sharing, pollution controls and hydroelectric development will go a long way in enhancing the welfare and security of Eastern Nile Basin countries. Acting unilaterally to manage a shared resource is beneficial if all members act in a responsible manner that gives consideration to the other members and there is an abundance of the resource in question. Since there is not an abundance of Nile water, unilateral management is not a beneficial option. In instances where the scarcity poses a challenge to all riparian states to different degrees, this paper asserts the solution is to cooperate to maximize comparative advantage of each country to maximize utilization of the scarce resource. This is critical for cooperation in the Eastern Nile Sub-basin as it offers the only way in member states will share in the burden, maximize their resource and still be acting in their self-interest which Keohane considers a prerequisite for countries to participate in regimes.²³⁰ Furthermore, this thesis contends that approaching cooperation with the concept of international regimes development as the goal is the only way to unify Egypt, Sudan and Ethiopia around a single cooperative framework.

Of the three countries involved in the discussion, Egypt has the most at stake as it is the country that is most dependent on the Nile River. The country has a long history of being in dominating Nile politics, and has benefitted the most from previous river agreements. Although

²³⁰ Stephen D. Krasner, *International Regimes* (Ithaca, New York: Cornell University Press, 1983), 7.

Egypt may feel far more comfortable with the status quo because it perceives any deviation from that to be a threat to their national security and their domestic stability for that matter, this thesis contends that approach is short-sided. My purpose is not to criticize Egypt's previous approach, but to discuss the what approach is best moving forward. A policy of non-decision making is only an option for those with sole decision making authority, which it has been demonstrated time and time again that Egypt no longer possesses. Egypt is no longer in control of their destiny in terms of water security. In fact, unless they seek a basin wide cooperative regime of some kind, they will not only be at the mercy of Sudan and Ethiopia, but also the other 8 member countries of the NBI to decide their water security.

Ethiopia, in contrast, has much less at stake, but can stand to gain significantly from a cooperative agreement between themselves, Egypt and Sudan. Ethiopia has long been the loudest advocate for multilateral cooperation in the Nile Basin. The country has always maintained the current regime is unsustainable and the 1959 Nile Waters Agreement is obsolete. Unlike Egypt, Ethiopia has not yet utilized most of their domestic renewable freshwater resources, and unlike in years past the country is now able to acquire financing for their hydrological projects from alternative sources. A new cooperative regime in the Eastern Nile Basin would not only offer diplomatic validation to Ethiopia's mega-dam projects, but could also encourage more investment in the country as regional power Egypt would be an ally in development as opposed to a barrier.

Sudan, as the country in the middle stands to benefit from the dispute between the two regional powers Egypt and Ethiopia, regardless of the outcome. This is because the country is already benefits from the status quo as they are due the second largest Nile water allocation based on the 1959 agreement. In addition, they benefit from hydroelectricity imported from dams

in Ethiopia. This thesis argues that Sudan stands to benefit more from increased cooperation as they will gain input on projects developed in Ethiopia. There is also potential for joint management of dam projects in the Ethiopian Highlands that will help control the floods that devastate Sudan annually.

The premise that the status quo Nile Basin management is unsustainable is not in dispute. Cooperation between the countries of the Eastern Nile Sub-basin has a number of advantages that significantly outweigh the status quo or the Cooperative Framework Agreement of the Nile Basin Initiative which already has the six signatories necessary to be ratified. Cooperation offers the predictability to the countries and potential investors. The development of an Eastern Nile Sub-basin cooperative regime also offers a forum to mediate disputes and discuss further projects as an alternative to the NBI group. This paper argues the NBI group is too large to manage unique regional issues and complicates an already complicated situation, as it involves countries that are not affected by the outcome. A sub-basin regime will offer more control to the three countries of the Eastern Nile Basin which would allow them to decide what is best for them autonomously or in conjunction with the CFA.

It is also my contention that the balance of power in the Nile Basin has shifted in favor of the upstream states. This can be attributed to two factors. The first factor that led to a redistribution of power in the Nile Basin was the strident policy of non-decision making adopted by the Egypt with regards to renegotiating the 1959 Nile Waters Agreement. This stubborn approach helped unify upstream states in resistance to Egyptian power. The second factor was the increased level of economic and political stability achieved by upstream states like Ethiopia have achieved over the past two decades.

Acknowledging the necessity of cooperation, this paper identified three key actions the countries of the sub-basin must do to for this cooperation to take place: acknowledge cooperation to be more beneficial than unilateral action, recognize armed conflict is not a viable option to alleviate the scarcity issues of the sub-basin and involve their citizenry in the water policy development conversation.

There have already been distinct levels of acknowledgement that cooperation is the best way forward by each of the three countries of the sub-basin. Ethiopia has been actively calling for a discussion between the countries to develop new ways of cooperation for the better part of the previous two decades. Sudan has also begun to see cooperation as the most beneficial path forward to manage the Blue Nile and has already begun working with Ethiopia on hydroelectric projects. Egypt has been the most resistant of the three countries, but has shown a willingness to enter the conversation as they recognize they are quickly becoming less relevant in the discussion and recognize that they cannot dictate the actions of upstream states. This still poses a challenge for Egypt as they still recognize the status quo as offering a better payoff than entering into a cooperative regime, but with the prospect of the payoff diminishing, this paper contends, Egypt will have no choice but to join a cooperative regime to provide themselves with some sort of fate control.

Because resource security issues have been elevated to national security issues, I do acknowledge the potential for conflict as scarcity ensues, but I contend in the Nile Basin, the Eastern Nile Sub-basin specifically, war among states is not a viable option. Whether one assumes states to be rational actors or not, the leaders Egypt, Sudan and Ethiopia all understand have little to gain by the way of war, and much to lose. The cost of occupying an entire river sub-basin will far outweigh the cost of cooperation, and war does not guarantee long term access to

the resource even if it is initially acquired. Moreover, Egypt or Sudan stand sacrifice their international legitimacy and influence if they were to act militarily to protect the status quo or to acquire a greater share of water. It would be far cheaper, sustainable and more efficient for a country to buy the needed water than to wage in armed warfare in the 21st century.

The most significant determinant to cooperation is the domestic politics of the sub-basin countries. If Egypt, for example, can't get its citizens to rally around the idea of shared sacrifice and cooperation, the country will never be able to act in the international area. The prospect of insecurity of the most basic resource of life and a key input in three countries' economies has the potential to lead to higher prices, unemployment and overall increased instability. While developing an Eastern Nile Basin regime organization will offer benefits that outweigh unilateral action, it will also require partners to make sacrifices. In countries where most citizens are dependent on some sort of government subsidies and nationalist rhetoric has been commonplace when discussing the Nile, a new tone must be set within the countries. A conversation must be had that discusses the necessities and benefits of shared sacrifice and cooperation and the potential adjustments to the social contract between the government and the people that can be expected.

The factors that make cooperation between the countries imperative also make also it very urgent. With population slated to double in the sub-basin over the next forty years an unforeseen amount of pressure will be put on an already threatened resources. Of the three countries in question, only Ethiopia is not considered to be on the verge physical water scarcity and all are experiencing different amounts of water economic scarcity. While this paper does not contend a sub-basin agreement will alleviate the scarcity problems, it does argue that is can mitigate some of the scarcity issues if agreed upon in a expedient manner.

Cooperation to manage the Eastern Nile Sub-basin can take on many forms, but this paper argues for a cooperative regime must address three key factors water sharing, pollution and hydroelectricity.

To address the water sharing issue, I propose a flexible system that will respond to the fluctuations in rainfall and periodic droughts at the source of the Blue Nile. This can be easily managed and measure with infrastructure that is that is already in place, and much of the storage capacity already exists or is being built. The challenge is to negotiate the specific allocation percentages for each country, but there is the potential to develop a scheme in which Egypt and Sudan in an average precipitation would be allocated a comparable amount of Blue Nile water to what they receive now. An additional procedure could also be developed in which countries could trade their water allocations for compensation. This would reward countries for conserving and encourage the development of efficient water use practices in all countries. While Egypt may object to a diminished allocation based on this system, the country should keep in mind that an empowered Ethiopia and Sudan not bound to this system may not deem it important to ensure Egypt receives ample water during a prolonged drought.

Addressing the issue of water quality goes hand in hand with allocation, as not all water is equal. Diminished water quality reduces its usefulness and benefits no state. Utilizing an enforceable framework to limit harmful pollutants in the Nile can go a long way towards increasing water quality throughout the sub-basin which will in turn increase the usefulness of the water for all.

All three countries in the Eastern Nile Sub-basin experience shortages in electricity which is one of the most critical drivers of economic development. This paper contends there is

considerable opportunity for joint-development and joint-management in Ethiopia's hydroelectric sector. Helping Ethiopia develop their economy through hydroelectric development gives incentives to the country to keep the Blue Nile flowing as much as possible and acts as a disincentive to using the river for other purposes. There is much room for growth in this sector in Ethiopia and the power generated can be power Egypt and Sudan far into the future.

Cooperation between parties with asymmetrical power and resources poses a significant challenge in international relations. More often than not, cooperation can be avoided in these instances because of the lack of interdependence or because one party can easily coerce the other. Avoiding cooperation the Eastern Nile Basin is no longer a viable option. Not only are all parties mutually dependent on a scarce resource, but no single state has the ability to lay claim to the hegemonic position. The longer cooperation is deferred, the more difficult and necessary it will be. As a consequence of Egypt's resistance to disrupting the status-quo, a shift in the balance of power has disrupted it for them with Ethiopia becoming the key beneficiary. This paper contends, based upon this shift in power in the Eastern Nile Basin, Egypt and Sudan have no choice, but to seek cooperation if they hope to have a significant stake in their water security future.

BIBLIOGRAPHY

- "Voters Back Sudan Split." *Belfast Telegraph* (-02-08, 2011): 22.
- "EGYPT: FUEL AND MINERAL OILS IMPORTS ON THE FALL." *Infoprod* (-01-01, 2010).
- "Ethiopian PM Lauds Bilateral Cooperation with Sudan." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-04-21, 2009).
- "ETHIOPIA: Mengistu Convicted of Genocide." *Africa Research Bulletin. Political, Social and Cultural Series* 43, no. 12 (-01-01, 2007): 16903C-4A.
- "Ethiopia to Cancel Visa KHARTOUM, July 22." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-07-22, 2000): 1.
- "Water Scarcity." *Adelphi Papers* 38, no. 319 (-06-01, 1998): 59-73.
- "MUBARAK BLAMES SUDANESE RADICALS SAYS MUSLIM LEADERS BEHIND ASSASSINATION ATTEMPT IN ETHIOPIA." *The Sacramento Bee* (-06-28, 1995): A.10.
- "Price Increases in Sudan Trigger Riot." *The Washington Post* (-10-06, 1987): a.25.
- "EUROPEAN ECONOMIC COMMUNITY—FRANCE—FEDERAL REPUBLIC OF GERMANY—LUXEMBOURG—NETHERLANDS—SWITZERLAND: CONVENTION ON THE PROTECTION OF THE RHINE AGAINST CHEMICAL POLLUTION." *International Legal Materials* 16, no. 2 (-03-01, 1977): 242-56.
- Abushouk, Ahmed. "The Anglo-Egyptian Sudan: From Collaboration Mechanism to Party Politics, 1898-1956." *Journal of Imperial and Commonwealth History* 38, no. 2 (-01-01, 2010): 207-36.
- Adriansen, Hanne. "Land Reclamation in Egypt: A Study of Life in the New Lands." *Geoforum* 40, no. 4 (-01-01, 2009): 664-74.
- AlJazeera. *Morocco Rolls Back Bread Price Hike* 2007.
- Amer, Salah. "Sustainable Development and International Cooperation in the Eastern Nile Basin." *Aquatic Sciences* 67, no. 1 (-03-01, 2005): 3-14.
- Amer, Salah and Salah El-Din Amer. "Egypt and the Nile Basin." *Aquatic Sciences* 67, no. 1 (-03-01, 2005): 42-50.
- Aquastat. "Irrigation in Africa Facts and Figures: Egypt." *Aquastat* (2006).
- . "Irrigation in Africa in Figures: Ethiopia." *Aquastat* (2006).
- . "Irrigation in Africa in Figures: Sudan." *Aquastat* (2006).
- Arrott, Elizabeth. "Nile States Work to Improve Quantity, Quality of Waters." *Voi*, September 1, 2010, .
- Arsano, Yacob. *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*. Zurich: Center for Security Studies, Swiss Federal Institute of Technology, 2007.
- Arsano, Yacob. "Ethiopia and the Eastern Nile Basin." *Aquatic Sciences* 67, no. 1 (-03-01, 2005): 15-27.
- Associated Press. "Egypt's Prime Minister, Seeking a Nile River Ally, Visits Southern Sudan, Offers Aid Projects." *The Washington Post*, March 28, 2011, 2011.

- Ayebare, Adonia. *Issue Brief: A Political Storm Over the Nile*. New York: International Peace Institute, 2010.
- Barnaby, Wendy. "Do Nations Go to War Over Water?" *Nature*.
- BBC. "East Africa Seeks More Nile Water from Egypt." *BBC News*, May 14, 2010, 2010.
- . "Ethiopia Urges Egypt to Engage in Dialogue Over Nile Waters." *BBC Monitoring International Reports* (-01-01, 2010).
- . "Sudan Said to be Ethiopia's Sole Oil Supplier." *BBC Monitoring International Reports* (-01-01, 2010).
- Biswas, Asit. "Management of International Waters: Opportunities and Constraints." *International Journal of Water Resources Development* 15, no. 4 (-12-01, 1999): 429-41.
- Bloomberg. "Congo, Burundi to Join Nile Agreement Opposed by Egypt." *Al Masry Al Youm*, January 20th, 2011, .
- Boswell, Alan. "Anger Sweeps North as Sudan Announces Split." *Calgary Herald* (-01-31, 2011): A.7.
- . "Youth Protests in Sudan Struggle Amid State Crackdown." *Knight-Ridder/Tribune News Service* (-02-07, 2011).
- Brooks, David. "Fresh Water in the Middle East and North Africa." *Integrated Water Resources Management and Security in the Middle East* (-01-01, 2007): 33-64.
- Caponera, Dante A. *Principles of Water Law and Administration: National and International*. Brookfield: A.A. Balkema Publishers, 1992.
- Cascão, Ana Elisa. "Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?" *Water Alternatives* 2, no. 2 (06, 2009): 245-68, <http://search.ebscohost.com/login.aspx?direct=true&db=eih&AN=41976668&site=ehost-live>.
- Cascão, Ana. "Changing Power Relations in the Nile River Basin: Unilateralism Vs. Cooperation?" *Water Alternatives* 2, no. 2 (-06-01, 2009): 245-68.
- CIA. *CIA World Fact Book: Egypt* Central Intelligence Agency, 2011.
- . *CIA World Fact Book: Sudan* 2011.
- . "Sudan." *The World Factbook Country Profile* (-01-01, 1998): 439.
- Clarke, David. "ANALYSIS-Political Change in Egypt to Boost Nile Cooperation." *Reuters Africa*, May 12, 2011, 2011.
- Collins, Robert O. *A History of Modern Sudan*. First ed. Cambridge: Cambridge University Press, 2008.
- . *The Waters of the Nile: Hydropolitics and the Jonglei Canal, 1900-1988*. Princeton: Markus Wiener Publishing, 1996.
- Collins, Robert. "Civil Wars in the Sudan." *History Compass* 5, no. 6 (-11-01, 2007): 1778-805.
- Committee, The International Commission on Irrigation and Drainage. "ICID, Irrigation and Drainage Area of More than 100 Countries." (2009).
- Comprehensive Assessment Secretariat. *Water for Food, Water for Life: Insights from the Comprehensive Assessment of Water Management in Agriculture*. Colombo, Sri Lanka: International Water Management Institute, 2006.

- Davidson, William. "Ethiopia Caps Food Prices to Combat Inflation." [http://www.ethiopian-news.com/ethiopian-caps-food-prices-to-combat-inflation/](http://www.ethiopian-news.com/ethiopia-caps-food-prices-to-combat-inflation/) (accessed June 1, 2011, 2011).
- Dinar, S. "Scarcity and Cooperation Along International Rivers." *Global Environmental Politics* 9, no. 1 (-02-01, 2009): 109-.
- Dougherty, James E. and Robert L. Pfaltzgraff. *Contending Theories of International Relations: A Comprehensive Survey*. Third ed. New York: Harper & Row Publishers, 1990.
- Egyptian Council for Foreign Affairs. "Egypt's Water Status and Needs." Cairo, Egyptian Council for Foreign Affairs, March 6, 2010, 2010.
- El Dahan, Maha. "Egypt's Water Needs to Surpass Resources by 2017." *Reuters* 2009.
- El Mashed, Sarah. "Environmental Breaches could Lie Behind Cancer Increase." *Al Masry Al Youm*, January 26, 2011, 2011.
- El Mufti, Dr Ahmed. *The Success of the Impossible Negotiations about the Waters of the Nile: 1891-2007* Khartoum International Centre for Human Rights, 2007.
- Eldaw, A. M. *The Gezira Scheme: Perspectives for Sustainable Development*. Bonn: German Development Institute, 2004.
- El-Din Abdin, Alaa and Ibrahim Gaafar. "Rational Water use in Egypt." *Technological Perspectives for Rational use of Water Resources in the Mediterranean Region* (2009).
- ESIS. "Egypt, Sudan Agree to Coordinate on Nile Water before Consulting Third Party." Egyptian State information Services. <http://www.sis.gov.eg/En/Story.aspx?sid=56037> (accessed June 11, 2011, 2011).
- . "Mubarak: Egypt to Provide all Assistance to Advance the Peace Process in South Sudan." Egyptian State Information Service. <http://www.sis.gov.eg/En/Story.aspx?sid=25276> (accessed June 11, 2011).
- . *PM, His Ethiopian Counterpart Discuss Means of Boosting the Egyptian-Ethiopian Relations*. Cairo: Egypt State Information Service, 2009.
- . "Egypt Establishes Two Power Stations in South Sudan." Egyptian State Information Service. <http://www.sis.gov.eg/En/Story.aspx?sid=16132> (accessed June 11, 2011).
- European Parliament and the Council of the European Union. "DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL." *Official Journal of the European Communities* (October 23, 2000, .
- FEIOCK, RICHARD. "RATIONAL CHOICE AND REGIONAL GOVERNANCE." *Journal of Urban Affairs* 29, no. 1 (-01-01, 2007): 47-63.
- Fitzgerald, Mary. "Ethiopia's Regime Remains Heavily Dependent on Foreign Aid." *Ethiopian Review*, January 25, 2010, 2010.
- Fitzmaurice, Malgosia. "The Helsinki Conventions 1974 and 1992." *The International Journal of Marine and Coastal Law* 13, no. 3 (-01-01, 1998): 379-93.
- Fleishman, Jeffrey. "On the Nile, Egypt Cuts Water use as Ethiopia Dams for Power." *The Los Angeles Times* 0, no. 0 (-01-01, 2010): 1.
- Formanek, Ingrid and David Mc Kenzie. *Pollution Fears Taint Sudan's Oil Promise*. Atlanta: CNN, 2009.

- Frenken, Karen. *Irrigation in Africa in Figures AQUASTAT Survey – 2005*. Rome: Food and Agriculture Organization of the United Nations, 2005.
- González-Ruibal, Alfredo. "Fascist Colonialism: The Archaeology of Italian Outposts in Western Ethiopia (1936–41)." *International Journal of Historical Archaeology* 14, no. 4 (-12-01, 2010): 547-74.
- Guo, Rongxing. *Territorial Disputes and Resource Management: A Global Handbook*. Hauppauge, New York: Nova Science Publishing, 2007.
- Hamad, Osman. "Sudan and the Nile Basin." *Aquatic Sciences* 67, no. 1 (-03-01, 2005): 28-41.
- Heinlein, Peter. "Ethiopia Offers Olive Branch in Nile Water Sharing Dispute." *Voice of America*, March 31, 2011, .
- Howell, P. P. and J. A. Allan. *The Nile: Sharing a Scarce Resource*. Cambridge: Cambridge University Press, 1994.
- Howell, P. "The Impact of the Jonglei Canal in the Sudan." *The Geographical Journal* 149, no. 3 (-11-01, 1983): 286-300.
- Ibrahim, Fouad. *Egypt: An Economic Geography* 2003.
- IN GAMBELLA, ALICE. "Sudan Rebels Find New Blood in Ethiopia." *The Guardian (London)* (-01-23, 1997): 014.
- International Bank for Reconstruction and Development/The World Bank. *Ethiopia - Managing Water Resources to Maximize Sustainable Growth: Water Resources Assistance Strategy*. Washington DC: World Bank Group, 2006.
- Jesman, Czeslaw. "Egyptian Invasion of Ethiopia." *African Affairs (London)* 58, no. 230 (-01-01, 1959): 75-81.
- Kalpakian, Jack. *Identity, Conflict and Cooperation in International River Systems*. Surrey: Ashgate, 2004.
- Kaplan, Marcos. "The Power Structure in International Relations." *International Social Science Journal* 26, no. 1 (-01-01, 1974): 95.
- Kendie, Daniel. "Toward Northeast African Cooperation: Resolving the Ethiopia-Somalia Disputes." *Northeast African Studies* 10, no. 2 (-01-01, 2003): 67.
- . "Egypt and the Hydro-Politics of the Blue Nile River." *Northeast African Studies* 6, no. 1 (-01-01, 1999): 141-69.
- Keohane, Robert. "Power and Interdependence." *Survival (London)* 15, no. 4 (-07-01, 1973): 158-65.
- Krasner, Stephen D. *International Regimes*. Ithaca, New York: Cornell University Press, 1983.
- Kroll, John. "The Complexity of Interdependence." *International Studies Quarterly* 37, no. 3 (-09-30, 1993): 321-47.
- Legro, JW. "Is Anybody Still a Realist?" *International Security* 24, no. 2 (-01-01, 1999): 5-55.
- Malla, Katak. "Current State of the Law of International Watercourses: Progress and Paradigm Shifts 18152008." *Nordic Journal of International Law = Acta Scandinavica Juris Gentium* 77, no. 4 (-01-01, 2008): 461-508.
- Malone, Barry. "Ethiopian PM Warns Egypt Off Nile War." *Reuters*, November 23, 2010, 2010.
- . "Ethiopia to Defy Egypt and Build Huge Nile Dam." *Reuters UK*, March 30, 2011, .
- MENA. "Egypt: Sudan Breakup Will Not Affect our Share of Nile." *Al Masry Al Youm*, January 11, 2011, 2011.

- . "South Sudan Secession Will Not Impact Nile Sharing, Says Sudan Army Official." *Al Masry Al Youm*, January 11, 2011, 2011.
- Menya, Walter. "Kenya Signs Nile Basin Pact." *Daily Nation*, May 19, 2010, .
- Metawie, AbdelFattah. "History of Co-Operation in the Nile Basin." *International Journal of Water Resources Development* 20, no. 1 (-03-01, 2004): 47-63.
- Ministry of Waster Resources and Irrigation: Planning Sector. *National Water Resources Plan for Egypt-2017*. Cairo, Egypt: Arab Republic of Egypt, 2005.
- Ministry of Water and Energy. *Existing Water Quality Situation in Ethiopia*. Addis Ababa: Federal Democratic Republic of Ethiopia, 2010.
- Ministry of Water Resources. *Water Sector Development Program: Main Report*. Addis Ababa: Federal Democratic Republic of Ethiopia, 2002.
- Draft Agreement on the Nile Basin Cooperative Framework*. (May 14, 2010, 2010): .
- Okbazghi, Yohannes. *Water Resources and Inter-Riparian Relations in the Nile Basin: The Search for an Integrative Discourse*. Albany: State University of New York Press, 2008.
- Osman, Ahkmed. "To Egypt's Chagrin, Burundi Joins Controversial Nile Basin Pact." *Al Masry Al Youm*, January 3, 2011, .
- Owen, Taylor. "Conflicts Over Shared Rivers: Resource Scarcity Or Fuzzy Boundaries?" *Political Geography* 25, no. 4 (-05-01, 2006): 361-82.
- Phelps, Timothy. "Egypt's Poor Grow More Hungry." *The Telegraph Herald (1935)* (-02-20, 2011): A.6.
- Radi, Magdi. *Mubarak Orders Food Aid to Ethiopia*. Cairo: Egyptian State Information Service, 2008.
- Rice, Xan. "Ethiopia's Rush to Build Mega Dams Sparks Protests." *The Guardian*, March 25, 2010, 2010.
- Roth, Dik. "Virtual Water: Virtuous Impact? the Unsteady State of Virtual Water." *Agriculture and Human Values* 25, no. 2 (-06-01, 2008): 257-70.
- Roudi-Fahimi, Farzaneh, Liz Creel, and Roger-Mark De Souza. *Finding the Balance: Population and Water Scarcity in the Middle East and North Africa*. Washington DC: Population Reference Bureau, 2002.
- Saif, Ibrahim. "The Food Price Crisis in the Arab Countries: Short Term Responses to a Lasting Challenge." *Middle East Program* (2008).
- Salama, Vivian and Mariam Fam. "Egypt's Foreign Minister Calls on Donors to Provide Economic Assistance." *Bloomberg*, February 15, 2011, .
- Salem, Metwali. "Egypt to Build Dams in Ethiopia." *Al*, February 21, 2010, 2010.
- Salevurakis, John. "Bread Subsidies in Egypt: Choosing Social Stability Or Fiscal Responsibility." *The Review of Radical Political Economics* 40, no. 1 (-03-01, 2008): 35-49.
- . "Bread Subsidies in Egypt: Choosing Social Stability Or Fiscal Responsibility." *The Review of Radical Political Economics* 40, no. 1 (-03-01, 2008): 35-49.
- SAMUELSON, ROBERT. "The World's Great Food Crunch of 2011." *Tulsa World (Tulsa, Okla.)* (-03-14, 2011): A.7.

- Schmedtje, Ursula.
Development of the Danube River Basin District Management Plan - Strategy for Coordination in a Large International River Basin. Vienna: International Commission for the Protection of the Danube River, 2005.
- Seri-Hersch, I. "'Transborder' Exchanges of People, Things, and Representations: Revisiting the Conflict between Mahdist Sudan and Christian Ethiopia, 1885-1889." *The International Journal of African Historical Studies* 43, no. 1 (-01-01, 2010): 1-26.
- . "'Transborder' Exchanges of People, Things, and Representations: Revisiting the Conflict between Mahdist Sudan and Christian Ethiopia, 1885-1889." *The International Journal of African Historical Studies* 43, no. 1 (-01-01, 2010): 1-26.
- Service, Washington. "Haile Selassie Implicated in Famine Deaths." *The Washington Post* (-08-29, 1974): A15.
- Staff. "Dams in Sudan." Sudan Online. <http://www.sol-sd.com/news/123/ARTICLE/2157/2007-05-06.html> (accessed June 5, 2011, 2011).
- . "Congo Confirms it Will Not Sign Entebbe Nile Water Agreement." *Al Masry Al Youm*, April 4, 2011, 2011.
- . "Kenya Urges Egypt to Join Entebbe Agreement." *Al Masry Al Youm*, March 7, 2011, 2011.
- . "Jonglei Canal Project Needs to be Revised, South Sudan Says." *Sudan Tribune*, August 8, 2009, 2009.
- . "Tekeze Project Inaugurated in Ethiopia." Global Trade Media. <http://www.waterpowermagazine.com/story.asp?storyCode=2054758> (accessed May 30, 2011, .
- . "Ethio-Yemen Cooperation Enters New Stage: Ethiopian PM." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-07-22, 2003): 1.
- . "Sudanese President Concludes Visit to Egypt." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-05-15, 2002): 1.
- . "Ethiopia, Sudan Sign Cooperation Accords." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-05-02, 2001): 1.
- . "Sudanese FM: Sudan, Egypt Plan to Normalize Relations." *News from Xinhua News Agency, China (Hong Kong : Weekly)* (-10-10, 1998): 1.
- . "Mubarak: Egypt Capable of Overthrowing Sudan." *The Orlando Sentinel* (-06-29, 1995): A.12.
- . "About the NBI." http://www.nilebasin.org/newsite/index.php?option=com_content&view=article&id=71%3Aabout-the-nbi&catid=34%3Anbi-background-facts&Itemid=74&lang=en (accessed May 29, 2011, .
- . "Border Clashes Follow Attempt to Kill Mubarak." *The Independent on Sunday*, June 25, 1995, .
- . "About the Nile Basin Initiative." Nile Basin Initiative. http://www.nilebasin.org/newsite/index.php?option=com_content&view=section&id=5&layout=blog&Itemid=68&lang=en (accessed June 2, 2011, 2011).
- . "Merowe Dam, Sudan." internationalrivers.org. <http://www.internationalrivers.org/africa/merowe-dam-sudan> (accessed June 5, 2011, 2011).
- . *Toshka Project - Mubarak Pumping Station / Sheikh Zayed Canal, Egypt*. <http://www.water-technology.net/projects/mubarak/> ed.Net Resources International, .

- Staff, BBC. "Sudan, Ethiopia to Link Electricity Networks." *BBC Monitoring International Reports* (-01-01, 2009).
- Swain, Ashok. "International Laws and Disputes in the Nile River." Bergen, Norway, February 9, 2007, 2007.
- . "Ethiopia, the Sudan, and Egypt: The Nile River Dispute." *The Journal of Modern African Studies* 35, no. 4 (-12-01, 1997): 675-94.
- Tekle, Tesfa-alem. "Ethiopia, Egypt, Sudan Discuss Nile Projects." *Sudan Tribune* (June 22, 2008, 2008).
- The Ethiopian News Agency. *Construction of Great Millennium Nile Dam Project to be Launched Soon : Ministry*. Addis Ababa: Government of Ethiopia, .
- Thompson, Mike. "Nile Restrictions Anger Ethiopia." *BBC News*, February 3, 2005, 2005.
- . "Nile Restrictions Anger Ethiopia." *BBC News*, February 3, 2005, 2005.
- Timmerman, Jos. *Transboundary River Basin Management: The Nile Basin Case Study*. Lelystad: NeWater project, 2005.
- Trott, Russel. *Demonstrators Killed in Tunisia Protests*. London: BBC News, 2011.
- U.S. Embassy Cairo. *Leaked Diplomatic Dispatch Intended for Briefing of Admiral Mike Mullen, Chairman of the Joint Chiefs of Staff*. Cairo, Egypt: United States Department of State, 2010.
- United Nations. "World Population Prospects: The 2008 Revision." (2008).
- . *Convention on the Law of the Non-Navigational Uses of International Watercourses*. Vol. 49. New York: 2007.
- . "Convention on the Law of the Non-Navigational Uses of International Watercourses." *Official Records of the General Assembly* (1997).
- van der Westhuizen, Lauren. "Italy's Salini to Build \$4.8 Billion Ethiopia Nile Dam, Addis Fortune Says." *Bloomberg*, April 5, 2011, .
- Water, Environment, Social and Rural Development Department. *Project Appraisal on a Proposed Loan in the Amount of \$20 Million to the Arab Republic of Egypt for a Second Pollution Abatement Project* World Bank, 2006.
- Waterbury, John. *The Nile Basin: National Determinants of Collective Action*. New Haven: Yale, 2002.
- Wichelns, D. "Moving Water to Move People - Evaluating Success of the Toshka Project in Egypt." *Water International* 28, no. 1 (-03-01, 2003): 52-6.
- Williams, Stephen. "Arab World Looks to Sudan as Bread Basket." *African Business*, no. 350 (-02-28, 2009): 34.
- Wolf, Aaron. "Shared Waters: Conflict and Cooperation." *Annual Review of Environment and Resources* 32, no. 1 (-11-01, 2007): 241-69.
- . "Incorporating Equity into International Water Agreements." *Social Justice Research* 14, no. 4 (-12-01, 2001): 349-66.
- World Bank. "Renewable Internal Freshwater Resources Per Capita (Cubic Meters)." *World Development Indicators* (2011).
- World Water Assessment Program. *Water in a Changing World*. London, Paris: UNESCO Publishing, 2009.
- Yang, Dawen. "Water Resources Allocation Considering the Water use Flexible Limit to Water Shortage—A Case Study in the Yellow River Basin of China." *Water Resources Management* 23, no. 5 (-03-01, 2009): 869-80.

Yohannes, Okbazghi. "Water Resources and Inter-Riparian Relations in the Nile Basin." (2008).

Young, Oran. *International Cooperation: Building Regimes for Natural Resources and the Environment*. Ithaca, New York: Cornell University Press, 1989.

Zayed, Dina. "Egypt's Online Movement Takes to the Streets." *Reuters*, January 27, 2011, .

Zeitoun, Mark. "Applying Hegemony and Power Theory to Transboundary Water Analysis." *Water Policy* 10, no. s2 (-08-01, 2008): 3-12.