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Transboundary River Policy and Governance for Water Conservation and Sustainable Water Use among the Eastern Nile Basin Countries

A Ph.D. Dissertation Submitted to the Department of Political Science and International Relations in Partial Fulfillment of the Requirements for the Degree of Doctorate of Philosophy in Political Science and International Relations

By

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Declaration

I hereby affirm that this thesis is my original work, and I am its author. It has not been previously presented for any other academic or professional purpose. All content in this work is my own, except for any collaborative publications that have been included. The specific contributions of both myself and the co-author (the supervisor) are outlined below. Additionally, I verify that proper attribution has been provided for any external sources referenced in this thesis.

The contents presented primarily in chapters two and six have been published in the **East African Journal of Social Sciences and Humanities (EAJSSH)** entitled **"Towards Transboundary Water Management Policy Regime in the Eastern Nile Basin for Sustainable Water Use and Conservation,"** with a link to **https://eajsh.haramayajournals.org/index.php/eajsh/article/view/630.** This publication was authored by the student as the corresponding author and the supervisor as the co-author. Additionally, an article entitled "**Challenges and Prospects of Transboundary River Water Conservation and Watershed Protection in Ethiopia: The Case of the Upper Blue Nile"** has been published on Heliyon with the link **https://www.cell.com/heliyon/pdf/S2405-8440(24)01913-3.pdf.** It is important to note that this study was a collaborative effort among both authors. I conducted and completed the overall thesis, resulting in novel findings.

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This is to certify that the thesis prepared by Emiru Gemechu Kedida entitled: "Transboundary River Policy and Governance for Water Conservation and Sustainable Water Use among the Eastern Nile Basin Countries**"** and submitted in partial fulfillment of the requirements for the degree Doctorate of Philosophy in Political Science and International Relations complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

This dissertation work aims to explore the need for a transboundary water management policy regime in the Eastern Nile Basin. It attempts to demonstrate the need for new and robust national and regional policy regimes in order to deal with water management challenges that are transboundary in nature. Accordingly, the study sheds light on the need for a policy regime in the Eastern Nile basin, not only because of the inadequacy of the existing water governance regime at the national and regional levels but also because of the new compelling developments such as the commencement of mega projects like GERD. It attempts to clarify the shortcomings of current unilateral water management policies that fail to tackle the challenges of sustainable usage and conservation of the Nile's water resources, as well as the transboundary water management issues. The study employed a qualitative research approach, and data were collected through key informant interviews. Different secondary sources of water issues that are transnational are thoroughly reviewed. The data were analyzed based on thematic analysis methods. The key finding of this research indicates that the existing water resource management policy regimes are inadequate and that there is a clear void in the policy regime hampering sustainable utilization and management of the shared Nile waters among riparian countries. The research finally suggests pathways for replacing the existing Nile water management policy regimes and for establishing comprehensive sub-basin policy regimes in the Eastern Nile Basin. A new pathway should satisfy the water needs of the ever-increasing populations and the ever-expanding development requirements in each riparian country through collaboration that enables the countries to deal with the common challenges that are otherwise difficult to address.

Keywords*:* Eastern Nile Basin; Water conservation; transboundary water management policy regime; Water use; Water governance

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Abbreviations

AU	African Union
BCM	Billion Cubic Meter
CFA	Cooperative Framework Agreement
COMESA	Common Market for Eastern and Southern Africa
CPA	Comprehensive Peace Agreement
DOP	Declaration of Principles
ENSAP	Eastern Nile Subsidiary Action Program
ENTRO	Eastern Nile Technical Regional Office
EU	European Union
FAO	Food and Agricultural Organization
GCI	Green Cross International
GEF	Global Environmental Facility
ICCON	International Consortium for Cooperation on the Nile
IES	Institute of Ethiopian Studies
IGAD	Inter-Governmental Authority for Development
ILC	International Law Commission
IPoE	International Panel of Experts
IR	International Relations
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
JMP	Joint Multipurpose Project
JPTC	Joint Permanent Technical Commission
NRBC	Nile River Basin Commission
NBI	Nile Basin Initiative
Nile-COM	Nile Council of Ministers
Nile-TAC	Nile Technical Advisory Committee
PoE	Panel of Experts
RBO	River Basin Organization
SADEC	South African Development and Economic Community

SDG……..	Sustainable Development Goals
SES	Social-Ecological System
SPLM/A	Sudanese People's Liberation Movement/Army
SVP	Shared Vision Program
TECCONILE	Technical Cooperation Committee for the Promotion of Development and Environmental Protection on the Nile
TFDD	Transboundary Freshwater Dispute Database
UN	United Nations
UN Convention	UN Convention 1997 United Nations Convention on the law of the Non-Navigational Uses of International Watercourses
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environmental protection
UNESCO-IHP	United Nations Educational, Scientific, and Cultural Organization

Chapter One: Background and Context of the study

The water management challenge is one of the foremost agenda items that is routinely identified as a challenge facing humanity in the 21st century, posing threats to peace and prosperity (Conca, 2015: xiv). Humanity started the codification of water use since the Mesopotamian civilizations 4000 years ago. The code of Hammurabi had evolved to allocate water during this Mesopotamian civilization (Cosens and Gunderson, 2018:9). Since then, the practice of exploiting water resources through engineering and regulatory institutions has continued throughout the world. In different parts of the world and throughout recorded history, humanity has managed and used water resources for different human needs. When it comes to the management of water, national governments play a crucial role in developing infrastructure as well as its allocation, particularly in developing countries. The conservation and protection of the river water and its environs, though only happening in the second half of the 20th century, were also sanctioned by national governments by introducing laws, regulations, policies, and responsible institutions to implement and follow up on the adopted laws and policies (Black and Fisher, 2001; Consens and Gunderson, 2018).

For casual observers, water is a ubiquitous resource, covering about 70% of the Earth's surface (Kallen, 2015). However, only a small fraction of water, i.e., 2.5%, is fresh water that can be used for different purposes, while the rest is saline water. Even the freshwater that is available is not easily utilized by humans because 98.7% is locked in frozen glaciers in Greenland and Antarctica or situated in deep underground aquifers that are economically and technically difficult to use for humans (USGS, 2019). Therefore, only a fraction of that, about 0.007%, can be easily accessible by humans, despite the importance and necessity of water for our daily lives. Thus, the available freshwater is only found in lakes, rivers, and shallow aquifers replenished by rainfall and melting snow (Schmeier, 2013: 2). The entire human race shares only this meager amount of fresh water, with an uneven distribution across space and time. As a result, the UN forecasted a 40% global water shortfall by 2030, with roughly two billion individuals already encountering water scarcity. With the world population increasing, the picture becomes dire (UN, 2021). This shows the demand for conserving each drop of water across the globe in general and in a water-stressed region in particular.

Humanity has almost used half of this planet's available and accessible freshwater with current technology (Conca, 2015). Globally, agriculture consumes 70% of the total freshwater use, and in most developing countries, agricultural water use accounts for about 95% of the total freshwater use (UN, 2021). Rivers provide much of the surface fresh water for humans (Whitworth, 2015; Kallen, 2015). A report by the Global Commission on the Economics of Water (2023) indicated that by 2030, global water demand is expected to exceed water supply by 40% (Mazzucato et al., 2023). Hence, in the 21st century, one of the major challenges that humanity faces is the conservation and sustainability of freshwater resources, which are very precious and finite (Salim et al., 2019). Salim et al. (2019) argued that it is because of this fact that the sustainability of freshwater is included as one of the Sustainable Development Goals (SDG) of the UN.

The majority of rivers are transboundary[1] and shared by two or more countries, and they "serve as a primary source of fresh water for approximately 40% of the world's population" (Earle and Neal, 2017:145). Moreover, these transboundary river basins are "home to more than 70% of the world population and supply water for roughly 60% of global food production" (Earle and Neal, 2017: 145). There are approximately 310[2] transboundary river basins in the world, which cover almost half of the earth's surface (47.1%). The transboundary rivers produce about 60% of the world's freshwater needs (McCracken and Wolf, 2019: 732).

The global water scarcity and mismanagement are echoed by academics, multilateral organizations, and different institutions working on the water issue (UN, 2021). Despite the relative improvement in the recent past in water use efficiency, studies indicate that 65–70% of

[1] There are two types of transboundary water resources: ground and surface water resources—rivers and lakes (Kliot et al., 2001: 230). This study refers only to transboundary rivers.

[2] Since the formal register started in 1978, the number has kept growing because of changes in political borders and improvements in the quality of remotely sensed data (McCracken and Wolf, 2019: 735).

the fresh water people use in the world is wasted or misused. It could be wasted through evaporation, leaks, and other losses (UN, 2023; WWF, 2023). Long ago, water analysts warned that the water crisis we are facing is “a crisis of mismanagement” (quoted in Black &Fisher, 2001:3).

After the intensive undertaking of hydraulic missions in the 1950s, 1960s, 1970s, and 1980s, the world has shifted the paradigm of water governance from development to management and conservation (Conca, 2006). The developed countries used to pursue water development policies in the developing world by financing the major water projects in the developing countries (Barry et al., 2004). However, since the 1990s, the paradigm has shifted from water development to water management and conservation, a policy that has also echoed throughout the developing world (UN, 2021).

Even before the 1990s, sustainable water use and conservation were on the agenda when water wastage and pollution affected most of the major river basins in the developed world. The agenda has emerged among academics, policymakers, and development actors not only within one country but also at the global level since the 1970s (Salman, 2018). Competition over water use intensified between the different sectors of the economy, both nationally and internationally. The competition has become tense in the already water-stressed regions of the world. The different UN organs and regional organizations have realized the acute challenge the world is facing and have adopted different strategies to tackle the problem (UN, 2023). To overcome the challenges, countries adopted different strategies; however, because of the complexity and transnationality of the challenges, most countries are struggling to address these problems (Salman, 2018).

Humanity has faced an enormous environmental challenge since the Industrial Revolution. Since then, enormous damage has occurred to the environment. To overcome the challenges, humanity developed different strategies to reverse environmental degradation or rehabilitate the degraded environment. Most of the environmental challenges are global in nature. Indeed, the management of shared resources like transboundary river basins is very complex. When natural resources are commonly shared, the management and protection of the resources become difficult. Aristotle long understood the complexity and difficulty of conserving such shared resources and had

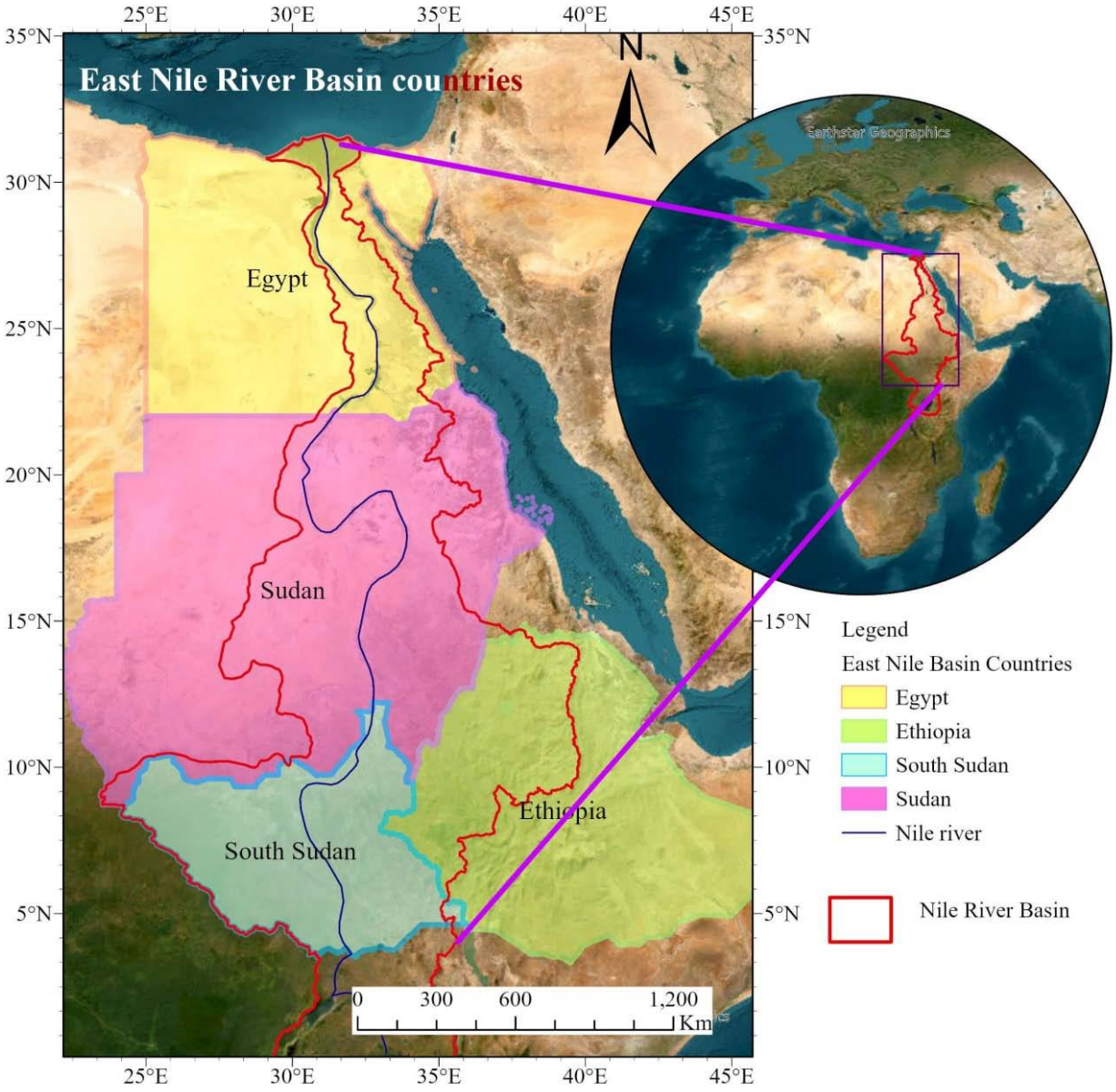
argued that “what is common to the greatest number has the least care bestowed upon it. Everyone thinks chiefly of his own, hardly at all of the common interest” (quoted in Ostrom, 1990: 2).

Long before Hardin’s (1968) “Tragedy of the Commons," William Foster Lyod (1833) developed a theory of the commons that “predicted the improvident use of the property owned in common” (Ostrom, 1990:3). Another study conducted on the conservation of common property by Scott Gordon (1954:124) underlined the difficulty of conserving commonly shared natural resources. In his own words:

> There appears then, to be some truth in the conservative dictum that everybody's property is nobody's property. Wealth that is free for all is valued by no one because he who is foolhardy enough to wait for its proper time of use will only find that it has been taken by another.,... The fish in the sea are valueless to the fisherman because there is no assurance that they will be there for him tomorrow if they are left behind today (Quoted in Ostrom, 1990: 3)

To reverse the damage and destruction of the environment, different scientists conducted research, nations made negotiations “to regulate environmentally harmful practices," and social movements were organized at local, national, and global levels (Jeong, 2001: XV). No one nation could solely tackle the problem of environmental degradation; this necessitated negotiation to overcome the challenge. In the past decade, several treaties have been signed to regulate the use of shared resources like transboundary rivers. So far, over 3600 treaties have been signed to govern and regulate the water use and management of such international rivers (Tarlock, 2015:12).

Fig 1: Map of Eastern Nile Basin Countries



Source: Author

In the case of freshwater management, several factors implied the need for freshwater regulations and policies, including transboundary river water. The continuing population growth, the expansion of urbanization, the shift in lifestyle, economic growth, climate change, water pollution, etc. all contributed to raising the eyebrows of policymakers (Whitworth, 2015; Black and Fisher, 2001). Environmental calamities caused by growing economic activities led to

extreme contamination of the air and river water in the developed world, which led to acid rain, and the ‘burning’ of the river caught by the media caused a public outcry, forcing governments to introduce laws and policies that curb misuse and pollution of water resources (Norman, 2015).

All these attracted the attention of the media and led to public outrage, prompting governments to enact environmental laws and policies. In response to the growing challenges and calls from environmentalists and academics, the international community organized conferences after conferences. Some of the conferences organized in response to growing natural resource mismanagement and degradation include the Stockholm Environment and Development Summit in 1972, the Mar Del Plata in 1977, the Dublin Principle in 1992, and the Rio Conference (Agenda 21, Chapter 8) in 1992, all organized in order to deal with regulating freshwater use in addition to the other issues discussed during those events (Homer-Dixon, 1999; UN, 2003; Miller and Spoolman, 2009; Norman, 2015; and Whitworth, 2015).

In the Nile Basin in general and the Eastern Nile Basin in particular, water conservation has emerged as a growing agenda as the demand for water keeps growing among the basin states. In its recent irrigation water report, the NBI indicated that the growing water shortfalls in the Nile basin countries to meet irrigation water demand can possibly be mitigated through water conservation, at least temporarily (NBI, 2020).

The Nile water represents just 2% of the Amazon (Dereje, 2010), yet the pressure on this vital resource continues to mount due to factors like population growth, economic development, urbanization, and the increased number of users among the upper riparian states. This heightened pressure has led to intense competition for access to and utilization of the Nile water. In the Eastern Nile basin, there is a lack of strong cooperation in managing this shared resource, with unilateral policies often dictating its use. However, this approach is insufficient to ensure the sustainability of the water supply, as each state seeks to maximize its own benefits without robust regulatory frameworks in place. Recognizing the unsustainability of the current situation, stakeholders have attempted to come together to establish agreements for joint management of the Nile River. Despite these efforts, progress towards effective cooperation has been slow, even though collective action is urgently needed to address the escalating threats facing the basin (Cascao and Nicol, 2016).

In the Nile basin, scholars divided the water use regimes into those developed during the colonial rule of the region and the post-colonial period water use regimes. According to Tvedt (2010), it was the British imperialists who tried to develop the water use regimes for the entire Nile Basin. Accordingly, they signed various treaties (the Anglo-Italian Protocol on April 15, 1891; the Anglo-Ethiopian Treaty on May 15, 1902; the Anglo-Belgian Agreement on May 9, 1906; the Tripartite-Britain, France, and Treaty of July 1906; the Anglo-Egyptian exchange of notes in 1925; the 1929 Anglo-Italian exchange of notes of December 1925; the 1929 Anglo-Egyptian and Egyptian-Sudanese Nile Waters full utilization treaty of 1959) that favored the lower riparian countries, particularly Egypt. The main driving force behind the signing of the British imperialist treaty was to secure water for its growing irrigation activities in Egypt (Yacob, 1997: 498). After the decolonization of the region from colonial rule, the two downstream countries negotiated several times to reach an agreement on the allocation of Nile water in 1959. Ethiopia expressed her objection to the agreement at the time (Tvedt, 2010). According to Yacob (2010), the agreement only exacerbated the disagreement between the upper and lower riparian countries in the Eastern Nile basin.

The problem of environmental degradation was identified long ago in the Nile River basin, which has a negative effect on the flow of Nile water. There have been reports of deforestation in the Ethiopian highlands, which led to soil erosion and the siltation of reservoirs in lower-riparian countries. The salinity and water logging of farmlands in Sudan and Egypt, due to the spread of poorly drained irrigation and the expansion of invasive weeds along the Nile water channels, obviously degrade the available freshwater in the basin. Moreover, global climate change is predicted to reduce/increase the flow of Nile in the coming years with extreme results of drought and floods (Siam and Elthair, 2017).

The Eastern Nile basin has been experiencing rapid population growth (in the Ethiopian portion of the sub-basin alone, the population is projected to grow from 25 million in 1997 to 70 to 90 million people in the coming three or four decades (Kefyalew, 1997: 159). The expansion of economic activities and the rapid urbanization process have led to environmental degradation as elsewhere in the world. Egypt is also expected to experience population growth from the current 95.455 million in 2017 to 119.753 by 2030 and 153. 688 million in 2052 with average growth rate of 1.99% (CAPMAS, 2017). These phenomena put pressure on the natural resources of the

sub basin, including freshwater resources. In the sub-basin, such pressures are believed to be exacerbated because of the lack of adaptive water policies both at the national and regional level. They all led to hydrological, economic, and political uncertainties, which in turn negatively affected the water conservation efforts, thus jeopardizing the sustainability of water use (Wu et al., 2016).

These Nile basin nations have a combined population of over 556 million people, and estimates indicate that over 200 million of them rely directly on the Nile for their food and water security (NBI, 2020). The Nile basin's population is expected to double in the next twenty-five years. Such an increase will further deplete the region's already scarce water supplies as demands from agriculture, industry, and domestic use rise. Water is a dangerously scarce commodity in the Nile basin, and the regional water security situation is extremely precarious. In addition to pressures from climate change and the resulting continual threat of drought, water security is also threatened by pollution from sprawling river bank communities (Wu et al., 2016).

In each of the riparian countries of the Eastern Nile sub-basin, water demands keep growing. Nile water has been exploited by Egypt for millennia, and it was in this Nile Valley that the earliest human civilizations flourished. They have used the Nile River water for different purposes. They used the lion's share of the river for growing food. However, modern irrigation practices started in this portion of the basin only in the second half of the 19th century. Since then, modern irrigation practices have intensified throughout the 20th century (Said, 1993). The aspiration for economic prosperity and modernity motivated the Egyptian rulers to expand agricultural lands, which necessitated water control work. Accordingly, modern water control projects commenced in 1861 (the Damietta and Rosetta) to provide water for perennial irrigation. The construction of barrages and water control projects continued in the country to meet the various demands of the Egyptian population. The water control projects particularly intensified with the British occupation of Egypt in 1882. The British imperialists gradually developed a basin-wide strategy to harness the water of the Nile for water development activities in Egypt and later on in Sudan (Tvedt, 2010). Their idea of century-old storage in the upper Nile never materialized. Inheriting the idea of over-year storage from the British colonialists, the Egyptians decided to build the storage within their territory following independence. Accordingly, the

projects of the Aswan High Dam, which started in 1959, were completed in 1971 (Elemam, 2010).

Egypt pioneered both unilateral water development and the extensive use of Nile water (Cascao, 2019). A close look at the trend of water use indicated that beginning in the colonial era, there was a continuous, sharp rise in water utilization among the lower riparian countries, a trend that continued throughout the twentieth century after the independence of these countries. This seemed to continue unabated well into the 21st century. On the other hand, the upper riparian countries of the Eastern Nile basin, seem determined to utilize the Nile water for the growing populations to meet food, energy, and industrial inputs to ensure the overall socioeconomic development and promote the social well-being of their citizens. The legitimate desire by upper-riparian countries to utilize the water resource of the Nile obviously would intensify competition as well as tension undermining the potential for cooperation and collective actions to jointly manage and utilize the Nile water resources (Wheeler et al., 2020; Wu, 2016).

In spite of the high demand for water in the basin and the desire to utilize the available water resources in the Eastern Nile basin, water misuse and overuse continued, particularly among the lower riparian countries. In the irrigation sector alone, Tesfaye Tafesse (2020) reported that 48% of water was lost due to poor application of water-saving technologies and regulations related to water use charges in the entire Nile basin. The Egyptian government has made several promises to rectify the misuse and wastage of this scarce resource by introducing laws, regulations and policies that promote water conservation (NWRP, 2005). In the 2005 Egyptian National Water Resources Plan (NWRP), Egypt is still looking for additional sources of water outside its border. However, this demand for more water outside its boundary is unrealistic as the upper riparian countries embark on projects that use the Nile water out of necessity to tackle food insecurity caused by recurrent drought and provide energy to the underserved population, which has no access to light (Yacob, 2020).

Although about 70 percent of the total surface runoff of Ethiopia is found in the Nile basin, Ethiopia uses a very small amount of Nile water for national development endeavors, despite population growth and the prevalence of poverty. From the total irrigation potential within the basin, which is estimated to be 1,496,000ha, Ethiopia only manages to irrigate less than one

percent of the potential (Yacob, 2007: 145–148). Ethiopia has shown the ambition to utilize the Nile water for her development endeavors since the 1920s, when the Ethiopian authorities at the time tried to cultivate good relations with the United States of America to establish a water barrage on Lake Tana outlet (Waterbury, 2002). According to Yacob (2007:153), this initiative failed because of diplomatic pressure from the United Kingdom on the Americans and the looming Italian invasion, which threatened the sovereignty of the Ethiopian state.

The second attempt to utilize the Nile water was initiated in the late 1950s, when the imperial government of Ethiopia invited the Americans to prepare a master plan for Blue Nile/Abbay. The study proceeded for five years (1958–1964) and resulted in the identification of several projects on the Abbay/Blue Nile. This time again, the identified projects were not implemented because of a lack of financial resources, both domestic and international (Assefa et al., 2014). Later on, in the mid-1980s, the Tana-Beles Development Project was initiated as a response to the 1984–85 famine in northern Ethiopia. People from the drought-affected areas and the overpopulated central Ethiopian plateau were resettled in the project area, forming 42 villages (Yacob, 2007:156).

Yacob (2007: 156) argued that the project failed because of mismanagement and political instability. Under the EPRDF, Ethiopia embarked on water development projects in the basin; the Tekeze hydroelectric power plant, the Tana-Beles hydroelectric plant, and the Arjo Didessa sugar plantation were some of the projects finalized at the dawn of the 21st century. The famous GERD, which commenced in 2011, is about to be completed in the coming few years as the project nears completion. Though this project does not affect the flow of the water and is in the long term believed to be advantageous for lower riparian countries, the filling of the GERD dam remains the bone of contention among the three Eastern Nile basin states—Ethiopia, Egypt, and Sudan (Salman, 2018). The problem still persists, and intense negotiations are going on to resolve the issue through diplomatic means (Tawfik, 2019).

However, it is not only the growing demand for water use that affects the quest for conservation of international waters, but also the lack of clearly stated property rights systems that also affects conservation efforts (Kefyalew, 1997). Though some have rejected the idea of the tragedy of the commons in the context of international rivers (Tvedt, 2010), the issue of property rights systems

poses a real challenge to dealing with the conservation of a scarce common resource like the Nile. Kefyalew (1997: 545) reported that there is a tendency by riparian countries not to recognize the Nile as a common property resource, which affects not only the conservation efforts but also the potential to reach a certain consensus over the allocation of Nile water.

In Sudan, the other extensive use of Nile River water, the demand for more water has grown substantially. The demand keeps growing in this country, despite the challenges of water resource wastage and mismanagement. For instance, the Sudanese need for more water had grown from 7 BCM in the 1970s to 13 BCM in the late 1980s (Said, 1993). According to Taha (2010:191), water is the only limiting factor for irrigation agriculture, as arable land suitable for irrigation agriculture is a ubiquitous resource in the country. To exploit the full potential of the water allocated for the country by the 1959 agreement, Sudan erected different water infrastructures for irrigation, agriculture, and the generation of electricity. Most of these infrastructures suffer from siltation, seepage, and evaporation, losing their initial potential for irrigation and electricity. These problems would have been mitigated if there had been cooperation between Sudan and Ethiopia. Moreover, the Sudanese irrigation fields still use the old technology of flooding the agricultural fields, leading to the loss of billions of cubic meters of water to evaporation (Said, 1993). In most of the areas, much has not changed in these wasteful and inefficient water utilization regimes in the country (Taha, 2010).

Long before the creation of independent South Sudan in July 2011, the British engineer Garstin suggested the construction of the Jonglei Canal in 1904 to reduce water loss in the Sudd of Southern Sudan, which is believed to hold back half of the White Nile flow. Accordingly, his team proposed the project to acquire additional water for irrigation agriculture in Egypt and Northern Sudan. But the proposal was delayed for a long time, up until 1978. The project, if implemented, would have been the first water conservation project in the Nile basin. The project never materialized because of the Sudanese civil war in the area, and the project was quit after it sustained a serious attack from the SPLA forces operating in the area in 1983. The Egyptians and the Sudanese government still hope to restart the project to acquire additional water for their ever-growing water demands (Timmerman, 2005). Despite this demand by both lower-riparian countries, the South Sudanese government has its strategy and policy of tapping the water resources of the Nile for its use, as implied in its 2007 water policy. Thus, the creation of South

Sudan as an independent state not only intensifies the competition over the use of Nile River water but also complicates the overall Nile negotiation process and efforts to conserve the Nile water.

The Jongeli Canal Project, which is estimated to conserve about 4 BCM[3] of water annually, is the first of its kind to jointly conserve the water resource of the Nile by riparian countries. If the project had materialized, it would have set a good precedent for further joint action by the riparian countries to save the water and protect the related natural resources that ensure the sustainability of the water of the Nile (Luiz, 2008). However, most of the South Sudanese scholars oppose the project, citing the environmental and livelihood impacts of the projects on the local populations (Salman, 2014; Ahmad, 2008).

The water policies of individual countries stressed the importance of water conservation and the sustainability of water resource use. The preliminary view of the 1999 Ethiopian water sector policy and strategies and the 2005 Egyptian National Water Plan underlined the importance of water conservation and sustainable use of all fresh waters in the respective countries. The 2007 South Sudanese water policy and the 2001 Sudan Environmental Protection Act all stressed the importance of efficient utilization of water and conservation of water resources. However, Samuel Luzi (2008), in his analysis of water policy networks in Ethiopia and Egypt, concluded that there is poor coordination between water sector institutions in both countries. Such fragmentation of water institutions undermines the effort to efficiently utilize the available water resources and promote sustainable water use in the basin. The phenomenon of environmental degradation reported by scholars continued unabated in the Eastern Nile basin, which in turn affected water resource availability in the basin (Assefa et al., 2014; Tvedt, 2010).

Thus, the ever-growing demand for water by Eastern Nile basin countries has led to a sharp rise in the number of water development projects in the basin. Unfortunately, these water development projects so far have not been coordinated, as unilateral water development strategy is the rule of the game in the basin. An exception to this rule of the game is the coordination between the two lower-riparian countries, Sudan and Egypt, due to the 1929 and 1959

[3] This amount only refers to the first phase of the project; otherwise, the full implementation of the project in three or four phases on the different marshlands of South Sudan can save 18 BCM (Mason, 2004).

agreements. The attempts made at coordinating water use activities through initiatives like NBI and CFA have not yet achieved the intended goals. Thus, so far, they have not coordinated water development projects in the Nile Basin. All these developments not only deplete the water resources of the Nile, undermining its sustainability but also could hasten the competition over the scarce resource, which then led to the outbreak of violent conflict over the Nile River water resources both within the individual states and between the riparian countries.

1.2. Statement of the Problem

In the Nile basin and Eastern Nile basin, studies reported widespread water misuse and wastage during storage, conveyance, and utilization by the different sectors (Tesfaye, 2020; Barnes, 2014; Sherif, 2014; and Whittington et al., 2014). In the Eastern Nile Basin, Tesfaye (2020) reported the rate of water loss in irrigation at about 48%. Similarly, the study by NBI (2020) indicated widespread water misuse in the Eastern Nile basin. The political decision by Egypt to construct the century-old storage reservoir in the middle of the desert exposed the shared Nile water to extensive evaporation, estimated to be 12–14 billion cubic meters (BCM) (Cascao, 2019). This rate could potentially increase due to the temperature rise in North East Africa (IPCC, 2014). A study by Wu et al. (2016) projected the gap between supply and demand to be around 50 BCM shortly when the present water projects plan of the basin countries are implemented.

Moreover, studies of NBI Strategic Water Resources Analysis indicated, that without the intervention and coordination of member states the water shortfall could go as high as 50% of the current Nile River water supply (NBI, 2015: 23). On the other hand, this analysis also indicated the water demand for irrigation could increase by more than 160% from where it was in 2015 calling for basin-wide water conservation intervention. The irrigated area in the basin was estimated to increase from 5.4 million hectares in 2015 to 8.7 million hectares by 2050 (NBI, 2020).

The other water management challenges in the Eastern Nile basin also include the difficulty of undertaking watershed protection with ramifications on the sustainability of the Eastern Nile basin due to its sheer magnitude, particularly in the headwaters of the Eastern Nile basin (Worku et al., 2020). The Ethiopian state intervention to rehabilitate the degraded environment since at least the 1970s is inadequate to deal with the sheer magnitude of a degraded environment. The

Ethiopian rehabilitation program also exhibits its shortcomings, particularly in maintaining and sustaining the intervention (Mengistu and Assefa, 2019). Unfortunately, though this is a common challenge for all the Eastern Nile countries, no cooperation or joint intervention has been made to deal with this common challenge (Wheeler et al., 2020). Neither Ethiopia nor the downstream states raised the issue as a common problem that needs a joint response from the countries that rely on Nile water.

The Eastern Nile basin water management has been dominated by unilateralism. To overcome this challenge, the basin countries, with the support of international partners, have tried to create basin-wide institutions, at least since the 1990s. Despite the expectations from the regional arrangements, the supranational agreements struggle to coordinate the Nile states responses to water management challenges. The expectation for such a common response falls apart when the basin countries are unable to conclude the CFA agreement due to disagreement on Art. 14(b). It was at this point that downstream states pulled out of the provisional arrangements like NBI, and all the previously agreed-upon joint programs like the Joint Multipurpose Projects (JMP) were suspended. This, in turn, dashed the hope for joint development and forced countries like Ethiopia to take unilateral measures when Ethiopia declared the commencement of GERD in 2011 following the withdrawal of downstream states from the CFA agreement and also suspended the Joint Multipurpose Project (JMP), which was designed to undertake hydraulic infrastructure in the Ethiopian highlands (Cascao and Nicol, 2016). This led to a sharp increase in the unilateral use of Nile water (Wu et al., 2016).

In relation to the above water management problems, it is worth mentioning efforts made to investigate issues related to this topic, at least indirectly, while studying the challenges to cooperation and the journey made by basin countries towards cooperation. The research work by Wheeler et al. (2020) underlined the risk perception that prevented the riparian states from cooperating, and the work by Jeuland et al. (2017) emphasized the benefits of cooperation to the Nile basin countries. On the other hand, Cascao (2019) underlined the importance of building reservoirs in the upstream areas of the Nile for conserving Nile water loss to evaporation. Other scholars have underlined the importance of cooperation among riparian states and documented the tendency and efforts to cooperate among the riparian states (Cascao and Nicol, 2016; Tawfik, 2016).

Moreover, most of these studies in the past dealt mainly with issues of fair and equitable utilization of Nile water in general and the Eastern Nile basin in particular (Wu et al., 2016; Parkes, 2013; Hassan and Al Rasheedy, 2007; Yacob, 1997), physical issues of the basin like echo hydrology (Assefa et al., 2014), and the role of the river in shaping the foreign policies of the riparian countries towards each other (Assefa et al., 2014; Hassan and Al Rasheedy, 2007). Works by Yacob Arsano (2007) and Aaron Tesfaye (2008) adequately showed how the disagreement over the Nile water allocation made the management of the Nile complex both at the regional and national levels.

Despite Yacob's (2007) book's comprehensiveness dealing with various aspects of Nile water management at regional and national, it has not given much space to the issue of water conservation through both national and regional transboundary river management policies. In his work, he reminded us of the need for regional cooperation by establishing legal and institutional frameworks and adopting a collective security approach to overcome national and regional hydropolitical dilemmas and ensure the sustainability of water use in the Eastern Nile Basin. However, his analysis has not given much space on how individual states and supranational water institutions like NBI attempt to deal with the challenge of water conservation and deal with the problem of watershed degradation. Simon Mason's (2004) work with emphasis on agricultural water sector management implied the inefficiency of water use in the sector. However, his work has not given sufficient space for the overall impact of water policies over water use practices and strategies the basin states devised to overcome the problem.

On the other hand, Mengistu Woube's (1995) work attempted to point out the fact that the current water use practices cannot be sustained without some conservation measures by the users of the Nile River. He gave much emphasis to land degradation in upper catchment areas, particularly the Abbay (Blue Nile) Basin, which significantly affected the water reservoirs of lower riparian countries. According to him, this in turn has affected the agricultural productivity of these nations. However, his conservation ideas were very limited and devoid of implying the measures required to ensure water use sustainability in the basin. Moreover, his analysis was only confined to the upper catchment area, particularly within the Abbay (Blue Nile) basin, without analyzing the conservation efforts and policies of the other riparian countries. Water use

trends and water management policies were also not discussed by this author, even in the Ethiopian context itself.

However, these studies paid little attention to the challenges the individual states faced while trying to deal with these water management challenges and the limitations of these individual states responses to deal with water management challenges, which are transnational through legal and policy means. Moreover, previous studies have hardly implied the shortcomings of the Nile regional agreements and regional institutions to coordinate joint responses. On top of these, the rationale to deal with the existing and emerging transboundary water management challenges, like governing a series of mega reservoirs like GERD and Aswan High Dam in the Eastern Nile basin, necessitates a new governance regime that makes the past Eastern Nile governance regime untenable.

Thus, this study analyzes the national government's responses to water mismanagement through policies, rules, and regulations in the Eastern Nile basin and the attempts of regional arrangements like NBI and CFA and its subsidiary programs like ENSAP and its institutional arm like ENTRO to deal with the challenge of transboundary water management. Moreover, this study tries to analyze the need to move from the current Nile water management regime to a comprehensive sub-basin-wide transboundary water management policy regime in the Eastern Nile Basin as a result of new water developments like GERD and the inadequacy of the existing water management regimes to deal with water conservation and watershed protection challenges at the national and regional level.

1.3. Research Questions

The main research question that the study attempted to answer was whether or not transboundary water policy and governance are needed for water conservation and sustainable water use among the Eastern Nile Basin countries in the face of the shortcomings of the existing regional and national water policy and governance regimes. The specific research questions are:

1) What are the challenges facing the policy and governance response of the individual states of the Nile basin in dealing with Nile River water conservation and sustainable water use in the Eastern Nile basin?

2) What are the shortcomings of the regional Nile water agreements and institutions in influencing water conservation and water use patterns in the Eastern Nile basin countries?
3) Why do we need to transform the existing water policy and governance regimes and go for a transboundary water policy and governance in the Eastern Nile Basin?

The specific questions are not mutually exclusive, and they all shed light on the regional and national response through legal and policy means to address the challenges the basin faces. In the course of trying to answer the above questions, the study enhances our understanding of the regional and national response to ensure the sustainability of the Nile River for the current and future generations that rely on the river water for their livelihood.

1.4. Core Argument

The water resource management systems in the Eastern Nile Basin, both at regional and national levels, are currently inadequate to address issues related to water conservation, sustainable water usage, and environmental protection, thus demanding a new sub-basin-wide water management policy regime that deals with the challenges effectively

1.5. Objective of the Study

The general objective of the study was to assess the challenges facing the existing regional and national water governance regimes in addressing problems surrounding water conservation, sustainable water use, and watershed protection in the Eastern Nile basin and look for better policy and governance regimes. Specifically, the study attempted to:

1) Assess the challenges facing the policy and governance responses of the individual states of the Eastern Nile basin in dealing with water conservation, sustainable water use, and environmental protection within their respective jurisdictions.
2) Investigate the shortcomings of regional agreements and institutions in reversing environmental degradation and bringing about water conservation in the Nile basin countries.
3) To examine the need for transforming the existing water policy and governance regimes and replacing them with transboundary water policy and governance regimes for the conservation and sustainability of water use in the Nile basin.

1.6. Significance of the Study

The study aimed at expanding the frontiers of understanding in the Eastern Nile Basin by shedding light on the fact that the current rate of water use is not sustainable under increasing population pressure, climate change that causes recurrent droughts and floods, and environmental degradation. Thus, basin-wide conservation policies and programs have to be instituted through the cooperation of riparian countries. The study will reveal how the overall political processes in the region affect natural resource development and conservation by trying to assess the water policies of the individual riparian countries. Thus, this study will bring a new perspective to the already existing water politics in the Eastern Nile basin.

The study could also serve as an input for decision-makers interested in sustainable water use and conservation, particularly in the areas of trans-boundary water conservation. Thus, it will obviously help at the practical level as it helps to reverse the environmental degradation in the Nile basin and at the policy level for diplomatic conversation between policymakers, thus helping the constructive dialogue between riparian countries.

In this regard, the study will try to indicate the fact that shared resources are connecting factors that foster cordial relations between countries, not a bone of contention, as protecting and conserving the shared natural resources is a common interest for all stakeholders. A rational actor is cognizant of the importance of promoting such a common agenda, and his or her inability to respond for this kind of good cause will potentially damage the reputations of those actors that do not accept such a common agenda and interest. Thus, cooperation for such common interests would further help promote cooperation for the shared benefits of water.

Obviously, this study would help as a stepping stone to conduct further research on the paradox of sustainable water use and conservation under growing demand for more water because of climate change and population growth. This climate change and population growth would call for efficient utilization of water if one meant to overcome poverty and avoid water disasters in the sub-basin.

1.7. Scope of the Study

Geographically, the study area covers only the countries in the Eastern Nile basin, which include Ethiopia, Egypt, Eritrea, Sudan, and South Sudan. The study concentrates more on analyzing the water policies of Ethiopia, Sudan, Egypt, and South Sudan, as Eritrea has not made active participation in the diplomatic negotiations and also hardly participates in efforts to forge basin-wide agreements such as the CFA. The study basically deals with the trans-boundary policies of water conservation and sustainable water use in the Eastern Nile sub-basin. The issue of sustainable water use is growing louder and louder among academics, environmental advocacy groups, water user associations, and water managers and planners. To deal with this growing problem of water scarcity, natural scientists have developed different models, and engineers have made technological advancements to overcome the challenge of water scarcity. However, the challenge is far from being addressed, demanding a more comprehensive response with clearly stated national and regional water conservation policies, at least to mitigate the challenge of water resource degradation and scarcity.

This study mainly focuses on the response of states to water resource degradation and dwindling supplies of water and strategies to ensure the sustainability of water use through the adoption of adaptive policies and institutions. Moreover, it tries to examine how political practices influence water conservation policies and strategies. It also discusses the issue of conservation and sustainable water use in the context of transboundary rivers; thus, it will not give a detailed analysis of the domestic political processes of individual states except for the political processes pertinent to water resource policies and management. This study rather tries to provide a full picture of the general water conservation policies of the individual state in particular and the region in general.

1.8. Organization of the Study

The study is organized into seven chapters. Chapter one deals with the introduction of the study; chapter two deals with theory and concepts. The third chapter deals with the study area and methodology. The fourth chapter analyzes the legal and policy responses of the individual states in the Eastern Nile Basin.The fifth chapter deals with the regional legal and institutional response to deal with the challenges of sustainable Nile River water use and water conservation. The sixth

chapter, on the other hand, sheds light on the need for a transboundary policy regime in the Eastern Nile Basin. Finally, the last chapter presents the conclusion of the dissertation.

Chapter Two: Review of Related Literature

2.1. Introduction

The chapter tries to expound on the conceptual and theoretical perspectives that help to analyze the issues of national and regional water management policy for the conservation and sustainability of Nile water resources and their environment. The conceptual and theoretical perspectives are perceived as relevant based on their capacity to explain the management regimes of shared water resources like the Eastern Nile basin. Accordingly, in this chapter, the concepts of water conservation, adaptive water management, adaptive water governance, and integrated water resource management and their application to the Eastern Nile basin will be elaborated. The chapter also deals with theoretical perspectives on international relations and international rivers.

The theoretical perspective helps to analyze and understand factors that determine state behavior over the use and management of shared international water resources in the Eastern Nile Basin. International relations theories such as realism, constructivist theory, and regime theory are discussed in this chapter. Particularly, regime theory was employed throughout the dissertation and helps to show the trajectories of how regimes and governing institutions evolved in response to resource degradation in the basin at the regional level. Moreover, the constructivist theory, with its emphasis on how state identities shape its interests and course of interaction with other co-riparian states, is elaborated. With the adoption of the constructivist approach, the study would nuance the ideational power beyond the material gains as suggested by realists and idealists.

Thus, in addition to those conceptual frameworks, the chapter briefly presents neo-realist theory, regime theory, constructivist theory, and their application to international rivers like the Eastern Nile Basin. Moreover, the literature review part, with emphasis on regional regimes that manage transboundary river basins, would provide vital lessons for the management and utilization of transboundary rivers shared by many riparians.

2.2 Concepts, Models and Terminologies used in the Study of International Rivers

Different conceptual and theoretical models were developed over the course of several decades to study international rivers. Particularly, debates about the optimum management of international rivers have not yet been settled, as most of these rivers are subjected to degradation because of human actions and also their inaction. The tragedy of the commons, collective action, and 'common pool resource' models are some of the analytical tools that scholars used to analyze the governance challenges of international rivers. Indeed, there are scholars who question the applicability of these models to analyze the governance challenges of the international river basins in general and the Eastern Nile basin in particular (see Tvedt, 2010: 237–26).

There are concepts and terminologies that need to be clarified in this part of the dissertation. If these concepts and terminologies are not correctly clarified, it would be difficult to diagnose the problems as several scholars used the concepts and terms interchangeably, which obscured the conceptual clarity of the terms and concepts. Moreover, the concepts help to analyze the challenges of transboundary water use and conservation policies. The following section thus tries to elaborate on the concepts of conservation and the different management strategies suggested by both scholars and practitioners to achieve the noble goal of conservation and hence the sustainability of the water resources of the international river basins.

2.2.1. The Concept of Water Conservation

The term conservation is the most elastic word in English. The term applies to almost all natural resources. Wantrup (1951) defined conservation as "slowing rates of resource use or shifting rates of use towards the future" (quoted in Black and Fisher, 2001:403). According to Black and Fisher (2001), the term also implies the controlling use of natural resources over time. When the term conservation is coined to apply to natural resources, it refers to 'wise use' of resources. The term was probably coined to apply to the relationship between human society and natural resources. At the time, more emphasis is given to the term "…'use' than on 'wise' (Black and Fisher, 2001:403). The term conservation incorporates both exploitation of resources and preservation. There is a clear distinction between conservation and preservation, as the latter refers to postponing resource use infinitely in the future. Black and Fisher (2001:403*)* summed

up the definition of conservation as "a balance of policies, programs, plans, projects, and practices that run the gamut from exploitation to preservation in order to manipulate (manage) the rate of using natural resources in the interests of humankind."

The concept of conservation, when applied to water, implies reduced use or reduction of water losses. Any efforts and mechanisms that led to the reduction of the amount of water that would have been used are considered to be conservation efforts. For Bauman et al. (1984), quoted in Black and Fisher (2001:405), a water management practice constitutes conservation when it meets at least two criteria: (1) it conserves a given supply of water through a reduction in water use (or loss); and (2) it results in a net increase in social welfare, i.e., the resources used have a lesser value than those saved. The first test ensures that the practice results in a reduction in use, while the second establishes that overall benefits exceed costs. We are thus led to the following definition: Water conservation is any beneficial reduction in water use or losses."

In the past, water conservation had been equivalent to a way to resolve the problem of drought. Black and Fisher (2001:402) further elaborated the long-held view of water conservation as "saving water for future needs by reducing waste and use, by storage, and by recycling." What makes conservation a really tough job is to strike an acceptable balance between exploiting natural resources for current consumption and meeting the needs of the expanding present generation while preserving them for future generations (Salim et al., 2019).

In most shared resources, including international rivers, there has been a clear governance deficit to achieve the goal of sustainable utilization of rivers (Delmas and Young, 2009). The governance crisis in freshwater management has long been declared (Black and Fisher, 2001). Institutions are one of the most important inventions to avoid the 'tragedy of the commons' at different scales. In this case, institutions refer to "humanly devised constraints that structure human interaction... made up of formal constraints (rules, laws, and constitutions), informal constraints (norms of behavior, conventions, and self-imposed codes of conduct), and their enforcement characteristics" (Berkes et al., 2003:12). Moreover, Homer-Dixon (1999) implied that not only the quality of institutions is important to mitigate or prevent the degradation of resources (promote the availability of physical resources), but also the quality of policies and technologies are very important in promoting the physical availability and conservation of water

resources. More importantly, the fitting of water-saving devices for all uses beyond the agricultural sector results in water conservation in many parts of the world, reducing the urge to look for additional supply in many water-scarce regions of the world (Postel, 2017:131).

Unlike pre-industrial society, population growth and extensive freshwater resource consumption can be mitigated through adaptive institutions and government policies, preventing extreme effects. However, the lack of such quality institutions and policies could lead to resource degradation, which affects both social and environmental systems. The environmental systems are extremely interdependent, and degradation in one system causes impacts on other environmental systems. In turn, the degradation of such natural systems both directly and indirectly affects the social systems that rely on the materials and services of the environmental systems. Moreover, research in other river basins of the world, like the Ganges basin, implied the way social arrangements and political behavior contribute to the degradation of water resources and their environs (Homer-Dixon, 1999).

In transboundary river contexts, states comply with international agreements if the agreements over the river promote the welfare of all parties to the agreement. The signatories of the agreement abide by the law as far as they believe their interests are best served by complying with the terms of the agreement rather than being free-riders, which undermines the interests of the riparian states. The agreements over transboundary rivers increased from time to time not only because they addressed the allocation between the upper and lower riparian countries but also because they came into being to curtail the incentives for free-riders (Jafroudi, 2018).

In the context of international rivers, conservation of water resources would not only lead to the sustainable use of water resources but also their preservation in storage dams that were built for that purpose, which would regulate the flow regime, hence prohibiting the potential for armed conflict over the use of water. Water management-related literature (Mollinga, 2006; Varis et al., 2008; Pahl-Wostl, 2008; Hansson et al., 2012; Cosens and Gunderson, 2018) implied the need to apply water management approaches to conserve water resources and their surrounding natural environment. These literatures imply that such water management approaches could be applied at local, national, or regional levels to ensure efficient utilization of water resources and avoid the degradation of shared resources like the International River.

However, the critique of applying the concept of 'tragedy of the commons' to transboundary river basins argued that it is difficult to apply this approach because "transboundary watercourses do not constitute common pool resources that can be exploited jointly and simultaneously." The critique of applying Hardin's model to transboundary rivers also criticized the assumption of the model that treats the river as "water resources that "must be managed as one resource, or on a basin-wide scale." Furthermore, the model of the tragedy of the commons is unsuitable for river basins like the Nile because it undermines the capacity of the riparian states to cooperate to use the river without impacting other users along the river because of its physical nature (Tvedt, 2010: 240). The following part briefly presents the water management approach to protecting and conserving the water resources of international rivers.

2.2.2 Collective Action Model

Rational individuals and firms who always pursue maximization of their self-interests are unable to provide public goods; thus, public goods can be delivered through the collective action of groups who have shared interests. In such circumstances, attempts to provide public goods can be considered irrational. Domestically, it is because of this fact that the provision of public goods is supported by politics through coercive means. Thus, in most cases, it is assumed that public goods are provided by a group that shares a common interest. However, at the heart of collective action to provide public goods lies the problem of the 'free rider', who wants to exploit the benefits offered by collective action without any contribution. According to the proponents of collective action theory, it is difficult to exclude these free riders from using the benefits of collective action (Waterbury, 2002).

Scholars like Tvedt (2010:241) argued that it is difficult to apply the model of collective action to transboundary rivers in general and the Nile basin context in particular. According to him, because of the physical nature of the river, there is no room for 'free rider' "since benefits and costs are not allocated by market forces but are partially affected by factors that individuals can neither create nor control, including the physical character of the river, the history of the river and river control works in each country, and the existence and relative importance of other water resources that can be exploited by the same actors". Furthermore, he argued that the problem of

the free rider cannot explain the lack of collective action in the basin in these circumstances; absences of collective action are “natural” (Tvedt, 2010: 241).

But with regards to water conservation and protection of the river water environments, it is possible to apply the concept of collective action problem, as countries that made no contribution in the fight against environmental degradation and the advancement of desertification are the most users of the resource without contributing a penny for environmental protection of the Nile environment. But in North East Africa, where drought is a recurrent phenomenon and the environment has been degraded, the water of the Nile is no longer a natural gift but ‘made’ (Barnes, 2014) by human intervention by fighting against natural and man-made hazards. In this case, the downstream states can be considered ‘free riders’ since they are enjoying the Nile water without contributing towards its protection at the expense of the Ethiopian state and Ethiopian farmers.

2.2.3 Integrated Water Resource Management (IWRM)

The concept has not been clearly defined; the Global Water Partnership (2000) definition of IWRM is the most widely used definition of IWRM. It defined IWRM as follows: “IWRM is a process that promotes the coordinated development and management of water, land, and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP, 2000: 22). The concept of IWRM evolved as a reaction to "conventional, fractional, and fragmented water management systems,” with an emphasis now on “integration and coordination” *(*Hansson et al., 2012: 3*)*. They also emphasized the need to manage water resources in a basin-wide context. The proponent of IWRM believes that its application ensures the sustainability of water resources. Salim et al. (2019) declared the aim of IWRM to "improve sustainability through better water use efficiency and conservation.” Furthermore, the proponents of this concept believe that IWRM was evolved to better manage multiple stresses and demands on water. Much has been placed on IWRM to ensure sustainable water management globally. Moreover, Hansson et al. (2012:3) asserted that the concept of IWRM "takes social, economic, and environmental issues into account, thus making these three dimensions, or the three E’s, decisive.”

According to GWP (2003), the leading advocate of IWRM principles, the three pillars of IWRM are summarized as follows: "(1) moving towards an *enabling environment* of appropriate policies, strategies, and legislation for sustainable water resource development and management; (2) putting in place the *institutional framework* through which the policies, strategies, and legislation can be implemented; and (3) setting up the *management instruments* required by these institutions to do their job" (Medema and Jeffrey, 2005, as quoted in Hansson et al., 2012:3). As a result, some multilateral institutions, like the World Bank (2004) and UN agencies (UN WWDR-2, 2006), tend to evaluate the progress in water management by individual countries in compliance with the IWRM stipulation.

Though the idea of IWRM is a contested concept, scholars believe that the concept calls for sustainable management of water resources (Mollinga, 2006). IWRM as a global approach was adopted at the Dublin Water Conference in 1992 and the subsequent Rio Earth Summit conferences. Peter Mollinga (2006:22) stated that the concept of IWRM "rose to prominence in global water policy around the time of the second World Water Forum in March 2000." Even the 2002 Johannesburg Plan of Implementation recommended IWRM and efficiency plans for all the major international rivers by 2005 (Varis et al., 2008). The proponent of the concept of IWRM claims that it is a universally accepted concept in the global water debate, though some suspect the universality of the concept. Especially the Bradford Centre for International Development, since its inception as an alternative water forum in 2003, has made a series of attacks against the idea of 'global water consensuses'. This school also broadened its criticisms to the water policy, as it is narrowly based on neo-liberal principles and places an emphasis on technical and managerial concerns, neglecting environmental, ecological, and equity issues (Mollinga, 2006:22).

Hansson et al. (2012) raised the paradoxical nature of the IWRM process. They stated that "we cannot abandon the concept of IWRM as a technical and managerial tool and that we recognize its political dimensions. This also begs the question of who should be 'doing' IWRM—national water agencies, river basin organizations, or technical experts. Or should it be a popularly driven process that is directed into the general IWRM framework?" (Hansson et al., 2012:5). They revealed the complexity of the problem at a tarnsboudary river level where transboundary water

management is defined by the vested interests of the co-riparian countries; it would pose a challenge to the IWRM to hide the politics of water management.

The IWRM, as a dominant development approach to water resources, has "a package of progressive values and practices that focus on integration and participation and enable well-considered development of available water resources in any system." For them, there is a clear difference between the IWRM approach and the politics of water. They aptly put the difference as follows: “By contrast, international and regional politics may adhere to a state logic that emphasizes sovereignty and national interests instead (Hansson et al., 2012: 2). In the transboundary river, the two ideas exist side by side and always undermine the efforts of joint development of international rivers and the efforts to balance water use and conservation.

There had been a historical precursor to the current paradigm of IWRM. Even prior to the 1990s, the integrated approach to water management had been practiced in different parts of the world. Integrated watershed management has been practiced in Latin America for centuries (Dourojeanni, 2001). In Europe, particularly Spain, integrated water management has been practiced for many centuries. The Valencia region of Spain has practiced this IWRM for several centuries. Analysts implied the fact that "multi-stakeholder water tribunals have operated at least since the tenth century” (Rahaman and Varis, 2005:2). In the US, following the Tennessee Valley Authority, integrated water management was widely adopted throughout the country and later expanded to other regions of the world in the 1960s and 1970s (Varis et al., 2008).

2.2. 4 Adaptive Water Management

Pahl-Wostl (2008:1) defined adaptive management as "a systematic process for improving management policies and practices by learning from the outcomes of implemented management strategies.” Adaptive management has evolved as a technical solution to the management of resource systems in the face of uncertainty, surprises, and complexity (Holling, 1978). Adaptive water management is defined from two distinct perspectives: scientific adaptive management and adaptive co-management. The scientific adaptive management idea entails “experimentation as a means to learn more about the social ecosystem,” while adaptive co-management focuses on “the importance of stakeholder involvement” (Raadgever et al., 2008:1). In this study, both the scientific adaptive management approach and adaptive co-management are adopted, as they help

to catch up both with the process of policy formulation, implementation, and evaluation and the use of the lessons drawn for further policy improvement to deal with the changes happening in the real world and also with the participation of stakeholders.

Adaptive water management believes that current knowledge is not sufficient for future management, thus recognizing change and complexity. According to adaptive management, conceptual framework policies are viewed as hypotheses and their implementation as experiments (Gunderson, 1999). It all focuses on the process of active learning to produce additional knowledge, and the continuous improvement of management strategies depends on the lessons generated when policies are implemented. According to our understanding of the adaptive management concept, there are always room for improvement and lessons to be learned from the outcomes of the implemented water policies. The proponents of the idea of adaptive management argued that:

> The learning process is not a matter of random trial and error, but a structured, cyclical process, involving 1) integrated assessment of current problems and possible solutions as perceived by different stakeholders, 2) setting goals, 3) formulation of policies that are hypothesized to contribute to reaching the goals, 4) implementation, to test the hypotheses, through 5) systematic monitoring and evaluation of policy outcomes, including surprises. In practice, these are not distinct stages, as the system pulses through alternating spurts of learning and implementing (Raadgever et al., 2008:1)

Adaptive management calls for the involvement of the stakeholders in the assessment and goal-setting stages to assess the technical capability, values, and interests of all the stakeholders involved in the process. This phenomenon allows for the formulation of appropriate policies that protect the freshwater environment from the risk of irreversible degradation. Such collaborative policy formulation, implementation, and monitoring also helps to generate additional knowledge and the capacity to modify or change policy according to the lessons and experiences obtained.

There is a wide recognition of the fact that sustainable water resource management and IWRM cannot be realized without a radical shift from the current water regimes to adaptive water management. Scholars in the water sector have called for adopting adaptive management for several decades, despite the slow move in that direction. This fact is revealed when one observes the slow change in water policies and operational management practices. Moreover, adaptive

management is viewed as a “systematic process” since it contributes to the improvement of policies and practices by drawing lessons from the implementation of previous policies (Pahl-Wostl, 2008: 3). Pahl-Wostl (2008) further implied that adaptive management is an integral part of water governance that unfolds at the process level, shaped by the overall governance structure.

2.3. Theoretical Frameworks in the Study of International Rivers

International rivers naturally cross the boundary of an individual state without recognizing the boundary or sovereignty of the state. More than any other kind of interdependence between states, like economic and security interdependence, environmental interdependence is the most binding one. That is why Biermann and Dingwerth (2004: 6) argued that unlike other kinds of interdependence between states, environmental interdependence is unlikely to be divorced from; in their wording, “no exit options remain” for countries connected by nature, such as transboundary rivers. Transboundary rivers do not recognize the sovereignty of states or, for that matter, any human constructs, thus connecting societies along their banks from beginning to end. As a result any effort of water management and utilization along such natural resources seeks collaborative efforts that demand the interaction between state actors to manage such resources. Thus, international relations theories such as neo-realist, constructivism and regime theories were found to be relevant to dealing with different aspects of transboundary river water management. The following sections present these theories in relation to international rivers management.

2.3.1. Classical Realism

Realists often trace their origins back to Thucydides’ historical account of the Peloponnesian War from the fifth century B.C. However, it wasn't until nearly 2,500 years later that the study of international politics became a formal academic field, leading to the emergence of the first classical realists. Among these figures, Hans Morgenthau, a German-Jewish émigré to the United States, significantly influenced the discipline. In his 1948 work, Politics Among Nations, Morgenthau presented a version of political realism that shaped international politics studies for more than two generations. Eventually, his dominant classical realism was followed by Kenneth Waltz, who is considered the founder of neorealism. In his 1979 book, Theory of International

Politics, Waltz aimed to create a more systematic and scientific approach to realism, which ultimately led to a division in this field into classical realism and neorealism.

Realism, according to traditional views, focuses on the world as it is, not how it should be. This makes it an empirical approach instead of a normative one (Morgenthau, 1956). Realism tends to be pessimistic, highlighting the ongoing nature of power struggles through repeated conflicts and wars (Jackson and Sorensen, 2007). In this bleak perspective, concepts like the balance of power and the security dilemma serve as key analytical tools (Buzan, 1997). All types of realists see the state as the main player in international relations, with particular emphasis placed on great powers due to their significant influence. Additionally, states act based on national interests and are viewed as rational actors, driven by the principles of state necessity. Lastly, realists argue that the distribution of power significantly influences international outcomes (Mearsheimer, 2001).

The quest for power is a constant element of human experience, present throughout history and across different cultures. It is clear that, regardless of their social, economic, or political situations, nations have consistently engaged in struggles for power (Morgenthau, 1965). For Morgenthau (1965: 9) the idea of power " may comprise anything that establishes and maintains the power of man over man …. from physical violence to the most subtle psychological ties by which one mind controls another". For Morgenthau, the most important material aspect of power is armed forces, but even more significant is a nation's character, morale and quality of governance (Morgenthau, 1956: 186). On the other hand, Waltz offers a considerably thinner definition of power or capabilities than Morgenthau. His estimation of power includes the following components: "size of population and territory, resource endowment, economic capability, military strength, political stability and competence" (Waltz, 1979: 131).

Morgenthau (1965) argues that the competition for power on the global stage stems from animus dominandi, the inherent drive within humans to control others. This idea is influenced by Nietzsche's concept of the 'will to power' (Petersen, 1999: 100-101). Morgenthau expands his analysis beyond human instincts to view the state as a collective embodiment of this desire for power, acting on the international front. In his theory, the state represents both the focus of attention and the agent striving for power, emphasizing the importance of the unit level in his approach. Additionally, he suggested that while anarchy is not the root cause of power struggles, it plays a significant enabling role. The lack of a global governing authority removes restrictions

on the fundamental human urge to dominate, which is evident in how states behave. In a structured hierarchy, however, the quest for power would diminish, as this urge would be limited by a global authority. Therefore, the natural human inclination to dominate can only manifest as long as the international system remains anarchic (Morgenthau, 1956).

Several scholars have analyzed the Nile Basin using the realist approach of IR theory. According to this research orientation, the distribution of capabilities has more to do with avoiding maintaining stability within the river basin than with the influence of river basin institutions. The concept of hydro-hegmon has to do with the power relations that existed between the riparian countries. Power, the most powerful actor, hydro-hegemon, in the basin determined the outcome of competition over transboundary water resources and would be the most favored. The hydro-hegemony thesis argues that unequal power dynamics in the basin lead to unfair distribution of water resources, even though the weaker co-riparian parties are unhappy (Zeitoun and Warner, 2006).

Zeitoun and Warner (2006: 436) revealed that the role of power in transboundary politics is vividly practiced in most of the major international rivers. When they pointed out the centrality of power, they stated that "control over water resources is not achieved through water wars but through a suite of power-related tactics and strategies." They elaborated on this conflict through power-related tactics in the following ways:

> The first is the existence of the varying intensities of conflict. Dozens of destructive but largely silent water conflicts lie somewhere between the much feared but non-existent "water wars" and the much lauded examples of trans-boundary water "cooperation". The reason these conflicts fall short of war and are largely silent may have much more to do with the imbalance of power between the riparians than with a perceived cooperation between them. Power relations between competing riparians, constitute the second under-considered feature of water conflicts that is a major element in this analysis.

They emphasized the lack of balance of power between the riparian countries for the lingering low-intensity conflicts in the international basin rather than the relevance of cooperation that favored the powerful actors among them. To illustrate this, they compare Turkey with Ethiopia, both upstream countries, but the former constructed huge infrastructure on the water heads of the Euphrates and Tigris, whereas the latter did not erect a megastructure like that of Turkey at that

time. According to their explanation, it is only the power difference that prohibited Ethiopia from constructing a mega dam on the Nile since Egypt is the hegemonic power in the Nile basin (Zeitoun and Warner, 2006). They also posit that the non-hegmonic actors within the river basin comply with the demands and preferences of the hegmon in the basin (Frey, 1993). According to them, this is what prevented war between riparian countries, in addition to mitigation factors like trade in virtual water (Allan, 2001) and social ingenuity (Homer-Dixon, 1999).

Moreover, what Homer-Dixon (1999) called resource capture is also another indication of the power dynamics in international rivers. The phenomenon of resource capture actually happens when the powerful within the basin control or deny access to the other riparian state through the construction of mega projects. Zeitoun and Warner (2006:444) equate the phenomenon of resource capture by a powerful actor within a basin to what Waterbury (1997:279) called “active unilateralism,” denying access to the other states within the basin using power-related tactics.

2.3.2. Constructivist Theory

Unlike the other international relations theories, which viewed the world from material and individual perspectives, the constructivist viewed the world from a structural and idealist perspective. Alexander Wendt (1999:1) presented the two basic tenets of constructivism as follows: “(1) that the structures of human association are determined primarily by shared ideas rather than material forces, and (2) that the identities and interests of purposeful actors are constructed by these shared ideas rather than given by nature.” He further elaborated on the two concepts as follows:

> The first represents an ``idealist'' approach to social life, and in its emphasis on the sharing of ideas it is also ``social'' in a way which the opposing ``materialist'' view's emphasis on biology, technology, or the environment, is not. The second is a ``holist'' or ``structuralist'' approach because of its emphasis on the emergent powers of social structures, which opposes the ``individualist'' view that social structures are reducible to individuals. Constructivism could therefore be seen as a kind of ``structural idealism.

All three variants of constructivists—modernists, post-modernists, and feminists—share the fact that the other IR theories—neo-realists and neo-liberalists—are under-socialized," i.e., insufficient attention is given to the fact that actors in international politics are socially

constructed. Moreover, constructivists believe that the failure of mainstream IR theories to predict systemic change like the end of the Cold War has to do with their fixation on “materialist and individualist orientation." For constructivists, the “ideational and holistic view” does better in understanding and analyzing international politics (Wendt, 1999:4). John G. Ruggie (1998:4) explained ideational factors as culture, norms, and ideas, as well as the social efficacy of actors. Moreover, Wendt (1999:31) further elaborated on the impacts of international structure on actors: "International structure consists fundamentally in shared knowledge, and this affects not only state behavior but state identities and interests as well.”

Constructivists problematize the interests and identities of actors, which neo-realists and neo-idealists accept as given and fixed. They problematize the identities and interests of states to show the fact that such identities and interests are constructed socially. For constructivists, the identities and interests of states could be formed at two levels. The first identity of a state could develop because of its interaction with other international actors. Second, domestic ideation factors could shape the behavior and outlook of the state. Certainly, domestic factors have more impacts on the identity of states than international system structures (Wendt, 1999).

Ruggie (1998:33) expressed the central feature of constructivism in the following ways: “Constructivists hold the view that the building blocks of international reality are ideational as well as material; that ideational factors have normative as well as instrumental dimensions; that they express not only individual but also collective intentionality; and that the meaning and significance of ideational factors are not independent of time and place.” On the other hand, Wendt (1999) explained the constructivist assumption of interest and identities as continually reproduced and dynamic; that is not constant. In his own words, “In the constructivist view, actions continually produce and reproduce conceptions of self and other, and as such, identities and interests are always in process” (Wendt, 1999:36).

Constructivists view power and interests as important factors in international politics; however, they argue that “their effects are a function of culturally constituted ideas." Moreover, they believe that the “self-interested and power-seeking” characters of states “are contingent and socially constructed” (Wendt, 1999: 41, 43). The constructivists assume that the material world shapes human action and vice versa. They believe that it is the interaction between states that

defines the interests of the state. Thus, relations between states define the interests of states. They were interested in the origin of state interests and preferences and the fact that they evolved over the course of time. Hence, the identity of the state matters most since it affects the interests of the state. They do believe that states are capable of determining their international environment. Through deliberate actions, states can create the international system to which they aspire when they recognize the agential capacity of the state. Unlike neo-realists and institutionalists, they believe that norms and ideas define the interests of states (Ruggie, 1998).

The kind of constructivism championed by Alexander Wendt's (1999) systemic constructivism, which stresses the interactions between unitary state actors over a particular issue area, is found to be useful in analyzing the interactions of states in the Eastern Nile Basin. This approach placed greater emphasis on interstate dynamics than intrastate dynamics. This variant of constructivism overlooks domestic politics and its role in transforming the identities and interests of the state. However, in this thesis, I would also consider the other variant of constructivism, which puts much emphasis on domestic political processes and their impacts on transforming state identities and interests. This unit-level constructivism theory was championed by Peter Katzenstein (1996:4) as "the relationship between domestic social and legal norms and the identities and interests of states." Thus, in this thesis, the view championed by John Gerad Ruggie (1998) and Friedrich Kratochwil (1989), which calls for the bridge between the two constructivist variants termed 'holistic constructivism' to integrate the domestic corporate identity of the state and their international-driven social identities, would help to provide a consolidated analytic perspective.

Despite the existence of material pressure for states to cooperate over the use of the water resources of transboundary water, why do states hesitate to cooperate to maximize the material benefit they could harness from such cooperation? The conventional international relations/IR theory attributes such a lack of cooperation to the situation of power asymmetry or a lack of functioning institutions at the basin level. Kalpakian (2015) tried to analyze the hydropolitics of the Eastern Nile from a constructivist perspective. He stipulates that several physical aspects of international rivers affect the politics of transboundary rivers. Thomas Naff (1994) has long implied the importance of riparian states' geographic location and military power in determining state relations over the use of shared river resources. Other scholars underscored the importance

of physical factors like usable discharge and sourcing, use patterns, environmental degradation, and climate change (Dinar and Getachew, 2013) as affecting the political outcomes of international rivers. Neo-realists and neo-liberalists implied that all these physical realities correspond to the distribution of material capabilities, which affect the prospect of cooperation or conflict (Kalpakian, 2015).

Kalpakian (2015:42) further argued that the material condition of the Eastern Nile Basin would have necessitated the cooperation of riparian countries, further compounded by population growth and climate change in the basin, to overcome these physical challenges. However, despite the need for cooperation and collaboration, it would be difficult and “not sufficient to explain policies that have frequently proven anti-cooperative and not peaceful at all”. Thus, if it is difficult and insufficient to explain the policies of the riparian countries from a material perspective, the policies of the riparian countries should be analyzed from the perspective of ideation factors. Moreover, this constructive theory provides a perspective through which the riparian countries view each other and how their respective policies emanate from such perspectives, which would help to analyze the policies of the riparian countries towards each other and the Nile water resources.

2.3.3. Regime Theory

Initially, regime theory emerged in the 1970s as a reaction to "dissatisfaction with dominant conceptions of international order, authority, and organization. The sharp contrast between the competitive, zero-sum "anarchy" of interstate relations and the "authority" of domestic politics seemed overdrawn in explaining cooperative behavior among the advanced industrial states” (Haggard and Simmons, 1987:491). The growing cooperation and coordination of nations cannot be explained by the realist framework, which was the dominant framework at the time to study international relations (Rittberger et al., 1997). Regime theory evolved from the liberal traditions of IR. It is the study of how international institutions and regimes affect state behavior (Ebaye, 2009). The subfield of international organization with particular emphases on regional integration contributed several theories in the 1960s. However, their theories focus most on formal organizations, neglecting state behavior in interactions with one another. Thus, Haggard and Simmons (1987:492) argued that regime analysis emerged "to fill this lacuna by defining a

focus that was neither as broad as international structure nor as narrow as the study of formal organizations."

International political economy and environmental politics have extensively adopted international regime approaches (Young et al., 2006). The regime theories assume that state behavior and actions are influenced by norms, but they assume that such 'norm-governed behaviors of states are certainly consistent with their national interests. In this sense, Haggard and Simmons (1987:493) argued that "the regime literature can be viewed as an experiment in reconciling the idealist and realist traditions."

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Katzenstein et al. (1999) attribute the emergence of international regimes in the mid-1970s as a challenge to realism based on international law traditions. According to Katzeinstein et al. (1999), it was John G. Ruggie (1975) who used the term international regime in political science. Ruggie (1975) defined an international regime as "mutual expectations, rules and regulations, plans, organizational energies, and financial commitments that have been accepted by a group of states (quoted in Katzeinstein et al., 1999:20). John Gerard Ruggie (1998) also used the same definition in his book entitled "Constructing the World Polity: Essays on International Institutionalism." In addition to the above view, Ebaye (2009) also argued that regime theory

came into being because of the failure of realism to capture the exercise of international cooperation between states in different issue areas. For him, the regime does constitute "instances of international cooperation." He further made a distinction between a temporary arrangement to promote short-term self-interest and a regime that is governed by norms and principles, which is something bigger than pursuing short-term gains in the anarchic international system (Ebaye, 2009:117).

No consensus has been reached on the definition of a regime. Because of this, Ruggie (1998: 87) argued that "the concept of regimes, like the concepts of “power,” “state,” or “revolution,” will remain a “contestable concept." The original definition of regime offered by Krasner (1983) was considered a complex definition of regime that lacked clarity, though many adopted this definition of regime as a universal definition. He defined a regime as:

> …implicit or explicit principles, norms, rules and decision-making procedures around which actors’ expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behaviour defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice.

The assumption that the four analytical components of regime: principles (“beliefs of fact, causation, and rectitude”), norms (“standards of behavior defined in terms of rights and obligations”), rules (“specific prescriptions and proscriptions for action”), and decision-making procedures (“prevailing practices for making and implementing collective choice”) are related instrumentally and the coherence among them shows the strength of regime was rejected as fallacious arguments on two accounts by John Gerard Ruggie (1998:98): First, epistemologically speaking, the assumption of instrumentalism assumes that "it is always possible to separate goals (presumably expressed in principles and norms) from means (presumably expressed in rules and procedures) and to order them in a superordinate-subordinate relationship. But this relationship need not hold.” When he further elaborated the above statement, he argued that the idea of reciprocity in an international trade regime, for instance, does not represent the means or the goals, but "in a quintessential way, they *are* the regime—they *are* the principled and shared understandings the regime comprises.” Second, when revealing the fallacy regarding the coherence among the four analytic components of regime, he argued that "once the machinery is

in place, actors merely remain programmed by it. But this is clearly not so. Actors not only reproduce normative structures; they also change them by their very practice, as underlying conditions change, as new constraints or possibilities emerge, or as new claimants make their presence felt." For him, the robustness of international regimes depends not on the coherence of the analytic components but rather on "the extent to which evolving and even diverging practices of actors express principled reasoning and shared understandings" (Ruggie, 1998:99).

Even Krasner (1983) offered another broad definition of regime before he refined it, as in the above case. He defined regime as "governing arrangements constructed by states to coordinate their expectations and organize aspects of their behavior in various issue areas (quoted in Ruggie, 1998:88). The other groups that rejected this definition of regime tried to offer alternative definitions of regime. Rittberger et al. (1997) call this alternative definition of regime the lean definition of regime, which was first defined by Robert Keohane (1989). He defined regime as follows: "Regimes are institutions with explicit rules agreed upon by governments that pertain to particular sets of issues in international relations" (Keohane, 1989c:4). He summarized the whole component of Krasner's definition of principles, norms, rules, and procedures as the rules of the institutions.

On the other hand, Young et al. (2006:3) defined a regime as "social institutions created to respond to the demand for governance relating to specific issues arising in a social setting that is anarchical in the sense that it lacks a centralized public authority or a government in the ordinary meaning of the term." Furthermore, they distinguish between regime and organization by saying, "Regimes provide the rules of the game; organizations typically emerge as actors pursuing their objectives under the terms of these rules" (Young et al., 2006:4). In most cases, regimes emerged as a result of a 'well-defined problem' that needs solutions: how to regulate international river water uses and protect these bodies from alien species invasion. Regimes could be arranged quickly to deal with a particular problem or take years of negotiation and bargaining to emerge. Regimes also vary significantly in their forms; some individual regimes are frameworks or protocols, whereas others are comprehensive. Moreover, regimes also adopt different approaches to address particular problems.

The process of regime formation is very complex. It takes a long time to develop the content and principles of a particular convention and reach agreements. Once the agreements came into being, the approach to addressing the problem also took a painstaking effort. The basic assumption is that regimes are issue-specific by definition (Rittberger et al., 1997). Issue-specific regimes are not only interested in the problems and complexity involving the formation of regimes but also in the effects of the functioning of the arrangements. But the big question remains: how does one know that the result achieved was because of the presence and operation of the regimes (Young, 2002b)? Young et al. (2006: 7) suggest that one way to overcome this kind of challenge is "to direct attention to outputs, outcomes, and impacts, where outputs are regulatory and organizational efforts occurring in the wake of regime formation, outcomes are behavioral changes following the creation of a regime, and impacts are changes in the status of the original problem that occurs in the aftermath of regime formation.

Indeed, for a long period, regime theory ignored the impacts of regimes on domestic policy processes and vice versa. The regime's strength and compliance all depend on the domestic political processes. It depends on the extent to which the cooperation and injunctions of the regime would benefit or affect the domestic political forces. If the injunctions of the regime harm influential local groups, the state may eventually rebel or engage in talks to improve the terms of the regime to safeguard the interests of these groups (Haggard and Simmons, 1987).

Traditionally, the members of a particular regime are states, and they became part of the regime to address a particular problem at the supranational level without compromising their sovereignty. In recent times, the role of non-state actors has increased in issue-specific regime settings (Keane, 2003). Regime acts as a source of governance at the supranational level, despite the effectiveness and compliance challenges. The compositions of the regime members are very crucial to determining the effectiveness of the regime; the nature of government in each of the member countries, the socio-economic development of states, and the nature of relations that exist between members of the regime seriously affect the effectiveness of regimes.

Scholars do not agree on what constitutes a regime; for some regime is simply the signing of an agreement, whereas others reject such ideas and demand the function of the agreement at the practical level (Rittberger, 1993). For the first category of scholars, the signing of an agreement

with some rules and procedures does constitute regime formation. For the second, what constitutes a regime is its functionality and the impacts observed because of the operation of the regime. Like most social constructs, regimes continually evolve to adapt to a newly emerged problem and/or maintain its relevance. Some forces contribute to these institutional changes and set patterns for change; thus, any analysis of the regime should focus on the forces that motivated it to change and identify patterns of change (Rittberger et al., 1997).

According to Rittberger et al. (1997), regime effectiveness incorporates two overlapping ideas: The first is the extent to which members of a particular regime comply with particular norms and rules, which imply the strength of that particular regime. The second component is that the effectiveness of a regime is determined by the achievement of the stated goal or purpose for which it was created. The most fundamental stated purpose of regimes is “the enhancement of the ability of states to cooperate in the issue area." On the other hand, regime resilience refers to the staying power of institutions regardless of both internal and external pressures. They argued that the regime could lose internal resilience when members no longer agreed and the dominant members of that particular regime felt that staying in the regime was no longer beneficial to its interests.

Despite the emergence of regime theory in the wombs of neo-liberalists, later on, the realist and constructivist versions were incorporated into the analysis of regimes. The realists viewed regimes in terms of the power and interests of each member’s particular regime. In contrast, the constructivist tries to analyze a regime from the perspective of the intersubjectivity, or mutual understanding, of the members of a particular regime. For them, the intersubjective understanding of the actors of the regime is very crucial, i.e., to use the wording of Ruggie (1998:86), "mutual intelligibility and acceptability of actions within the intersubjective framework of understanding that is embodied in the regime’s principles and norms.” This approach gave more emphasis to the issue of mutual intelligibility and acceptability than the regulative role of the regime. The constructivists give particular emphasis to the way state identities and interests affect their norms, behaviors, and overall self-perception while they are interacting with other states.

The power-based theorists of regimes believe that power is very important in the formation and maintenance of particular regimes of nations. For them, the issue that determines regime effectiveness is the distribution of power among members of a particular regime (Wendt, 1995). The neo-liberalists, on the other hand, argued that international regimes played a significant role in promoting cooperation and the benefits that could be reaped because of cooperation. The neo-liberalists adopt the position of institutionalists in the sense that regimes are both effective and resilient.

According to Ruggie (1998), the assumption that regimes are solely multilateral is erroneous because regimes could also form in the context of bilateral agreements. According to him, what makes a regime multilateral is beyond the coordination of policies among three or more states; the constituents of the regime are appropriately applied to its functions. He cited the collective security regime as an example in his wording: "In the case of a collective security regime, they would include the norm of nonaggression, uniform rules for the use of sanctions to deter or punish aggression, and, again, collectively sanctioned procedures for implementing them" (Ruggie, 1998:111). Historically, multilateral regimes have been very crucial, at least to resolving three crucial issues: the international property rights regime, issues of coordination problems between nation-states, as in the case of the use of international rivers, and collaboration problems that can only be solved through collective actions in a multilateral forum. Without such multilateral forums, it would be difficult to address those problems that require the collaboration of states (Haas, 1990).

The regime theory of international environmental politics has several dimensions. The management of transboundary rivers is one of the areas where the cooperation of the riparian state is required, leading to the formation of some sort of regime to govern the transboundary rivers. The inability of individual states to manage such transnational resources as transboundary rivers efficiently calls for the formation of a regime that governs the resources effectively and efficiently. According to Raadgever et al. (2008), there are five key features of the transboundary river basin management regime: "actor networks, water law, water policy, information management, and financing systems."

Actor networks refer to a forum where different stakeholders in water coordinate their actions through the established river basin commission. This established commission is expected to provide a platform for an interdisciplinary and intersectoral approach to managing the international river. In most cases, the commission is empowered to engage in restoration activities and enforce tribunals to address disputes that arise between the members of the regime. But what is not clear is how such supranational entities like the River Commission reconcile the issue of member state sovereignty by applying some of the norms of the commission (Luiz, 2008).

According to Turton and Funke (2008: 28), citing the work of Ken Conca (2006), there are now more than 150 international river treaties based on the data obtained from different sources, such as the Oregon State University's TFDD, the FAOLEX legal database, and the Systematic Index of International Water Resources Treaties, Declarations, Acts, and Cases by Basin, which determine the rights and responsibilities of co-basin countries. Globally, the 1997 UN Convention on Non-Navigable Use of International Watercourses represents a good example of a global river regime (Turton and Funke, 2008). There were several precedents for this particular global river regime. The attempt at codifying legal regimes for governing international rivers has a history spanning more than six decades, which started in 1956 with the International Law Association's (ILA) Dubrovnik Rules for the planning and management of international rivers (Biswas, 2008). A decade later, in 1966, ILA again introduced the Helsinki Rules for transboundary water. Finland presented the matter to the UN General Assembly, endorsing the rules as the standard for transboundary water. During the discussion, concerns were raised regarding the rules that were established solely by professional organizations without the involvement of member states. These states opposed the drainage basin approach, which was believed by the participants to threaten the sovereignty of nation-states (Turton and Funke, 2008).

The idea of adopting the Helsinki Rules faced opposition from several member countries of the UN, and they all voted to replace it with another resolution to develop rules and regulations on the non-navigable use of international watercourses by the International Law Commission (ILC). The ILC produced a draft document on the non-navigational use of the International River in 1991, which was long overdue. Thus, the UN General Assembly finally approved the draft

proposal on July 8, 1997, after member countries engaged in an intense debate on the draft proposal from 1991 to 1997. Despite the adoption of the resolution by several countries, only a few countries have ratified the non-navigation use of international watercourses (Biswas, 2008).

The legal regime governing transboundary rivers has evolved. The Dubrovnik Rules, which were established in 1956, were updated and became the Berlin Rules in 2004. These rules provided a framework for negotiations and treaty development for complex and challenging discussions related to the use of international rivers. Thus, international legal regimes gradually evolved, at least to serve as a guideline during the negotiation process over the use of international rivers like the Nile, regardless of their perceived limitations (Turton and Funke, 2008).

According to Dellapenna and Gupta (2008:5), “global water law refers today to the customary international law applicable to water resources and the various treaties created to govern the use or protection of freshwater resources." Many of these legal regimes gave much emphasis to water allocation between the upper and lower riparian countries. In the provisions of these legal regimes, conservation of transboundary rivers receives little attention. The degradation of international water, like the Aral Sea, has not significantly motivated the international community to conserve the international river, with few exceptions. In 1972, UN global water policy began with the UN Conference on the Declaration of Human Environment, followed by the 1977 Mar del Plata and the 1980s UN-Water and Sanitation Decades. The inclusion of Chapter 18 of Agenda 21 in the 1992 Rio Earth Summit marked a significant departure that was consolidated at the 2002 Johannesburg Sustainable Development Summit (Turton and Funke, 2008).

The third feature of the transboundary river management regime is water policy. According to Luiz (2008: 192), "the term ‘water policy’ is understood in a broad sense, including policy documents as well as the formal and informal decisions that determine which policy elements are prioritized during implementation." Thus, the term denotes not only the policy document but also the whole process of water management, which includes the process of setting rules and regulations for water, the implementation of those rules and regulations, and the entities to implement those decisions made about the water policy. Raadgever et al. (2008:2) presented policies as “the goal of the government or other organizations or the strategies to reach the goal,"

which" are perceived as policies in general. In a transboundary river basin, policy development and implementation are crucial features to achieve the stated goal of the river regime. To achieve the environmental sustainability goal, it is vital to assess the water policies for the whole basin by the river basin commission and the individual countries' policies towards that. It would enable us to assess how the water policies of the river basin are tailored towards the achievement of certain goals, whether the goal is short-term or long-term (Raadgever et al., 2008).

The fourth important feature of the transboundary river regime is information management. Information management is all about producing the needed information and exchanging it with concerned stakeholders. In a transboundary river regime context, the shared production of information, the exchange of relevant information between the national government and transboundary commission, and the dissemination of the information to a wider public are very vital. Cooperation in information management is one of the prerequisites for building trust between riparian countries through, for instance, joint monitoring of the environment. Cooperation in information management not only produces trust and confidence between riparian countries but also builds their technical capacity and enhances mutual understanding and shared insights (Mostert et al., 1999; van der Zaag and Savenije, 2000).

Finally, they raised the financing system as another salient feature of the transboundary river regime. The financing system is such an important feature of the transboundary regime that it determines the robustness of the river regime. It is suggested that such a river basin regime should secure funding from multiple sources. It should focus on generating its funds from member countries rather than being solely dependent on donor sources. Some even suggested the river commission and authority collect revenue from increased pricing mechanisms for the water in the river, as such a pricing regime would limit the amount of water used and polluted (Chess and Purcell**,** 1999). Thus, the pricing mechanism serves a dual purpose: on the one hand, it serves as a source of income for the River Basin Commission, and on the other hand, it promotes the objective of discouraging water overexploitation and pollution (Charnley and Engelbert, 2005). The financing system for a transboundary river regime requires sufficient funding. For the regime to be adaptive and effective, the funding system needs to come from multiple sources.

Keohane and Ostrom (1995:2) suggested that to bring about effective governance of common pool resources like international rivers, regimes need to have effective monitoring mechanisms to assure widespread compliance of the members of a regime. For them the existence of regimes "…increase the availability of information" to its members and "reduce transaction costs-the costs of devising, monitoring and enforcing rules." At regional level national governments establish regimes to address problems of collective action like prevention of transboundary river pollution and/or the degradation of related resources of the international river through collective means by co-riparian countries (Young, 1982).

The regime theory is concerned with how states use resources and view natural resource exploitation as an exclusive jurisdiction of the state (Furlong, 2006). In political science, regimes unfold around conventions and actors (Pahl-Whostl, 2008). Pahl-Wostl (2008:6) further argued that unlike international regimes that focused on single institutions, the water management regime focused on societal functions of water like water supply and flood protection. During the course of change, actor platforms and learning cycles are closely connected to water management regimes. Pahl-Wostl (2008) further implied that the command and control approach that focuses on technical solutions still significantly shaped the water management regimes. The attempt to introduce major changes in water management requires structural change in existing water management regimes. In the case of transboundary rivers, regimes came into being after intense inter-state bargaining in the context of international anarchy to achieve the goal of governing the river resource as an indivisible entity (Varis et al., 2008).

Regime over the international rivers is created to enhance the capacity of member states along the basin to manage the transboundary water. They are designed to enable the member states to cope with the pressure on the hydrology and also enable the optimal utilization of the water resources. The underpinning principles of such a river regime in most cases included 'reasonable and equitable use', and no significant harm as determined in international water law. Moreover, in most cases, IWRM serves as another principle of international regimes (Mirumach and Allan, 2015).

Hansson et al. (2012) found that the type of collaboration recognized in the database by Wolf et al. (2003) can be easily replaced. In most of the literature, cooperation is regarded as only the

signing of an agreement that is not accompanied by its implementation. For Hansson et al. (2012), such trends obscure the reality on the ground, or, in other words, "that may obscure rather than demonstrate genuine commitment. Cooperation of this kind is often shallow and may be used to justify doing nothing; no joint development efforts follow, and the contents of the agreement are only loosely respected" (Hansson et al., 2012: 6). They further implied that the dominant trend is that the agreements are rarely implemented in most international river basins (Swain, 2012).

For Turton and Funke (2008:10), the cooperation of riparian countries over transboundary rivers and the subsequent formation of river basin organizations (RBOs) in most cases prevent or reduce the possibility of violent conflict, but they rarely avoid water management based on the logic of sovereignty and national interests. Transboundary water governance at the supranational level is a costly activity that has to be financed by member countries. However, the challenge with this is that member countries make contributions based on the rewards they reap from such investments (Nicol et al., 2001).

Keohane (1980) reported the fact that if any of the members of a river basin regime, particularly the hegemon within that particular regime, wish to violate the norms of the regime that would pose serious risks to its interests. The non-compliance of any member of a particular regime would create a situation of instability from which no side would benefit. The conditions of water pollution and overexploitation would affect all the members of the riparian countries in a transboundary river context (Zeitouun and Warner, 2006). Regardless of the power of the member state over a particular regime, non-compliance with the established regime could result in the alienation of the powerful from the political process. Collins (2003) expressed the scenario as follows: "In the absence of a partner with whom to form a more cooperative approach, this may result in the weaker states taking "further action to hedge their bets, reducing their reliance on the hegemonical regimes and perhaps attempting to set up alternative arrangements of their own" (Collins, 2003: 14, quoted in Zeitoun and Warner, 2006:454).

2.4. Water Governance

Despite the existence of water governance practices for more than 5000 years, the water governance system has yet to mature. There were rampant water management problems around

the world. Nevertheless, there was progress reported in different parts of the world. Dellapenna and Gupta (2008: 16) implied that "more and more regional agreements, more administrative law frameworks, more joint water bodies at all levels of governance, from community through to global levels." All these developments contributed to the maturity of the institutionalization of water governance practices at all levels, which enable societies to best manage their water resources.

There is ample literature that shows the gradual evolution of transboundary water governance, particularly with the deepening of cooperation, which led to the formation of supranational institutions in major international rivers. Such supranational institutions created an enabling environment for the cooperation of riparian countries over their shared water resources (Dellapena and Gupta, 2008; Van der Zaag, 2009; de Castro, 2009). There are such supranational arrangements that pave the way for collective action to safeguard the river basin from degradation (Van der Zaag, 2009). The European Union Water Framework Directives and the SADAC region water law epitomize a supranational approach to sustainable management of transboundary water resources. The following section elaborates on the evolution of such water management regimes and their success in achieving the stated goals of water sustainability in both regions. Moreover, the limitations of the supranational institutions in achieving the stated goal would be discussed to draw lessons for such a regional approach to managing the Nile water resources. The two cases not only epitomize the cooperation of countries to allocate shared international rivers but also how cooperation could ensure the sustainability of water resources and their environs by setting rules, regulations, and standards for water use. Moreover, the various laws issued by supranational entities would protect the water and its immediate environs.

2.4.1. The European Union Water Framework Directive

According to Dellapenna and Gupta (2008), Europe is the leading example of supranational water law and policy success in achieving the protection of transboundary rivers in the region. Following the establishment of the European Community in 1970, efforts were made to coordinate water laws in the region. It could serve as a role model to address the problem of transboundary water resource management with the sustainability agenda at its core in the 21st century. The European water law and policy have undergone phases of evolution: in the first

phase, it emphasized water quality and standards; during the second phase, it gave much emphasis to emission standards and water treatment; and finally, the development of European Union Water Framework Directives as comprehensive water policy was developed. Before the adoption of EU water Framework Directives, the European Community adopted a common water policy that was 'constitutionalized' in 1986. It was a single European environmental protection policy. Regardless of all these efforts from the regional organization, there has been a huge discrepancy between the laws to protect the transboundary water resource and the compliance of the law. Most member states did not comply with the law, and there was little that the regional organization could do to enforce the laws. Moreover, the law has its limitations, which make its implementation very difficult (de Castro, 2009).

The European Union water policy evolved over the course of time to meet the new challenges the member states face. It has developed several directives regarding the water affairs. de Castro (2009) divided the water legislation moves into three phases: the first phase of water legislation which occurred in the 1970s and 80s deals with laying a foundation for the European 'community legal edifice'. The second phase concerned more with the experimentation of the previous legal regimes by applying the regime to new areas of application such as municipalities and irrigation agriculture. The last phase of such legislative process began with the adoption of EU Water Framework Directive in 2000. This phase of water law and policy making has been very comprehensive and innovative in its approach (de Castro, 2009: 230).

The adoption of the EU Water Framework Directive further enhanced the goal of environmental sustainability in general and water sustainability in particular. It focused on tackling the challenge of non-compliance behavior exhibited by member states. It has established more effective enforcement mechanisms and is comprehensive in its approach to dealing with water management problems at the regional level. The previous water policy focused on the quality of water but broadened to include the quantity aspect of the water. Particularly, the adoption of a common implementation strategy further enhanced the goal of achieving sustainable water use in the region. Following the entry of the Water Framework Directive into force, the EU adopted the common implementation strategy for multiple reasons: to create a common understanding among the multilevel actors and to avoid the previous non-compliance behavior exhibited by the member states during the first and second waves of the water legislation. The EU learned a

lesson from previous experiences and incorporated those lessons as remedial to the challenges it faced in its stated goal of achieving a good status of European freshwater (Myint, 2008).

The Water Framework Directive represents a significant departure from previous water management laws and practices, not only because of its comprehensiveness but also because it was innovative. de Castro (2009:233) identified ten departure points from the previous legal regimes: The holistic treatment of all management problems: The new water policy tried to deal with the complex and true nature of the water problems, departing from the previous tradition of giving excessive attention to quality issues, leaving aside the quantity aspect of the water problem. Moreover, the new policy also incorporated ways to deal with conditions of extreme events like drought and flood. By any standard, the new water framework directive represents a paradigm shift from the fragmented water management approach to an all-encompassing holistic approach to solving water problems in the 21st century. In the EU region, the legal and policy regimes changed every time in response to the new challenges and lessons learned while implementing the previous laws and policies. In turn, the evolution of legal and policy regimes necessitates further reforms to meet the changing circumstances on the ground, showing the adaptive capacity of the river regime in the region (de Castro, 2009).

2.4.2. The South African Region Water Regime

As elsewhere in Africa, the emergence of the regional organization SADC created an enabling environment for transboundary water cooperation to flourish in the South African region. One of the objectives of the regional arrangement has been sustainable utilization and the protection of natural resources in the region, in addition to the goal of achieving economic prosperity and the eradication of poverty. To this end, the regional arrangement adopted different protocols that deal with freshwater management at the regional level. The 1995 shared watercourse protocol is one such development. In the region, there is an uneven distribution of fresh water in time and space, which has caused water scarcity in the region. Moreover, the region is prone to extreme events like drought and damaging floods. According to Van der Zaag (2009), the complete decolonization of the region towards the end of the 20th century paved the way for more regional cooperation on the management of transboundary freshwater resources.

Van der Zaag (2009) pointed out that the 1995 shared watercourse protocol of South African regions was intended to be enforced in 1998. However, the refusal by the upper-riparian countries, particularly Mozambique, delayed the enforcement and necessitated the revision of the protocol to incorporate the legal principles of the 1997 UN Watercourse Convention and make the protocol acceptable to Mozambique. Thus, the protocol was only signed by all the member states in 2000 and entered into force in 2003 (Conca et al., 2006). The preamble of the protocol refers to the 1966 Helsinki Rules and the 1997 UN Watercourse Convention. The objective of the protocol is also incorporated into Art. 2 of the protocol. The protocol incorporated environmental considerations in water management, with vital emphasis on the cooperation of the states in the region. It called for more coordinated and integrated water management through the harmonization of water legislation and policies related to the planning, development, and conservation of shared water resources (Van der Zaag, 2009).

The protocol implied that it respects existing agreements about the shared water course and promotes the establishment of water institutions in every member state of the regional organization. Moreover, it called for amicable settlement of disputes in the region; if not, the protocol already established the Community's Tribunal for the final decision of resolving the disputes whenever they arise between the co-riparian states. The decision of the Tribunal is final and binding (Böge, 2006). It also established institutional layers for the management of the entire river basin. As a lower layer, it calls for the establishment of catchment-based institutions within individual countries to carry out the day-to-day management of water at the catchment level.

The efforts to reform the individual countries' water laws and policies later led to the establishment of the River Basin Organization. The individual countries' reform efforts contributed to the development of transboundary river management. In 1994, most of the riparian countries in the region revised their water policies and laws. Such reforms led to mutual understanding and consensus on the major principles of water management. The agreements signed in the 1980s and 1990s led to the formation of institutions that created a conducive environment for communication and negotiation even during times of tense political tensions between the riparian countries. Since the mid-1990s, there has been an intention to turn those institutions into a permanent River Basin Organization where the riparian countries delegated

some decision-making power to the transnational institution. Each of the international river basins in the region has some sort of river basin organization with decision-making power. This was made possible because of the existence of South Africa as a regional hegemon committing human and financial resources and the donor governments that support the formation of such institutions at the river basin level (Jacobs, 2012).

2.5. Reflection on the reviewed literature

From the review of related literature, it is possible to have an overview of the conceptual and theoretical perspectives on the study of transboundary rivers. The review showed the various water management approaches that, when applied to international river basins, contribute to the conservation and sustainability of water resources. The review also indicated how water management approaches such as IWRM, adaptive water management, and adaptive water governance, when applied to the management of international rivers by both national governments and supranational entities, contribute to the conservation and sustainability of the rivers using different strategies. The application of such management approaches not only contribute to the efficient utilization of water resources and, hence, the conservation of the water resources of the international river but also to the conservation and sustainability of the entire ecosystem within a basin. The adoption of such management approaches also contributes to the resilience of the institutions, so that the institutions work towards the attainment of efficient water use and sustainability goals within the context of transboundary rivers. Likewise, the concept of virtual water trade is also discussed as a concept that not only promotes cooperation between the riparian countries in the non-water sector but also contributes to water use efficiency and the conservation of water resources.

The review offers a theoretical perspective on international relations. The IR theories of neo-realism, constructivism, and regime theory and their applications to transboundary river systems have been discussed. The constructivist and regime theories will provide most of the insights for the analysis of the empirical data in this dissertation. However, while discussing the power relations between the riparian countries, there are circumstances under which the neo-realist perspective offers insight to explain the material determinants for the use and conservation of water resources in the Eastern Nile Basin.

Finally, the review presents river regimes at the supranational level that govern the international river sustainably at the regional level. Moreover, from the cases presented in the review, enormous lessons can be drawn for Nile River supranational institutions. The European Union Water Directive and the SADAC region water regime play an exemplary role in governing transboundary river systems in their respective regions. Indeed, there are lessons to be learned from those institutions and contextualized in the Nile River Basin. The policies, laws, and strategies of these institutions helped resolve conflicts over water resource usage and protect the water body from degradation and pollution. Moreover, such supranational institutions coordinated collective actions and programs to promote the health of the river. Such living examples provide immense lessons for regional institutions in the Eastern Nile Basin and national governments. They help to figure out what works there and what is not in the Nile Basin, and the challenges for supranational institutions to achieve the same level of success in the Eastern Nile Basin.

Chapter Three: Research Methods

3.1. Introduction

This chapter provides an overview of the physical description of the Nile water and the states that share the water. Moreover, the research methods of the study are also provided in this chapter. Thus, the chapter provides the context in which the study is undertaken, and the overall strategy used to accomplish the study is discussed in this chapter.

3.2. Physical Description of the Water Course and Basin States

This section discusses the physical description of the Eastern Nile water course, as well as the countries that constitute the sub-basin.

3.2.1. The Physical Description of the Eastern Nile Water Course

The Nile River Basin, with an area of about 3 million (2,900,000) km2, is geographically shared by eleven countries in Africa: Burundi, the Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda. It accounts for about 10% of the African landmass (UNECA, 2004; Okoth-Owiro, 2004). The Nile River is the longest in the world, with a length estimated to be 6,825[4] km from its source in Lake Victoria to the Mediterranean Sea and flowing over 35 degrees of latitude (Collins, 2002: 11). The Nile River extends from "4°S to 31°N latitude and from about 21° 30'E to 40°30'E longitude" (Shahin, 1985:15).

Even though the Nile is the longest river and relatively small in volume of water it carries. Dereje (2010: 422) aptly expressed this fact as follows: "A giant in terms of length and a dwarf in terms of the volume of water it carries, the fabled Nile has an annual discharge constituting only a mere 6 percent of that of the Congo." According to the NBI (2012), among the 424 million Nile basin countries populations, 232 million (54%) live within the Nile basin. Thus, more than half of the Nile basin population relies on Nile basin water. The basin's climate ranges

[4] There are varying estimates regarding the length of the Nile River; for instance, some estimate it to be 6671km (Oestigaard, 2012:25) and 6650 km (Tvedt, 2010).

from tropical in the Equatorial Great Lakes and Ethiopian highlands to semiarid and arid in Sudan and Egypt (Paisley and Henshaw, 2013).

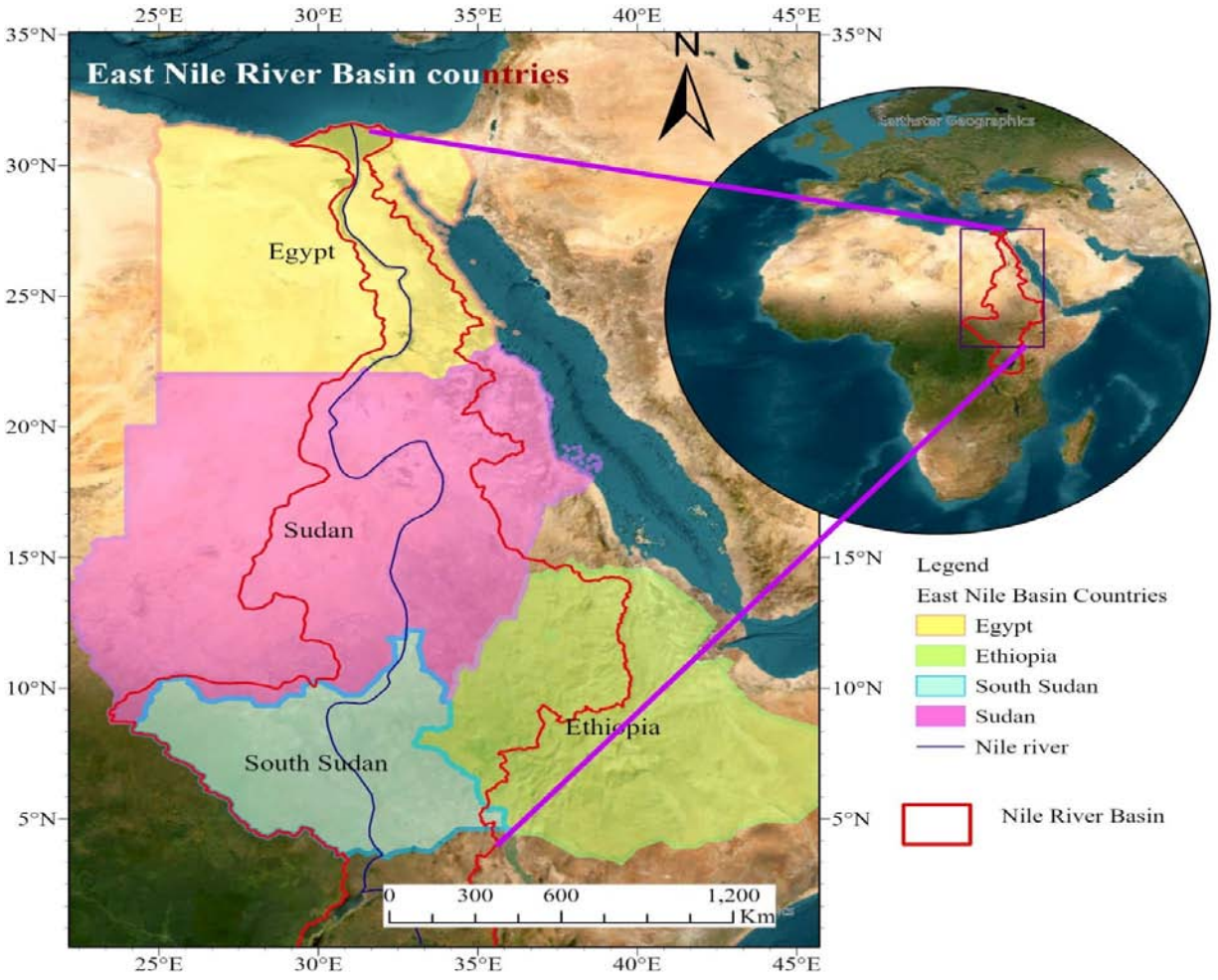
Moreover, despite its fame as one of the great international rivers, the Nile River has not been developed very well (Elmam, 2010). The Nile River is shared by 11 riparian countries with different topography and climatic features, covering about 10% of the African continent. Except for the small islands (Madagascar, Mauritius, Seychelles, and Cape Verde), every African country has some transboundary basin, which makes Africa's water management essentially transboundary water management (Awulachew et al., 2008).

The Nile draws its water from four rivers: the White Nile, the Abbay (Blue Nile), the Baro-Akobo (Sobat), and the Tekze (Atbara). The White Nile, which originates from Lake Victoria and other equatorial great lakes, converges with the Blue Nile at Khartoum, forming the proper Nile. The tributaries from Ethiopia (Abbay, Baro, and Tekeze) contribute more than 85%[5] of the Nile's water, while the White Nile approximately contributes about 15% of the Nile water, as measured at Aswan High Dam. On the other hand, Ashok Swain (1997: 675) estimated the contribution of the tributaries of the Nile from Ethiopia to be 86 percent: "Blue Nile 59 percent, Baro-Akobo (Sobat) 14 percent, Teke [z]sse (Atbara) 13 percent, while the contribution of the Equatorial Lakes region is only 14 percent."

However, during the wet season, the Ethiopian contribution of the Nile water swells to more than 90% (Swain, 2008:201). The Sudd wetland in South Sudan serves as a natural hydrological regulator, maintaining the steady flow of the White Nile, though the water from the Blue Nile exhibits extreme variations across seasons (Wheeler et al., 2018). The Nile traverses three climatic zones—from tropical Africa through the Sahara—and ends up in the Mediterranean. As a result, the ecology of the Nile is extremely varied. According to Oestigaard (2012), the area within the Nile basin shows the degree of the country's dependence on the water resources of the Nile for its development endeavors. The following map shows the area of the countries in the Nile basin.

[5] The other scholars estimate the contribution of the water from the Ethiopian tributaries of Abbay (Blue Nile), Baro (Sobat), and Tekeze (Atbara) at 86% (Yacob, 2007; Abadir, 2011; Swain, 1997).

Figure 2: Map of Eastern Nile Basin Countries



Source: Author

The NBI (2012:26) characterized the ecosystem of the Nile as having “high climatic diversity and variability, a low percentage of rainfall reaching the main river, and an uneven distribution of its water resources." The environmental resources and the water of the Nile provide the diverse population of the Eastern Nile basin with the goods and services upon which their livelihood depends. Moreover, these Nile environmental and water resources have also contributed to the nations of the Eastern Nile basin. The Eastern Nile basin’s natural resource base has been threatened because of “agriculture, population increases, urbanization, invasive species, bushfires, mining and quarrying, climate change, and natural disasters” (Kimenyi and Mbaku, 2015: 5).

There have been efforts to conserve and protect the endemic ecosystem and the natural resources of the basin through forest reserves, national parks, games, etc.; nonetheless, the basin remained vulnerable to the problem of degradation (NBI, 2012). Kimenyi and Mbaku (2015: 5) identified the causes of rapid environmental resource degradation in the basin as “population pressures, relatively weak governments, dysfunctional legal and institutional frameworks, and poor public policies." In the Eastern Nile basin, regardless of the growing concern about these challenges to the Nile River system, the response of the riparian states and regional institutions has not been fully grasped.

The Nile river system has ‘one rainy season’ in a year, during the summer season, which has filled the major tributaries of the main Nile from its Ethiopian tributaries of Sobat, Blue Nile, and Atbara. During this season, the Nile starts to swell and becomes a mighty river at the peak of the season, which usually occurs in the period between July and September every year. In these months, the volume of the river has begun to decline (Kimenyi and Mbaku, 2015; Collins, 2002). The NBI (2012) reported that the volume of Nile water decreases even during the peak weeks as one moves from the Ethiopian highlands to the lower arid regions of Northern Sudan and Southern Egypt.

Despite the small discharge of the Nile River, the countries in the Eastern Nile basin have an ambitious plan to use the Nile water for irrigation and the production of energy. Especially Egypt and Ethiopia have plans to use the Nile water for their development purposes. Egypt has a plan to divert 10 percent of her share to reclaim the western desert through the Toshka Canal, which Egypt dubbed the New Valley project (the Toshka project). Moreover, the country has already commenced developing the Sinai Desert through another canal El-Salam.

Table 3.0.1. Shows the total area of the Nile basin countries and part of their territory within the basin

S/N	Name of Countries	Total area	Area within the Nile basin
1	Burundi	28,702	13,860
2	DR Congo	2,516,395	21,796

3	Egypt	1,014,742	302,452
4	Eretria	117,600	-
5	Ethiopia	1,129,065	365,318
6	Kenya	589,070	51,363
7	Rwanda	25,107	20,625
8	South Sudan	640,000	627,200
9	Sudan	1,911,341	1,435,358
10	Tanzania	937,762	118,507
11	Uganda	244,491	240,067

Source: Oestigaard, 2012: 27

As shown in the above table, the size of the area of the country lying within the basin shows the level of the country's dependence on the Nile water resources for its overall economic development. Those riparian states with a significant portion of their territory lying within the Nile basin are heavily dependent on the Nile for their economic development. However, in the Eastern Nile basin, no other country is as dependent on the Nile as Egypt. About 98% of Egypt's freshwater needs come from the Nile. This against the backdrop of the country having an estimated 150,000 BCM (Mason, 2004:100) of water in the Nubianstone aquifer alone. The other five aquifer systems in the country estimated to have a huge water potential (Mason, 2004: 87-88) which could develop to substitute the country's over reliance on the Nile. Agriculture constitutes a significant portion of the Egyptian economy, which is heavily dependent on irrigation systems to produce water-intensive crops (Swain, 2011). In Ethiopia too, the population is growing at an even faster rate than the Egyptian population; thus, Ethiopia has no option but to feed the burgeoning population compelled to use the Nile water for irrigation purposes (Brunnee and Toope, 2002).

According to Conway (2017), the Nile basin is believed to be one of the basin systems most vulnerable to the impacts of climate change. The basin has experienced recurrent drought and flooding on what appears to be a regular basis. It is difficult to estimate the impact of climate change for sure in the basin; however, climate change has been known to impact water systems. It is also clear that climate change will cause extreme rainfall variability, which will result in unpredictable floods and droughts. Especially in countries like Ethiopia, where the majority of farmers rely on rain-fed agriculture, they experienced the unpredictability, unevenness, and erratic nature of the rain, which affected the livelihood of the population. Climate change has led to a shortage of water in the basin. The impacts of climate change are expected to cause a severe water shortage in the future (Oestigaard, 2012).

Though the impacts of climate change in the Nile basin are uncertain, it is predicted that the overall impact of climate change will cause a diminishing of water flow in the basin. Oestigaard (2012:25) expressed this as follows: “Some predictions suggest there will be less water overall and that the Nile Basin will become drier, thus experiencing higher water stress." He further argued that the diminishing volume of Nile water further undermines the potential of the riparian states to cooperate.

The volume of the Nile’s annual flow is estimated at 84 billion cubic meters, as measured at Aswan High Dam (Hassan and Al Rasheedy, 2007; Tvedt, 2010). It is widely reported that the volume of the Nile water that originates from Ethiopia varies greatly between the dry and wet seasons as well as between the good and bad years, as the volume of the water could increase as high as 104 BCM in good years like 1946 and could go down as low as 45 BCM in bad years like 1913, when Ethiopia experienced poor rain (Swain, 1997:675).

The Nile basin is characterized by varying landscapes, with high mountains, tropical forests, woodlands, lakes, savannas, wetlands, arid lands, and deserts, making the Nile ecological systems very unique. The Nile waters come from rainfall on the Ethiopian highlands and the catchment areas of the equatorial lakes. According to some estimates, the total rainfall in the Nile basin is estimated to be 1600 BCM per year (Oestigaard, 2012: 28). The water tower of Africa, Ethiopia, contributes about 86% of the Nile water from the rainfall that occurs mainly from June to August. The total rainfall in the country is estimated to be 123 BCM per year, which is 1.5

times the volume of the total Nile River. However, only 3% of the total water rainfall remains in Ethiopia; the remaining leaves the country to neighboring countries (Oestigaad, 2012). The distribution of precipitation is highly unevenly distributed in the Nile basin over time and space. The northern part of the basin, in north Sudan and Egypt, hardly receives rainfall.

3.2.2. The Eastern Nile basin States

The Eastern Nile basin consists of five riparian countries from the eleven Nile basin states: Egypt, Ethiopia, Eritrea, South Sudan, and the Republic of Sudan. The Nile Valley is one of the regions where the oldest statehood tradition has evolved. States are said to be the longest states to exist on the continent (Swain, 2011). The area is among the world's poorest, with most countries classified as least developed, except for Egypt. This region in the Eastern Nile basin witnessed state formation in Africa, with Eritrea and South Sudan seceding from Ethiopia and Sudan in 1993 and 2011, respectively. The establishment of these two states greatly impacted northeast African geopolitics and the Nile water allocation struggle. Despite being a lower riparian state, South Sudan has aligned with upstream states in the Nile dispute between upper and lower riparian states (Kimenyi and Mbaku, 2015).

The three major riparian countries in the Eastern Nile Basin are Egypt, Ethiopia, and the Republic of Sudan. The three are identified as the major riparian states of the Nile because Ethiopia is the primary supplier of the Nile water, while the other two are the two most extensive users of the Nile water (Swain, 2011). However, the newly created state of South Sudan is also an important factor in the water-sharing struggle as well as the management of the Nile. The Sudd Canal Project, which hoped to increase the water supply for North Sudan and Egypt, is located in the country. Thus, active involvement and the political willingness of South Sudan are vital for water conservation and cooperation over the use of river water. The water loss at Sudd is estimated to be around 42 BCM per year due to surface evaporation from the swampy surface. Thus, any hope of generating additional supply for lower-riparian countries lies in the realization of the Sudd Canal Project, which was disrupted because of the civil war in South Sudan (Okoth-Owiro, 2004). The proximity of the country to Ethiopia can also provide some geostrategic importance; thus, the states in the basin struggle to influence politics on the ground in the country. The political turmoil that the country has experienced since December 2013 showcases

how the regional countries compete for influence in the country by siding with the warring parties based on their respective geostrategic interests rather than solving the country's political rivalry (Brouk, 2015).

In the basin, hydropolitics and geopolitics are extremely intertwined. At least since 1869, following the opening of the Suez Canal, the major powers have been active in North East Africa because of geostrategic considerations. The region's proximity to the major oilfields of the Middle East and the international trade through the sea routes partially explain the presence of major powers. Egypt has an interest in maintaining the status quo on water utilization regimes; they fight hard in their attempt to change their dominant position over the use of the Nile. As a result, they internationalize the Nile issue as if it's an Arab issue (Hassan, 2018). Beyond the Arab world, they influenced the IMF and World Bank to finance water projects over the Nile by the upstream states (Allan, 1999).

Egyptian foreign policy towards sub-Saharan Africa has been focused on the Nile water issue (Hassan and Al Rasheedy, 2007). To this end, there is ample evidence that Egypt has sabotaged the political stability of countries like Ethiopia, the country from which the majority of the water came. They used to support the Eritrean and Somali secessionist movements during the Cold War. The proxy war was based on the logic that if there is turmoil in Ethiopia, the country has no resources or a time plan for development projects over the Nile. In 2016, Ethiopia accused Egypt of intervening in the domestic political affairs of Ethiopia. Egyptian TV channels also live-streamed when the politicians of Egypt conspired against the Ethiopian state to prohibit Ethiopia from constructing the GERD in 2013 (Jeuland et al., 2017).

The Northeast Africa region remained one of the most important geostrategic areas for the major powers. Regional politics have been influenced by the influence of major powers since the opening of the Suez Canal in 1869. The proximity of the region to the oilfields of the Middle East and the sea lanes of the Red Sea are some of the factors that made the region attractive to the global powers. The Nile hydropolitics have never been immune from the influence of external powers, beginning in the 19th century (Yirga, 2021).

In the Nile basin, many have questioned the sustainability of the water use regime, accordingly calling for an alternative, all-inclusive water use regime. The efforts made to form the NBI and CFA are part of the effort to come up with an alternative water use regime. The upstream riparian states' determination to utilize the water of the Nile for their national development has revealed the importance of the alternative water regime. If the status quo is maintained, the Nile basin is destined for crisis, which will occur because of military confrontation and the degradation of the basin if there is no intervention from the states and regional organizations to maintain the fast-degrading ecosystem of the Nile basin (Kimenyi and Mbaku, 2015).

Most of these states are characterized by political instability and inter- and intra-state conflicts. There had been a border war between Ethiopia and Eritrea in the period 1998–2000; since then, they have been in a no-war, and no-peace situation until the border dispute was resolved by the new Ethiopian government, which has been in power since 2018. Countries like Egypt, Ethiopia, and Sudan have experienced political upheavals in the recent past that resulted in government changes, though the hope for democratic transition has been dashed in countries like Egypt since the democratically elected Mohammed Morsi government was ousted by a military coup (Algezeera, 2014).

In Ethiopia, the popular movement that engulfed the country following the 2015 election has caused a change of leadership in 2018, inducing political uncertainty. The protest that erupted on November 9, 2015, though it induced a change of leadership in the camps of the ruling party, has not yet clearly set the political and economic goals for the country, though the new leadership has openly rejected the political ideology of the ruling party, revolutionary democracy, and the developmental state model (Reporter, 2019). The recent popular movement in the Republic of Sudan has resulted in overthrowing the Al Basher government and paving the way for the formation of a new government in July 2019 (BBC, 11 April 2019). But in both Sudan and Ethiopia, it is premature to conclude the direction of the political transition.

South Sudan, which became an independent state in July 2011, was immersed in civil war in December 2013. The civil war caused a humanitarian crisis in the region and arrested institutional development in the country. South Sudan has been a failed state since 2013; stability and order have not been restored to that country till now. The diplomatic attempt to make peace

between the fighting groups has not been put into action, although the fighting groups have agreed on multiple occasions. Recently, the negotiation efforts by international and regional countries seem to have brought relative calm to the country, though the situation is very precarious. The conflict impedes not only socioeconomic development in the country but also the development of institutions to govern natural resources, including the freshwater resources in the country. The legislation and policies that govern the water sector were enacted in 2007, but their implementation was halted as a result of the civil war in the country. Practically, South Sudan has been regarded as a failed state.

In the Eastern Nile basin, the political turmoil that engulfed the whole country except Eritrea rarely affected the international relations of the states in the basin, particularly concerning the Nile River. The regime change in the Nile basin countries has hardly changed the status quo. The countries that squabble over the use of the Nile water—Ethiopia, Egypt, and Sudan—have hardly reached a consensus over the filling of the GERD. The hope for multilateral agreement in the basin has not yet been revived, and Egypt and Sudan have pulled out of the NBI and suspended the CFA agreement. The window for unilateral utilization of Nile water has not yet closed in the basin. The Declaration of Principles (DOP), which was signed between these three countries, still has not yet solved the contradiction this time on the filling pace of the GERD (Tawfik, 2016).

At the time of this writing, Egypt had reversed all the tripartite negotiation processes and called for the participation of the US and the World Bank. Accordingly, all three countries were invited to the US on October 26, 2019, and briefed the president about the pros and cons of the project. At that meeting, the three countries agreed to resolve their differences amicably; however, if they could not reach an agreement by the end of the year, they agreed to invoke Article 10 of the Declaration of Principles (DOP). The interesting part about this round of negotiations is that there is a wide difference between what the participants of the negotiation briefed the media and the reports of the Egyptian media. The Ethiopian delegates, when they arrived home and gave official statements to the media, demonstrated the event as an opportunity to present the American president with the facts on the ground and the impacts of the project on the lower riparian states. They stated that they successfully presented the other side of the story to the president to help him have a balanced view of the issue (The Ethiopian Reporter, 18 June, 2022)

The demand for water keeps rising, not only because of population growth but also because of the rise in individual per capita demand for water due to rising living standards. The other factor that pushes up water demand in the basin has to do with urbanization, industrialization, and the expansion of irrigation in the basin to feed and provide energy for the growing population. Studies indicated that on the African continent, the demand for freshwater is estimated to increase by about 40% for agriculture, industry, and domestic needs by 2030 (UNECA ACPC, 2011).

In the Eastern Nile basin, most states in the basin would become water-stressed, according to certain estimates of climate models (Oestigaard, 2012). According to Elmam (2010), countries like Egypt have already utilized the available fresh water in the Nile basin. He attributed the demand for more water in Egypt to population growth. He expressed this fact in the following manner: “Since population growth is the main reason that Egypt has reached its limits concerning the availability of water from the Nile, further substantial growth in the population, in particular in rural areas, will be very difficult to cope with” (Elemam 2010:220).

Politically speaking, there are asymmetric power relations between the upper and lower riparian countries in the Eastern Nile Basin. Egypt has been the military and economic power in the basin. It is this asymmetric power that dissuaded the upper riparian countries of the Nile from utilizing the water of the Nile, in addition to their weak economic condition, which hampers them from financing development projects by their means. Egypt considers the Nile to have an indisputable right to access Nile water while threatening the other riparian states with using “their historic water." The basin has faced political deadlock over the allocation of Nile water resources between the upper and lower riparian countries (Cascao and Nicol, 2016).

3.3. Population, Economy and Hydro Politics of the Eastern Nile Basin States

This section tries to present about the population of the Nile basin, the economy of the basin countries and hydropolitical relations among the Eastern Nile Basin states.

3.3.1 The Population of the Eastern Nile Basin States

According to the NBI (2012), the Nile basin population was estimated to be 424 million in 2010, of which 232 million people (54%) lived in the Nile basin. The same study predicted that by

2025, the population living in the basin will be 600 million people, with 300 million people living in the basin. Other studies also predicted that by 2050, the population of the basin will increase tenfold from what it was in 1950 (Raftery et al., 2009). The basin is also home to the second and third most populous countries on the African continent (Ethiopia and Egypt, respectively). The following table shows the trend of population growth among the Nile basin countries.

Table 3.0.2. Nile basin countries population prospect

Country	Population				
	1950	2009	2015	2025	2050
Burundi	2,456	8,303	9,413	11,161	14,846
DRC	12,184	66,020	77,419	98,123	147, 512
Egypt	21,514	82,999	91,778	104,970	129, 533
Eritrea	1,141	5,073	6,009	7,404	10,787
Ethiopia	18,434	82,825	96,237	119,822	173, 811
Kenya	6,077	39,802	46,433	57,573	85,410
Rwanda	2,162	9,998	11,743	14,676	22,082
Sudan	9,190	42,272	47,730	56,688	75,884
Tanzania	7,650	43,739	52,109	67,394	109,450
Uganda	5,158	32,710	39,710	53,406	91,271
Total	**85,966**	**413,741**	**478, 581**	**591,217**	**860, 586**

Source: Raftery et al., 2009. World Population Prospect

On the other hand the US Census Bureau has a slight higher figure for the Nile basin countries. However, all the predictions show dramatic population growth in the Nile basin, which will put

immense pressure on the availability of an already water-stressed basin. The population increase among lower-riparian countries obviously undermines the potential for providing affordable freshwater for the population with the current technology and water management system. According to the estimations of the UN World Population Growth Prospect and the US Census Bureau, the population in the basin countries can grow to one billion by 2050 (Oestigaard, 2012). Oestigaard (2012:32) aptly expressed the pressure on the Nile water resources as follows: "Exactly how many people will live in the catchment area is uncertain, but one may expect in the range of 400 to 600 million people. In practice, this means that the number of people dependent on the Nile and rainfall within the basin will double or triple from today."

The Nile is extremely important for both the upper and lower riparian countries in the Eastern Nile basin. Among the lower riparian countries, the Nile contributes about 98% of Egypt's fresh water and satisfies more than 95% of its requirements (Elemam, 2010). In both North and South Sudan, the Nile provides 85% of their freshwater needs (Abadir, 2011). As implied elsewhere, irrigation and hydroelectric generation are major uses of Nile water (Mason, 2004). Except in South Sudan, agriculture consumes more than 80% of the Nile water in Sudan and Egypt. On the other hand, Ethiopia can use only less than 1% of the Nile water resources, though it contributes more than 86% of the Nile water. This suggests that the upper riparian states, including Ethiopia, have not begun to use the water of the Nile (Fasil, 2008).

3.3.2. The Economy of the Eastern Nile basin Countries

Economically, most of the countries in the Eastern Nile basin are characterized by persistent poverty and food insecurity. Moreover, the Eastern Nile basin states are characterized by economic asymmetry. Whittington and McClelland (1992:146) reported that during the late 20th century, the Egyptian economy remained the dominant economy, with the per capita of the country being twice that of Sudan and five times the per capita of Ethiopia. Ethiopian economic growth in the last two or three decades is believed to have reduced the wide economic gap between Ethiopia and Egypt.

The Nile basin has huge potential for economic growth if the riparian states agree on the terms of the use of the water and coordinate the use of the Nile water (Abadir, 2011). The upper catchment area of the Eastern Nile is dependent on rain-fed agriculture and subsistence

agriculture, whereas the lower riparian countries rely on irrigated agriculture. Abadir (2011) further reported the undersupply of infrastructure like energy and severe degradation of the environment in the basin as major features of the basin. The region mainly relies on subsistence rain-fed agriculture as a means of livelihood for the majority of the population in most Nile Basin countries.

Despite the socio-economic backwardness of the Nile basin countries, in recent times they are scoring impressive economic growth. Figure 3.2 shows levels of economic growth for the last one decade. That economic growth and social transformation obviously led to the demand for more natural resource use including freshwater. In concurrence with the realist assumption the demand for more natural resources use in turn led to what some calls the phenomena of 'hydraulic mission'-that is to say resource capture/control which again lead to intense competition between the nations along the Transboundary River. On this level of socio-economic development less attention is given to the cause of environmental protection as the government policies of the basin countries emphasized fueling of the economic growth to achieve the stated goal of socio-economic modernization. Irrigation agriculture much developed among the two lower riparian countries. These two countries, Sudan and Egypt extensively used the water of Nile. Egypt alone used more than what all the remaining nine (9) Nile riparian countries used. It is also the most advanced economy among the basin countries

There is also growing economic activity in the region which led to environmental degradation. In Ethiopia alone, the major source of Nile water, there has been a serious environmental degradation. There has been a process of deforestation and hence the exposure of the Ethiopian highlands to severe soil erosion. This environmental degradation has impacts beyond the Ethiopian border on the water reservoirs of the lower riparian countries. Due to this degradation the Sudanese reservoirs have had filled with silts that undermine the use of the reservoirs and increase the maintenance costs of the reservoirs. Moreover, the region is also susceptible to the vagaries of climate change. However, in the Nile Basin Di Baldassarie et al. (2011) concluded that population growth and the associated land use and urbanization has more effect on the flow regime of Nile than the impact of climate change.

The region is made up of the poorest countries. Most of the countries in the region are relied on subsistence agriculture for their livelihood. As a result the overall socio-economic goal of the countries in the region is to achieve economic development. Such economic development can only be achieved through resource capture. One of the critical resources for such socio-economic transformation is water. To achieve the economic development thus to lift millions from poverty requires extensive resource capture. Thus, the countries in the Eastern Nile Basin are engaging in hydraulic mission which obviously led to intense competition between the riparian countries over the use of Nile water. With the exception of Egypt and Sudan, irrigation agriculture is very low. In sub-Saharan Africa the land under irrigation is estimated to be less than 5% of the overall potential (GIZ, 2014). In the same taken since the Nile basin countries are at low level of economic development the energy sector, manufacturing sector and etc. are still underdeveloped. However, there has been a growing demand for each of these the population and the economy is keeps growing. The competition is between the one aspires maintain the status quo and the upper riparian countries which wants to change that.

The Nile basin water in general and Eastern Nile basin water economic potential, in particular has not been tapped. In terms of hydropower energy potential, the basin has the potential to generate more than 25,000MW. It has huge potential to increase irrigated agriculture in the basin from 6.5 million hectares to 10 million hectares which means the water in the basin has the potential to irrigate additional more than 3 million hectares. Moreover, more storage dams' capacities can be built in the basin. Thus, the states in the Nile basin in general and the Eastern Nile in particular view the Nile water as an opportunity to exploit its water resources for their national development goals. This in turn would increase the demand for water in each of the basin countries aggravating the competition over the use of water in the basin (Vink, 2018). The two lower riparian states, Egypt and Sudan, through which the Nile traverses primarily need the Nile water for irrigation agriculture but also for hydroelectric generation, domestic use, transportation and industries (Abadir, 2011).

Table 3.3. GDP and Population growth rate of the Nile basin countries respectively.

S/N	Name of basin countries	Rate of economic growth estimate in 2017	Rate of Population Growth estimate in	Remark

			2018	
1	Burundi	0% (2017)	3.23 % (2018)	
2	Democratic Congo	3.4% (2017)	2.33% (2018)	
3	Egypt	4.2% (2017)	2.38% (2018)	
4	Ethiopia	10.9 (2017)	2.83% (2018)	
5	Eritrea	5% (2017)	0.89% (2018)	
6	Kenya	10.4% (2017)	1.57% (2018)	
7	Rwanda	6.1% (2017)	2.3% (2018)	
8	Tanzania	6% (2017)	2.74% (2018)	
9	Sudan	1.4% (2017)	2.93% (2018)	
10	South Sudan	-5.2% (2017)	-1.16%(2018)	
11	Uganda	4.8% (2017)	3.18% (2018)	

Source: Compiled by the author from the CIA World Fact Book, 2018

3.3.3 Hydro politics Among the Eastern Nile basin states

Hydropolitically, the Eastern Nile Basin encompasses five countries: Ethiopia, Eritrea, Sudan, South Sudan, and Egypt. The Eastern Nile Basin is important because it contributes about 85% [6] of the water in the main Nile. The region experienced rapid political changes with popular protests that changed governments in Egypt and Sudan in 2011 and 2019, respectively. Moreover, the state of South Sudan gained its independence in July 2011, which had ramifications for the political economy of Sudan. With the independence of South Sudan, Sudan ceded most of its oil fields to the breakaway state. This development forced the Sudanese government to revitalize its agricultural sector, which it abandoned for years after the discovery of the oil industry. The revitalization of agriculture in Sudan has a huge impact on water demand (Vink, 2018).

[6]There are various suggestions concerning the size of the Ethiopian contribution: Some say 80% (Oestigaard, 2012; Elmam, 2010), and most Ethiopian scholars claim it is 86% (Yacob, 2007; Dereje, 2010; Abadir, 2011).

In the Nile basin in general and the Eastern Nile basin in particular, the effort to forge legal regimes that govern the water resources of the Nile has been very slow. Despite the progress made towards the cooperation of the Nile Basin states, it has not yet reached the aspired goal of an institutionalized legal framework that governs the water use and management of the Nile River and related environs. The Nile Basin is one of the few international basins without permanent legal frameworks that govern it. In this regard, the NBI marked an indispensable departure by facilitating the negotiation of establishing a permanent legal framework to govern the Nile River. However, the negotiating states have not yet agreed, though it has been tabled for signature since 2010. The two downstream countries withdrew from the agreement, making it challenging to establish comprehensive legal frameworks for the entire basin (Kimenyi and Mbaku, 2015).

3.4. Research Design and Approach

This study employed a case study research design to systematically analyze and interpret the need for transboundary river policy for sustainable water use and conservation in the Eastern Nile Basin. Key informant interviews were the primary method used to collect data in this study. The selection of the interviewees was dependent on the research questions. Thus, the interviewees in this study were selected based on the kind of information sought. Accordingly, for this study, the interviewees were drawn from institutions and individuals that participated in the Nile water issues, particularly experts who are believed to be familiar with the processes of Nile hydropolitics through research and Nile related diplomacy.

In this study, the interviewees were also drawn from experts of regional institutions such as ENTRO, ECA, World Bank and IWIMI, pertinent officials from Ethiopian Ministry of water Resources and Energy, and Ethiopian Ministry of Foreign Affairs were also included. For this study diplomats from Egypt, Sudan and South Sudan were interviewed. Moreover, hydrologists and water bureaucrats who also work at Juba University were also interviewed to include expertise views from South Sudan and Sudan. Furthermore, professionals with different backgrounds from higher education institutions are also targeted as potential interviewees for this study. The following sub-section offers the details of the interviewees targeted for the study from the different potential institutions.

This study employed a qualitative approach as it would help to systematically analyze and interpret the conservation policy decision-making process and institutional setup and functions. The qualitative inquiry also assisted in examining the impacts of environmental degradation and the impacts of government policies on conservation and water resource utilization. Geddes (2003) argued that, if the intent of the researcher is theory testing, it is appropriate to adopt a quantitative approach. However, this study aims at understanding and explaining states' and governments' responses to the growing water problems in the Eastern Nile sub-basin. Qualitative research aims to answer questions like what, how, when, where, and why of the object to be studied. Thus, according to Lune and Berg (2017:12), qualitative research "refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things." Establishing generalizations is not the ultimate goal of qualitative research; it is more interested in deeper understanding and explaining uniqueness.

Qualitative research takes account of the context, which enables the actions to be situated. The description of the context helps to understand the historical background of the phenomena under investigation (Dey, 2003). The phenomenon under investigation is the impacts of transboundary water policies and national water policies on the conservation and sustainability of the Eastern Nile Basin. Blackmore and Lauder (2005) cautioned researchers that when researchers undertake policy research, it is important to make the distinction as to whether they are doing research for policy and/or research about policy'. A second question is whether you are an 'outsider' or an 'insider'…" to the policy-making community. I want to clarify that in this study, I am not conducting research for direct policy input or involved in the water policy-making circle. Moreover, they also underlined the importance of identifying in which part of the policy process the researcher is most interested: "policy production, dissemination, and implementation, or policy effects?" (Blackmore and Lauder, 2005:97).

According to Marton (1981), there are two perspectives from which people interpret reality: the first-order perspective and the second-order perspective. According to the first-order perspective, people try to describe the different aspects of the world, whereas from the second-order perspective, research describes people's ideas about the various aspects of the world from their personal experiences. The phenomenographic approach of qualitative research thus focuses on the second-order perspective, studying a phenomenon indirectly from people's understanding and

beliefs. The second-order perspective influences how research questions are formulated. According to Yates et al. (2012:99), in phenomenography studies, research questions focus on “how” and “what” rather than "why”.

Thus, it is more appropriate to adopt a qualitative approach, as this research aims for a deep understanding and explanation of states' responses to the growing environmental challenges facing the region through policy. Moreover, the qualitative approach would help to critically analyze and interpret state responses to the growing demand for water conservation and sustainable use of water resources to overcome the imminent challenge of water scarcity.

The paradigm of research is influenced by the philosophy of science, either to accept the unit of science as applied in physical science as proposed by positivists or by the need to adopt an interpretivist approach to uncover the principles and rules that govern social phenomena (Kumar, 2011). In most cases, quantitative approaches tend to adopt positivism, which in general is perceived to be “purely scientific, justifiable, precise, and based on facts often reflected in exact figures” (Jonker and Pennink, 2010:38). On the other hand, the proponents of positivism regarded qualitative research as “‘messing around’, being ‘vague’, not scientific, and not following a structured plan” (Jonker and Pennink, 2010: 38). Interpretivist epistemology rejects positivism as irrelevant to studying the social sciences, as it places much emphasis on uncovering the general patterns of social phenomena. Instead, they call for emphasizing understanding of the meaning and context of social phenomena.

3.5. Sampling Strategy

To choose important informants, the study used purposive and snowball sampling strategies. First, important informants who have studied the Nile water management and have research interests were considered. The key informants were chosen based on their professional backgrounds, and first-hand knowledge of Nile water management gained through research or employment in water-related departments in their respective areas.

A guide questions that might assist in addressing the research objectives were developed before reaching out to the key informants in accordance with the purpose of the study. Key informants were interviewed face to face to fully comprehend the subject of inquiry. The interviews

meticulously recorded in order to capture all of the important details. Using the snowballing technique, we contacted and conducted key informant interviews with additional scholars and diplomats that had been designated as key informants.

3.6. Methods of Data Collection

The data were gathered from primary and secondary sources. The primary data collection took place in two phases between 2019 and 2021. Various factors, including the COVID-19 pandemic and difficulties in accessing key informants, presented challenges during data collection. To address the issue of incomplete data, the information was collected twice. Additionally, key informants from diverse backgrounds and organizations were involved in the study to enhance the data's quality and accuracy.

3.6.1. Key Informant Interview

Primary data were collected from key informants while secondary data were gathered from relevant books, research articles, working papers, newspapers, proceedings, and reports. Key informant interview is an appropriate method of data collection when the researcher is interested in collecting data about opinions, knowledge, perceptions, or beliefs. The key informant interview is selected for this study because this method can help to gain an insight which otherwise difficult to obtain. Moreover, this approach provides an insider's view about the topic under investigation (Akhter, 2022). When revealing the importance of interview methods for political science research, Moisio (2014: 119) argued that "especially in political science, questions related to decision-making processes, informal procedures, different stages, and the reasons behind decisions are often impossible to reveal since they remain for the most part unrecorded in the official documents. The selection of the interviewee is also another important research strategy and is determined by research questions. Thus, the interviewees in this study were considered because of their expertise and experience with the topic.

As indicated on table 3.4. the key informant interviewees were drawn from eleven institutions and 53 participants were participated in this study. In this study, data were collected from (four (4) ENTRO officials, three (3) IWIM, three (3) World Bank and two (2) ECA expats) about the evolution of regional policies and their impacts on national government policies, as well as the

impact of such policies in the Eastern Nile Basin. The second level will be pertinent national government officials from the Ministry of Water Resources, five (5) officials, and the Foreign Ministry, two (2). My desire to incorporate the views of the downstream states officials in this study were though unsuccessful due to COVID-19 pandemic, I tried to address this lacuna by contacting the diplomats from these countries in Addis. Thus, for this study the views of these diplomats were incorporated to balance the views from both downstream and upstream states.

The other target interviewees were university professors from Addis Ababa, Ambo and, Bahirdar, Debremarkos and Wollega universities. Professors of hydropolitics, international law, irrigation engineers were included as source of data. The following table shows the potential number of officials and experts targeted as research participants, as well as the institutions included in the study.

Table 3.4. Table of Stakeholders and target interviewees.

S/N	**Name of stakeholder Organization**	**Number of participant in the Key informant interview**
1	NBI Officials (ENTRO)	4 persons
2	Local elders	2 persons
3	Addis Ababa University (College of law, Political Science and International Relations staffs, Ethiopian Institute of water resources)	6 persons
	Ambo University (Irrigation engineers, Natural Resource management lecturer, International Relations lecturers),	6 persons
	Bahirdar University (Governance and Development studies staffs, Civic and Ethical Studies staffs, Natural Resource Management Staffs)	6 persons
	Debremarkos University (History Department staffs, Natural Resource Management staffs)	4 persons
	Wollega University (Political science staffs, History department staffs, Economics department staff)	5 persons

4	Juba University (professors Hydrology)	2 persons
5	Ministry of Water Resources	5 persons
6	Ministry of Foreign Affairs	1 person (Director of Transboundary Rivers), 1 Ethiopian Veteran diplomat
7	Egypt Embassy	1 person
8	Sudan Embassy	1 person
9	South Sudan Embassy	1 person
10	IWIM Expert	3 persons
11	ECA staffs	2 persons
12	World Bank Staffs	3 persons
	Total: 12 stakeholders	**53 interviewees**

3.6.2. Document Analysis

The policy documents, meeting minutes, directives, archives containing official exchanges of letters, and different conventions related to the Nile were considered in this research. These documents help to corroborate other sources of secondary data and data from interviews. This study aimed to access secondary data from different sources. The technical reports of development projects and reports of international organizations working on transboundary rivers, such as the World Bank, ECA, UNDP, UNEP, NBI and FAO, were also consulted as sources of secondary data. In addition to these global organizations, there is a regional intergovernmental organization working specifically on the issue of the Nile. The Nile Basin Initiative (NBI) reports and official statements from representatives of regional organizations, heads, and ministers of the riparian states were also used in this study.

Moreover, the documents and publications of the Ministry of Water Resources and Irrigation, the Foreign Ministry, and other pertinent ministries were also used as sources of secondary data. International organizations' working papers, reports, and research publications like the Global Environmental Facility (GEF), the Global Water Partnership, the World Water Council, the Green Cross International (GCI), etc. were useful sources of secondary data. Secondary data from academic journals, books, working papers of research institutes, gray materials, reports, policy documents, archives, newspapers, and magazines at both national and regional/global levels were used in this study

3.7. Instruments of Data Collection

For key informant interviews the main instrument of data collection is lead questions that give the way for further probing. For this study the leading questions were developed to generate required data as attached to this dissertation as an annex A. In qualitative research probing is a very important strategy to generate additional data. It is a research technique used by researchers during interview to generate further explanation from the research participant. It is an act of asking interviewees for further explanation, clarification, or elaboration. It could be used during individual and group interviews as well as during focus group discussions. Probing can be done both non-verbally with pauses or gesture and verbally by the follow up questions. During interview efficient and efficient probing can be done with the good listening of the interviewer to the answers of the interview and judge whether further question is important to generate additional information (Given, 2008).

3.8. Method of Data Analysis

The researcher used thematic analysis to review the gathered data. Field notes were diligently taken and later translated into English for non-English interviews. After the translation of the data, the researcher delved into the material by reading, categorizing, and identifying key themes related to the research questions. Subsequently, the data were scrutinized to pinpoint any trends or new insights. The main themes derived from the interviews were categorized into three groups: challenges encountered by individual states in addressing water conservation and sustainable water usage issues; shortcomings in regional frameworks for addressing water conservation and sustainable utilization of the Nile River; and drivers for governance changes in the Eastern Nile River basin. The primary data collected were compared with existing literature to highlight similarities or differences. Any discrepancies between the study's results and the literature were clarified.

3.9. Research Ethics

Research ethics cover various ethical aspects such as obtaining consent, protecting privacy and confidentiality, reducing harm, ensuring data accuracy, and managing conflicts of interest. In this research the researcher informed the research purpose and objectives and obtained informed consent from participants. Moreover the researcher adhere to the basic principle of research ethics that uphold the protection of participants’ privacy and confidentiality. The data obtained

from the research participants were used only for intended purposes. To enhance the integrity and honesty of this study the researcher accurately reported the method, data and findings of the study and duly acknowledged the sources of data. Overall, in this study relevant research ethical standards were maintained while undertaking this research to enhance knowledge and understanding in the need for transboundary policy regime for sustainable water use and conservation.

Chapter Four: Individual States Response to Water Conservation and Watershed Protection in the Eastern Nile Basin

4.1. Introduction

In the context of the Eastern Nile basin, this study focuses mainly on the primary states (Swain, 2011) in the basin, where there has been competition over the use and management of the Nile-Egypt, Ethiopia, and Sudan.[7] The remaining two states, Eritrea and South Sudan, being new states, rarely played an active role in the competition for the use and control of the Nile River. However, it provides a full picture to discuss the water use and conservation policies of Sudan and South Sudan in tandem. Accordingly, this chapter tries to analyze the way the individual states in the Eastern Nile basin responded to environmental degradation and the challenges of water conservation.

In the basin, the dichotomy between the upper and lower riparian states is clear in terms of Nile water development. The upstream states of the Nile have not yet tapped the development potential of the Nile basin, though the lower riparian states have comparatively exploited the Nile water development potential. Thus, the challenge to the basin is not similar in the upper and lower parts. Accordingly, the responses of the states to the water management along the river also differ in their emphasis. For instance, in the upper basin countries like Ethiopia, much emphasis is given to water development and the protection of the Nile environment to tackle drought and desertification, whereas among the lower riparian states, water misuse, pollution, and mismanagement are the major challenges the basin faces. Thus, they emphasize different ways to improve water use efficiency and conservation of water to achieve further development with the saved water.

Thus, this chapter provides the major findings about individual states' responses to water conservation and watershed protection. In particular, the chapter shed light on the effect of the

[7] In the Eastern Nile Basin, Ethiopia is considered the primary state because it supplies the majority of the Nile, and the other two states are the most extensive users of the Nile water.

legislation on efficient water utilization and, hence, contributed to the sustainability of river water. Accordingly, it explores the status of water conservation and protection of the Nile environment in each state.

4.2. Water Resource Management Policy for Sustainable Water Use and Conservation in Egypt

4.2.1. The overall context of water management in Egypt

As indicated in chapter three, Egypt is a water-stressed country that relies on the Nile for its survival despite the country's huge groundwater potenial. It is a large country with a total area of 1002,000 km2, of which 95% is desert, which receives a small amount of rainfall along the northern coastal areas. The total precipitation the country receives is estimated to be 1.8 BCM (FAO, 2017).

The Egyptian Minister of Water Resources and Irrigation, Mohamed Abdel Atty., in his April 2, 2018 speech, underscored that "though a significant amount of water is lost in the process of watering the irrigation fields through the extensive drainage networks, we can collect the water that is lost from the irrigation fields for recycling." Despite the claims of the Minister, the flooding of the irrigation fields not only led to the loss of water through percolation but also exposed excessive water in the fields to evaporation losses due to the high temperature in the country. In addition, the minister indicated the low investment made to modernize the irrigation sector of the country to reduce water loss and also to meet the inflated water demands in the country. The minister also estimated that the amount of water the country needs to meet the inflated water demands is about 114 BCM (Egypt Streets, April 21, 2018).

The water management policy in Egypt has evolved mainly to guide water development programs in the country. In the recent past, the country's water management policy has shifted towards issues of demand management, as water infrastructure development alone was unable to address the problems of water scarcity in the country. The demand for freshwater has already outgrown the water supply in the country.

The demand for water keeps escalating because of population growth, urbanization, and economic growth. The improvement of living standards and industrialization also put pressure on

Nile water resources, which supply more than 95 percent of Egypt's water needs. The other challenges to Egypt's water resources include water loss and pollution, though the freshwater resource is very limited in the country. Nevertheless, the escalation of water demands has called for the introduction of demand management as an alternative for supply enhancement through the construction of reservoirs, which have already reached their limit. This demand management policy took center stage, though they hardly abandoned the search for additional water supply beyond their national border (NWRP, 2005).

To this end, Egypt has adopted water legislation and policies that promote water use efficiency and conservation. However, the incorporation of such approaches into the laws and policies and the impact of the legislation and policies on water use patterns and conservation of water in the country have not been thoroughly assessed. Water-stressed countries that have incorporated the IWRM approach into their laws and policies have seen the water management paradigm shift from a policy that focuses on boosting supply to demand management. Moreover, Egypt's 2005 National Water Resources Plan (NWRP) identified water conservation as one of its core objectives.

In Egypt, although the government has embraced the Integrated Water Resources Management (IWRM) principle and is dedicated to conserving water, their projects aimed at diverting Nile water from its basin via the Toshka and El-Salam Canal seem to conflict with their stated goals for effective water management. This highlights a discrepancy between a policy document that emphasizes water conservation and the actual water management practices implemented in the country.

There has been little investigation into the impact of laws and policies on water use efficiency in the country. Additionally, it is unclear whether the policies and laws implemented to conserve water have had an impact on Egypt's foreign policy. The following table shows the Egyptian water balance (FAO, 2017).

Table 4.1 Egypt’s Water Balance

S/N	Sources of water	Amounts	
1	Nile	55.5	

2	Rainfall	1.3 BCM	
3	Fossil Groundwater Extraction	2.2 BCM	
4	Renewable Groundwater Extraction	6.2 BCM	
5	Desalination	0.2 BCM	
6	Waste Water	2.9 BCM	
7	Agricultural Drainage Water Reuse	13 BCM	
	Total	81.3 BCM	

Source: Compiled from FAO, 2021 Aqua stat database

The country's water resources are under serious threat because of population growth, economic growth, and urbanization. Even though the country's water demand increases every year, the supply remains constant, which puts pressure on the available water resources in the country. Moreover, the expansion of economic activities not only affected the water resources by abstracting more water but also contributed to the pollution of the available water resources in the country. The low investment in the maintenance of the conveyance and the adoption of modern irrigation technologies that save water and evaporation from the reservoirs all contributed to the country's water loss. In Egypt, at least 80% of the irrigation is conducted through flood irrigation, which exposes the country's precious freshwater resources to wastage. However, the highest water official, His Excellency Abdel Atty (2018), boasted about the capacity of the country to recapture water resources through the drainage networks that underlie most of the country's irrigation fields (Egyptian Streets, April 21, 2018).

Moreover, there is a growing demand from the upper riparian states to utilize the Nile water resources for their development. In the Eastern Nile basin, Ethiopia had long studied and prepared the Blue Nile development plan, which it shelved to be utilized when it got the capacity to implement the water use plans with an implication on Egypt's water share of the Nile, thus demanding the enhancement of water use efficiency and the development of alternative water resources. The Egyptian Policy document conceded that the plan for expanding the irrigated area by 35% can only be achieved if the country can apply strict implementation of irrigation water conservation programs (NWRP, 2005). However, this policy document hardly recognized the right of the upper riparian countries to utilize the fair share of the shared Nile water resources.

4.2.2. Impacts of Water Resource Management policies and Laws on Water use patterns and water conservation in Egypt

The Egyptian diplomat[8] based in Addis as well as the Egyptian officials (Egypt Today, December 9, 2021) underscore the long journey the country made towards efficient utilization of the Nile water; demand-side water management resurfaced only recently (El Din, 2013). The absence of focus on demand side management has exposed the water sector in the country to mismanagement, overuse, and pollution. As a result, a large volume of water is lost in agricultural fields and domestic uses, with the remaining being exposed to effluents from industries and agricultural fields. Though the water regulations, laws, and policies have contributed tremendously to the conservation of Nile water, there is still huge potential to conserve water in different sectors (El-Din, 2013; Elmam, 2010). The less emphasis given to the adoption of water-saving technologies and the inability to implement conservation-related regulations and legal instruments to promote water safety protection and water-saving show the long way to go to achieve the sustainability of Nile River water in the country. Nonetheless, the 2014 Egyptian Constitution's incorporation of environmental sustainability issues into its content shows the great attention Egypt gave to the sustainability of natural resources, including the conservation of the country's freshwater resources (Sherif, 2014).

Egypt, unlike many of the water-scarce regions of the world like India and many North African and Middle Eastern countries that adopted the concept of the water audit to minimize water losses, has so far failed to adopt the idea of the water audit for all sectors. The Egyptian water policy document has not included known water management policy instruments like water audits. This policy instrument would have enabled the country to measure the progress it made in terms of water conservation through its interventions in different sectors (Whitworth, 2015). Moreover, after the 1992 Dublin Conference, many countries started to consider water as an economic good. Many international institutions, like USAID, encouraged the Egyptian Ministry of Water Resources and Irrigation (MWRI) to consider water as an economic good and thus to

[8] Interview with an Egyptian diplomat based in Addis on May 5, 2020.

tag more water charges to discourage water misuse in irrigation fields and municipal and industrial uses.[9]

However, the Egyptian popular view, which considers water a God-given resource, stands in sharp contrast with perceiving water as an economic good. The much-lauded policy instrument that could have conserved water would have been the idea of viewing water as an economic good that has to be valued. The idea of tagging the price of water has been promoted since the 1992 Dublin conference, which declared water an economic good. Countries that charge users of water are better conserved by prohibiting farmers from overwatering, which led to water loss in irrigation fields, domestic users, and factories from wasteful practices. In Egypt, officials are struggling to use water charging as a policy instrument for water conservation because of a myriad of factors (Elmam, 2010; Said, 1993).

The other mechanisms suggested by the donor communities, who are very active in the Egyptian water sector, called for a change of governance style from a centralized management system where all water storage, distribution, and maintenance decisions are made at the center to a bottom-up approach where inputs for decision-making should come from the water users themselves to better manage the water resources. According to their logic, this governance approach solves water loss due to the inefficiency of previous centralized decision-making (Barnes, 2014).

Informants based at international institutions are very optimistic about the Egyptian attempt to address water mismanagement through laws and policies during storage, conveyance, and field application. The Egyptian water policy document also implies the long journey the country has to make to reduce water loss in the country. However, one expert at the Economic Commission for Africa (ECA) [10] is skeptic about the Egyptian state's capacity to address water

[9] Interview with IWIM tansboundary water expert in Addis on 23 March 2020.

[10] Interview with ECA staff who work on water resources management, including in the Nile basin, on February 22, 2021, at Addis Ababa.

mismanagement through laws and policies, as it is usually difficult to address entrenched cultural practices through introducing laws and policies. For this skepticism, he underlined that even after the introduction of such legislation in the 1980s, flood irrigation still dominates the irrigation sector. According to Barnes (2014), this is because the conveyance systems, both for irrigation and domestic use, have not been modernized, exposing the water to loss.

There are experiences in other countries that show it is difficult to achieve water-saving targets simply by introducing proclamations, laws, and policies. It needs the regulations to be verified clearly in the sectors (agriculture, domestic, and/or industrial use) where the water savings have to come from, and the amount of the savings also has to be quantified to evaluate the progress the country has made towards the water-saving goal. For instance, in Spain, the 2006 Royal Decree to achieve a national water-saving goal proclaimed that water projects should achieve water-saving goals to offset drought in the country (Aranda-Martin, 2009). According to Aranda-Martin (2009: 215), the decree was proclaimed to be implemented on "over 866,898 hectares and estimates annual water savings of 1,162 hm3[11]..." Thus, the water regulations, laws, and policies have to be as specific as possible, as such specifications help measure the impacts the policies and laws have on the ground. Indeed, the Egyptian policy to limit the farm size of selected crops like rice and sugar cane helped the country save an estimated 24% of the total agricultural water withdrawal (Mason, 2004: 118). To conserve irrigation water, the Egyptian government recently launched projects to reduce seepage by lining canals and encouraging farmers to use water-saving technologies (Ahram online, May 5, 2021).

The following sub-section attempts to highlight how the Egyptian water management policy influenced water use patterns in the irrigation sector, how the water policies helped protect Nile River water from pollution, and the effects of the policies in reducing water mismanagement during storage and distribution through the water channel networks.

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[11] 1162 hm3 (hectometer cubic meters) is approximately equivalent to 1.162 billion cubic meters (BCM).

4.2.3. Egypt's Water Resource Management Policies and Laws in conserving water in the irrigation sector

According to my informant[12], who studied the history of Nile hydropolitics, the modernization of the irrigation sector dates back much earlier than the arrival of the British. The British water management policy in Egypt had been designed based on their experiences in India, where hydraulic missions had existed long before the arrival of Britain as a colonial master. Thus, when they started conquering the Nile Valley, they came with enormous technical expertise to harness water resources. He further underscored that this period also coincided with the period when the European industrial powers felt that they could bring nature under their control with their technical and economic power. Thus, they embarked on a hydraulic mission in their colonies, including Egypt. The British engineers arrived in Egypt to undertake the historic mission of controlling the Nile River by building water infrastructure to harness the economic potential of the Nile in the country for their own raw material demand for their industries back home. Previous studies also coincide with why the British are interested in Nile water development and their desire to control the entire Nile system to secure the flow of the Nile for Egypt (Allan, 1999).

Since the commencement of the hydraulic mission in Egypt around the second half of the 19th c, the water sector's governance has been more focused on supplying water for the ever-growing water demands. This can be witnessed with the building and renovation of a series of barrages across the Nile basin within the country. To respond to these growing water demands in the country, the water authorities in the country keep expanding the hydraulic structures along the Nile River. These hydraulic structures included Delta barrages built in 1861 and 1901, the Asyut Dam in 1902, and the Isna Dam in 1909. The demand for more water further motivated the Egyptian authorities to construct the first Aswan Dam between 1899 and 1902. This dam had been enlarged twice: once between 1908 and 1911 and again between 1929 and 1934. These hydraulic infrastructures increased the irrigation and hydroelectric generation capacity of the country (Teshome, 1997).

[12] Interview with a historian who studied the history of Nile hydropolitics at AAU on July 21, 2020.

According to the Ethiopian Academia[13], the hydraulic mission process now seems to have reached its climax in the country, as it has exhaustively exploited its irrigation and hydropower potential using the available freshwater resources of the Nile. However, this water use rate in the country cannot be sustained. Thus, the demand for additional water use should come from the conservation of the available water resources and technological innovation to extract fresh water from alternative sources like seawater desalination at affordable prices. Egyptian officials (Aharam online, May 5, 2021) and previous studies also corroborated this view when they indicated that the country imports more than 50% of its foodstuffs in the form of virtual water (Oeistegaard, 2012).

From the perspective of the Europeans, when they arrived in Egypt in the late 19th century, they found that there were no rules or institutions that governed water use in the Egyptian irrigation sector. Hopkins (2005: 1) reported the first impression of Europeans about Nile water resources management and use in Egypt as “rulelessness” and "chaotic." He quoted Barois (1887: 123–124) to reveal the lack of water legislation that governs water use and management in the country as follows:

> Thus we find in Egypt neither a special set of rules covering water use, nor any particular court for irrigation affairs, nor suitable penalties for irrigation faults. This is surprising and one should take note ... The farmer enjoys the greatest freedom to open irrigation ditches or to create off-takes in canal banks and to use and abuse the water that flows by his land. There is no model to govern water extraction. There is no relationship between the area under cultivation and the size of irrigation head-works. Under these conditions, the big landowners have obviously a lot of opportunities to seize the water for their benefit and to the detriment of the small farmers (Hopkins, 2005:3).

Though some scholars were doubtful about the absence of water governance models in Egypt before the arrival of the British colonial system (Mass and Anderson, 1978), it was the British that instituted legislation to govern Nile water irrigation use by the 1890 and 1894 decrees, in

[13] Interview with an Ethiopian International Relations Professor at Addis Ababa University on February 4, 2021.

addition to the intensification of engineering works that promote water storage facilities for irrigation use in the country (Hopkins, 2005). The Egyptian water policies are adopted at different times in most cases to guide water resource development and allocation of water resources among the different sectors (Abdin and Gafaar, 2009). Because of these policies, major water development projects were undertaken, particularly to expand the cultivated area in the country. Water and irrigation policies are highly intertwined in the country. In fact, in Egypt, the laws and policies that have governed water use and management are fragmented among the various Egyptian institutions. The National Water Resources Plan (NWRP) identified the national-level ministries that influence water governance in the country. The NWRP (2005) aimed to tackle the issue of legal and policy fragmentation by implementing IWRM. This involved consolidating water-related laws and policies from various institutions under the oversight of the Ministry of Water Resources and Irrigation (MWRI). The Egyptian government's land reform in the 1950s had an impact on water use patterns; the right to irrigation water use was and is related to owning plots of land in independent Egypt (Attia, 2004).

Despite the fragmentation of Egyptian water policies among the different ministries, the Ministry of Water Resources and Irrigation (MWRI) has the mandate to coordinate and govern water-related issues. Before the adoption of NWRP, Law No. 2 of 1982 gave the power and responsibilities to coordinate water use and management to the then Ministry of Public Works and Water Resources (MPWWR) [14] which was later named the Ministry of Water Resources and Irrigation (MWRI). The country also enacted water use policies and legislation that keeps being modified. From 1975 to 2002, Egypt introduced or modified more than five water policies that mainly focused on supply enhancement through the construction of reservoirs and conveyance systems (Elmam, 2010). However, the question remains: how have these different water legislations and policies impacted water conservation in the country?

In the irrigation systems of Egypt, two management systems co-exist without much integration. The formal laws and decrees often enacted by the central government that guide water use in the Egyptian irrigation system are parallel to the local customs that govern water rights and use patterns at the local level. According to Abdulaziz (1995), water conservation became an

[14] This was the official name of the Ministry of Water Resources and Irrigation until 1999 (NWRP, 2005: xvi).

emerging issue in the Egyptian irrigation system only in the 1970s and 1980s, when donors were concerned about ways to improve the overall productivity of irrigation while also saving water for other development purposes as well as to build resilience against the anticipated water shortage in the country. USAID was the pioneer in introducing the idea of conserving irrigation water in Egypt (Barnes, 2014). However, according to an informant [15] from the Economic Commission of Africa (ECA), despite efforts to improve water use efficiency, particularly in the irrigation sector, a significant amount of water is still wasted during the application of water to irrigation fields. Tesfaye's (2020) finding also corroborated this view of the expatriate.

The Ministry of Public Works and Water Resources (MPWWR) is given the authority to regulate irrigation lands, irrigation water use rights, and the pattern of rotation among irrigation canals under Law No. 2 of 1984. It was the power and responsibility of this ministry to issue permission to dig wells and install a pump and a water wheel to withdraw water from irrigation canals (Hopkins, 2005). However, Barnes (2014) reported the daily violation of this law by Egyptian farmers. The farmers install pumps and pipelines on their farm plots without the permission and knowledge of the authorities. The farmers hardly observe the laws introduced to regulate water use patterns because of the weak monitoring systems, hence the low enforcement mechanisms in place to regulate water use. However, the series of water laws since the introduction of new constitution in 2014 including Law No. 147/2021, proposed new legislation that was destined to introduce harsh measures for those violators of the law (Egypt Today, June, 4, 2022).

The water conservation program in Egypt is mainly intended to save water to reclaim additional desert lands. In recent times, particularly after the introduction of the 2005 National Water Resources Plan (NWRP), the program of water conservation has gained momentum in the old lands (the Nile Valley and Delta areas). The 2005 National Water Resources Plan (NWRP) underlined the fact that the country had reached the limit of its available water resources. The document also recognizes the little hope for generating additional water supply, mainly through cooperation with the upstream states. Hence, the Egyptian Ministry of Water Resources and Irrigation (MWRI) has aimed to conserve water for the further development of the country by

[15] Interview with ECA staff who work on transboundary river water resources management, including in the Nile basin, on February 22, 2021, at Addis Ababa.

adopting different strategies. According to the document, 97 percent of the Egyptian population concentrates only on 4 percent of the land; thus, the government has resettlement plans to make Egyptian territories habitable through the expansion of not only irrigation agriculture but also the building of new industrial areas and new cities, which all need additional water supply. This plan shows the government's intention to grow the current cultivated area by 35 percent (currently, 3.734 million hectares are irrigated agriculture) (FAO, 2017). According to this plan, the majority of the water is proposed to come from water conservation (NWRP, 2005).

The NWRP (2005) stressed the importance of the development of non-conventional water resources to complement conventional sources. Accordingly, the limited domestic and industrial treatment plants should be expanded for all the industrial plants and domestic sewage systems throughout the country. It was also proposed to expand the drainage networks from the current 50%[16] (Barnes, 2014) to stretch throughout all the irrigated lands to collect water that percolates from the irrigation fields, thus utilizing the collected water by mixing with fresh water for the expansion of reclaimed lands. Moreover, it stressed the need for harvesting rain and flash floods along the Northern Egypt coastal strips, in addition to investing heavily in the technology of desalination to reduce desalination costs (NWRP, 2005).

The overarching water policy of Egypt is dominated by capturing the water resources of the Nile for further economic development. The country's approach to water development and management has been driven by the goal of maximizing the use of Nile water resources to achieve rapid economic growth, without adequately considering the potential impacts of these actions. Egypt has thus far emphasized the policy of uninterrupted supply of Nile water, disregarding the issue of efficient utilization. Elmam (2010: 218) conceded the failure of the water use policy in Egypt to conserve water, citing the ever-deteriorating water situation in the country and calling for "a major shift from the classical paradigm used in water resource planning and management to a different and innovative one." The long-held policy of increasing water supply and denying other riparian states access to water has done little to ensure water

[16] According to the speech of Abdel Atty on April 2, 2018, the coverage of the drainage network has already reached 80% of the irrigated area in the country.

'security'. The policy that is oriented toward the outside has not brought success, and that is why scholars began questioning this long-held policy of the country (Swain, 2011).

Regardless of the limited water supply, the country's agricultural policy stipulates the need to bring more desert lands under irrigation, which demands additional water for the newly reclaimed desert land. This food self-sufficiency policy encouraged the irrigation of large areas to increase the production of foodstuffs for the growing population in the country. The desire to bring additional marginal desert lands under flood irrigation has exposed the country's precious freshwater resource to mismanagement and inefficient utilization (Kerisel, 2001). According to Kerisel (2001), the modern rulers of Egypt, who inherited the ambitions of Pharaonic dreams, cannot easily quit the policy of supply increase to realize ambitious project plans like developing desert lands through building canals like Toshka and El-Salam.

According to Elmam (2010), Egypt is one of the states already categorized as a water-scarce country. It cannot meet the demands of the population, like food, though they use more than 80 percent of their freshwater resources for irrigation agriculture. Multilateral institutions and scholars alike recommended the Egyptian government abandon its food self-sufficiency policy and instead focus on less water-intensive economic sectors like light manufacturing industries and high-value agricultural products. In the world, many water-poor countries like Singapore and Saudi Arabia have abandoned the policy of food self-sufficiency. It has been suggested as a preferable policy and development in many regions where there is or has the potential for water scarcity. However, the policy response of the Egyptian state is too late and too little to deal with the actual and potential water problems of the nation (Oestigaard, 2012).

In Egypt, the major legislation that impacted water governance was Law 12-1984, which was adopted to regulate water use, management, and distribution in the irrigation sector. This law bestows the power and responsibilities to coordinate water management, usage, and distribution on the Ministry of Water Resources and Irrigation (MWRI). This law provides a set of provisions that water users should obey and also introduces mechanisms to enforce the state laws. Under this law, farmers are not allowed to cultivate rice outside the specific area designated for rice production. This provision has been introduced to promote water conservation by discouraging

the cultivation of water-intensive crops and encouraging crop patterns. This regulation has been implemented to conserve water resources (Mason, 2004).

However, the economic liberalization that was introduced in the 1980s in Egypt freed farmers from government intervention that determined the kind of crop they grew. As a result, the farmers got the right to grow the crop of their choice. This new development encouraged many farmers to grow rice, which led to the doubling of rice farms in the country. The expansion of rice farms following the economic liberalization in turn caused excessive water withdrawal, creating water scarcity for fellow farmers at the ends of the canals in the irrigation fields. This prompted the Egyptian government to introduce a new water policy that aims at reducing the size of rice fields from 1.8 million *feddans*[17] to 1.2 million *feddans.* Accordingly, the size of the rice farm in the entire country was reduced from 1.8 million *fedans* to 1.1 million *fedans* by the year 2010. Nevertheless, that number bounced back to where it was following the Egyptian revolution in 2011 (Barnes, 2014: 42). Despite the policy changes because of the world political economy and domestic political upheavals, Law 2-1984 and other irrigation-related programs achieved irrigation water conservation (Allan 1999). Mason (2004) reported the water conservation achievements in the irrigation sector and also the capacity Egypt developed to reuse sewerage water, which enabled the country to meet its water demands up until 2020.

Despite the 2005 NWRP document commitment to invest in water-saving technologies to conserve water in the irrigation fields, archaic and wasteful flood irrigation still dominates the sector. This lack of investment in water-saving technologies, combined with the Egyptian government's plan to bring large tracts of land under cultivation by expanding the marginal lands within the Nile valley and beyond, The expansion into desert lands brought the Nile water beyond its natural watershed to be reclaimed by individual farmers, multinational corporations, or even government programs that support and encourage university graduates to engage in the program of reclaiming desert lands. As a result, the demand for additional water keeps growing in the country despite the low capacity of the country to conserve water. On the part of the Egyptian government, the attempt to conserve through legal and policy measures remains very weak. For instance, one of the strategies to conserve water is the introduction of water charging

[17] 1 feddan = 0.42 ha.

to water users. However, such topics are very taboo and politically sensitive, as such issues are very unpopular among Egyptians (Barnes, 2014).

Nevertheless, if the country adopted water-saving technologies, there is a huge potential to conserve additional water from the irrigation sector alone. According to Barnes (2014:133), the Egyptian Ministry of Water Resources and Irrigation (MWRI), realizing this fact, has planned to conserve additional water through farm-saving practices, thus having surplus water for reclamation purposes. The ministry estimated that "the irrigation efficiency of traditional surface irrigation is only 45 percent, whereas that of sprinkler irrigation is 75 percent, and drip irrigation is 85 percent."

Similarly, Abou Kheira (2009: 23) expressed the low level of water use efficiency in the country in the following ways:

> About 2.52, ha (6 million feddans) are old lands irrigated by surface irrigation methods with low on-farm water application efficiency (40–60%). Water logging, salinization, and low application efficiency are the main problems inherent with surface irrigation. Replacing the surface irrigation method with precise irrigation systems became the main interest of the decision makers and policy planners in Egypt.

This clearly shows the low level of water conservation, as the majority of the farmers in Egypt have been practicing flood irrigation when they apply the water to their fields, demanding the modernization of the irrigation sector.

The Egyptian authorities face difficulty whenever they try to implement such efficiency-enhancing policies on irrigation farms, as farmers oppose such government policies. The efforts to create awareness about water conservation since 1986 in the country have not changed the attitude of the Egyptian population, which views water as a natural resource that should be exploited for use and also free of charge, which poses a challenge to the Dublin principle, which urges nations to view water as an economic good and also to discourage waste. It also urges national officials to tag high water use charges (Barnes, 2014).

In Egypt, the regulation that aims to reduce the rice fields was introduced because of the high water consumption of individual growers, which caused scarcity for other farmers by affecting

their quota, hence the bitter struggle among the upper and lower farmlands along the farm water canals. In this case, the upper farmlands are better positioned to access water than the lower farmlands. In Egypt, the majority of farmers still practice flood irrigation, increasing the chance of water wastage (Barnes, 2014).

The agricultural sector of Egypt, which consumes about 90%[18] of the country's total freshwater resources, is also the sector where the bulk of the resources are mismanaged and wasted. Waste and mismanagement in the agricultural sector occur in the irrigated fields. Except for the big agricultural investors, small-scale farmers today practice flood irrigation, which causes the wastage of water in the fields. Thus, a large volume of water evaporated from the fields because of flood irrigation, the absence of investment in water-saving technologies, and the enforcement of laws and policies to ensure efficient utilization of water in those fields.

The irrigation fields are not the only place where water is lost in the country because of backward practices, but also the water distribution networks. A significant amount of water is lost every year in the thousands of kilometers of distribution canals and ditches that spread throughout the country. These all imply the mismanagement and loss of water in storage, distribution, and when applied to the fields. Jean Kerisel (2001), in his book entitled *The Nile and its Masters*, revealed that though the current Egyptian leaders inherited the dreams and visions of the Pharaohs, they lacked the wisdom that matches the Pharaohs when it comes to water management. The author criticized the current leaders' ambition to develop two valleys at the same time, though the Nile water is insufficient to develop the two valleys at the same time. He warned that if they go about implementing the Toshka project, there is a possibility that they will face a water shortage to develop even the main Nile valley, given the current circumstances that surround the Nile River (Kerisel, 2001).

According to Barnes (2014), the donor communities and expatriates that work with the Ministry of Water Resources and Irrigation (MWRI) officials suggest the need for emphasizing water

[18] There is controversy regarding the freshwater share of irrigation agriculture. According to Abdin and Gaffar (2009:130), the agricultural sector consumes 85% of the country's freshwater, which is slightly lower than Barnes's (2014) estimation, which is 90%.

conservation that addresses water scarcity challenges in the country. Despite the recommendations of the expatriates, Egyptian officials at the Ministry of Water Resources and Irrigation (MWRI) are still obsessed with searching for additional sources of supply outside their border, which makes compromise over water allocation very difficult in the Eastern Nile basin, if not impossible, as the demand was clearly stated in the NWRP policy document.

The officials at the Ministry of Water Resources and the donors, who are very active in the Egyptian water sector, believe that most of the water waste occurs in the farm fields. The wastages that occur in storage through the distribution systems are less recognized and politically incorrect to suggest a change in operating the entire water system, including the operation of the Aswan High Dam. Indeed, if Egyptian officials are interested in water conservation at all, the loss of water in the farmers' fields is incompatible with the government's plan for new projects to reclaim desert lands, which need to undercut the current water flow to the individual farms (Barnes, 2014).

Such misuse and mismanagement of the Egyptian water resource not only resulted in affecting the availability of freshwater resources for different purposes but also caused desertification and soil degradation, undermining the already small size of Egyptian arable land, which accounts for 3 %[19] of the total Egyptian land. The expansion of desertification and soil degradation threatened the fertile arable land of Egypt as a result of water misuse and the use of highly polluted water that caused soil salinity. Furthermore, holding back the silt of the Nile River at Aswan High Dam decreases the soil fertility, therefore requiring the application of fertilizers to the agricultural fields. The fertilizers and pesticides applied to the fields are washed away back to the river banks, thus undermining the potential of the river for further use. Thus, intervention from water users has caused the diminishing of freshwater availability besides the growth of the population, economy, improved living standards, and urbanization (Sherif, 2014:197).

[19] The Egyptian National Water Resources Plan (NWRP, 2005) estimated this figure to be 4% of the total Egyptian land.

4.2.4 Egyptian Water Management policy to conserve the Nile Water during Storage and Distribution

According to Ethiopian academics with international relations and hydraulic engineering backgrounds, the decision to store the Nile was more of an ideological/ a political decision than an economic and environmental one due to the high evaporation rate in this desert area. Even the British engineers who came up with the century-long storage plan never considered the idea of building such storage facilities within Egypt. Similarly, Whittington and McClelland (1992), attributed the decision to build water storage in Egypt in a very hot environment is more related to the idea of Arab nationalism than other considerations. Moreover, the different Egyptian water resources management policies offer no option for the loss of water from the Aswan High Dam, as 'national security' is more important than the physical saving of water, which is lost to evaporation (Cascao, 2019). On the other hand, the Egyptian diplomat[20] on the subject of where to store the Nile water stated that judging the issue from water conservation alone is a mistake and other considerations need to be factored in including the context of Cold War in the period. Thus, no water policy document questions the rationality of the decision to store the shared water resources of the Nile in the middle of the desert. Moreover, though the 2005 NWRP water policy document recognizes the need to invest in the water sector to reduce the loss of water during the distribution of river water, so far little investment has been made to address the problem of water wastage during distribution (Barnes, 2014).

In line with the views of Ethiopian scholars, studies by Barnes (2014) and Mason (2004) indicated that the decision to store the Nile within Egypt was only for security concerns. The gigantic size of the dam exposed an estimated 10–12 BCM of water to evaporation loss (Barnes, 2014: 56; Mason, 2004). In addition, the reservoir could store the annual inflows without difficulty if the previous stores were used properly, without the need to divert the water through spillways in the event of high inflows, as was the case in 1998 and 2007, when the reservoir filled beyond its maximum holding capacity (Barnes, 2014: 56).

The wastage of the Nile water resources begins when the Nile water enters the High Aswan Dam. When good rains occur in the Nile source region, a huge volume of water reaches the

[20] Interview with Egyptian diplomat, May 5, 2020.

country, sometimes more than the carrying capacity of the gigantic dam, as was the case in 1998 and 2007, when the Egyptian authorities spilled over into the western desert through a spillway built in 1978. According to Barnes (2014: 53), the water diversion to the western desert's series of depressions has formed the Toshka Lake, which is about a third of Lake Nasser in size, holding about 25.3 BCM of water in 2001, which later diminished over time until again the authorities diverted the water to the desert in 2007 since the country received a large amount of water as a result of high rainfall in the Nile source regions.

Barnes (2014) also revealed that the Egyptian authorities discharge such huge amounts of water into barren land with no economic benefit to the nation. This shows the widespread wastage of water in Egypt, not only when it is supplied for different uses through the extensive networks of water canals, where officials invest little in water-saving technologies. The neighbor of Egypt to the north, Israel, is known for the widespread use of water-conserving technologies and practices that enable them to utilize scarce freshwater resources efficiently. Surprisingly, the Egyptians have been mismanaging such a huge volume of water within the country while they have been fighting hard and using every resource they have to prohibit other riparian states in the basin from utilizing the Nile while they waste and mismanage resources at storage facilities, in the irrigation fields, and in the municipal water supply systems unrestrained.

Oestigard (2012) and Barnes (2014) underscored the inability of Egypt to conserve the Nile water that inflows into the country. An expatriate who works in the Egyptian Ministry of Water Resource and Irrigation (MWRI) comments on the situation in the following ways: "Egypt's big challenge is how to store the water. Egypt can't store as much water as it gets" (quoted in Barnes, 2014:54). This assessment of expatriates working in the Egyptian water sector indicates the misuse and wastage of water resources in the country. The water expert communities—expatriates, scholars, and local water managers—concluded that the current operation of water management in the country has sacrificed the efficient utilization of water for political reasons (Sherif, 2014).

This mismanagement and wastage of water in Egypt occurs in storage (Barnes, 2014) and distribution channels because of seepage and blockage (Sherif, 2014). Jessica Barnes (2014), who extensively studied water politics with her work entitled "Cultivating the Nile: The

Everyday Politics of Water in Egypt," reported that the top authorities in the Ministry of Water Resource and Irrigation (MWRI) are trying to instill the perception of water scarcity as "they may not be able to provide in the future" (Barnes, 2014: 52).

In Egypt, there has been a culture of water misuse and waste in their dams and irrigation systems. As a result, billions of cubic meters of water have been squandered in Egypt. An estimated 10-12 BCM of water was lost to evaporation from the Aswan High Dam and 2 BCM from the extended irrigation networks throughout the country (Mason, 2004: 111). Despite the extreme dependence of the country on the Nile River as a sole source of fresh surface water, the country has so far misused hundreds of millions of cubic meters of water in its irrigation system. When one looks at the Egyptian water use efficiency in the irrigation system, it is found to be very archaic (Swain, 2011).

According to Elmam (2010), Egypt's 2005 National Water Resources Plan (NWRP) was developed to deal with the challenge of water problems through the way leaders in water sector management handled the matter and the incorporation of an integrated water resource management (IWRM) approach. He further noted that the plan made a paradigm shift by focusing not only on the physical aspect of the water system but also on "users and institutions as part of the water resources system" (Elmam, 2010:219). Despite the claim that Egypt reached its population cap because of the limitations posed by water, the 2005 NWRP called for a conservation scheme in the White Nile River to increase the supply of Nile water to Egypt outside the country. Despite the fact that Ethiopia is the source of the majority of the Nile water, the document overlooked the idea of conserving the Nile water that originates from Ethiopia.

According to Elmam (2010), the cooperation of the basin countries is important because it allowed Egypt to reclaim swampy areas all along the river basin to generate additional water resources for Egypt and build the technical capabilities of the upstream states. In his own words:

> Cooperation in the Nile basin has become essential. For downstream countries, conserving water and harvesting water wasted in swamps, for instance, might be seen as the most important issue. For upstream countries, modern facilities and technical expertise would enable them to use their available water resources more efficiently. Egypt has an important role to play as a major downstream state and as

> an important provider of the technical abilities that have accrued through unrivalled experience in the relevant fields (Elmam, 2010:224).

However, the reclamation of swampy areas and technical support for upstream states are not enough to face the challenge in the basin. Indeed, that could probably increase the availability of more water for Egypt temporarily. The problem is much more complicated than this to ensure the sustainability of the Nile River. If all the concerned stakeholders do not invest in fighting drought and land degradation in the Ethiopian highlands, the springs and streams that feed the tributaries of the Nile will gradually dry up, resulting in a reduction in the volume of water that reaches Egypt.

The 2005 Egyptian NWRP was more interested in the conservation of the water in the Equatorial Lake Region and swampy areas all along the basin. However, the threat to the river because of human action and climate change that could affect the flow regime by changing the rain pattern and expanding drought in the region is not a concern of the policy. The availability of water in Egypt depends on the fall of rain elsewhere, like in the Ethiopian highlands. The expansion of drought in the region and degradation of the environment, coupled with climate change, pose uncertainties for the flow regime in the basin. Moreover, such erratic rainfall in the basin reduces the dependence of farmers on rainy seasons, leading to the development of dams to produce food for local consumption. Thus, Egyptian water policy and plan should also take into account those facts on the ground in addition to investing in technologies and practices that increase water use efficiency at home.

According to my informant[21] from IWMI who worked in Asia, countries like Egypt have to make water conservation a national mission, as other countries like India and China have adopted water conservation measures through policies and other regulatory mechanisms to cope

[21] Interview with an IWIM expert who worked in developing countries, particularly in Asia, on March 24, 2020.

with the reality of water shortages. Countries like Egypt, which is dependent on the Nile, which originates outside its territory as the major source of freshwater, have to adopt water audit strategies for each sector of the country and make water conservation a national mission if that nation is to survive in the era of climate change and increasing competition from the expanding economies, urban, and growing population, as well as the growing demand from the co-riparian states to use the resource for their own development goals.

He further noted that many water-scarce countries have adopted different policy instruments to conserve water. Among many water policy instruments, these are notable ones that many adopted to conserve water loss in the different water-using sectors: water auditing, tagging high charges, enforcing to fit water-saving gadgets, modernization of the irrigation sectors, replacing water-intensive crops with less water-consuming crops, and creating awareness among the water-user communities. Moreover, the desire to conserve water demands a paradigm shift in water governance, including the inclusion of IWRM and replacing the management style from a top-down approach to a bottom-up approach.

Even though the water policy documents of Egypt, particularly the 2005 NWRP, incorporated most of these policy instruments, it has been struggling to enforce these policies to conserve water in the country. There are areas where the policy instruments contributed towards water conservation, like changing cropping patterns and collecting irrigation water from the irrigation fields through drainage networks for reuse. The 2014 Egyptian constitution, which commits the Egyptian state to environmental sustainability, is one such example of how the states in the region are concerned about the efficient utilization of resources (Sherif, 2014). Despite the claim that the Egyptian constitution's commitment to efficient utilization of resources has led to no meaningful investment in water-saving technologies, except for the reuse of drainage water for different purposes, it is only agri-investors who applied water-saving technologies to the irrigation fields, which constitutes an insignificant proportion in comparison to individual farmers who have no capital means to adopt water-saving technologies to their fields (Barnes, 2014).

Egypt's water policy, which gives priority to more water supply through cooperation with the source countries and some engineering solutions like the Jongeli Canal construction, won't bring

a long-term solution to water challenges in Egypt. Mason (2004) argued that the implementation of the Egyptian water policy enabled the country to meet its water needs up until 2020 without much difficulty. Still, the policies of demand management and investment in water-saving technologies offer far more alternatives for Egypt. On the other hand, unlike the model of Keller et al.(1998), which argued that once the country's policy intervention to conserve the water failed, it should consider what they call 'water augmentation' projects like river basin transfer, sea desalinization, or water import through virtual trade.

4.3. Nile Water Use and Conservation in the Sudan and South Sudan: Impacts of water laws and policy

4.3.1. The Nile water management context in Sudan and South Sudan

This section reflects water use and management regimes in both the Sudan and South Sudan republics, which seceded from the former in 2011, ushering in the formation of new states in the Horn of Africa. Indeed, the secession of South Sudan from the Republic of Sudan ushers in a new era of geopolitics in North East Africa, including the Nile Valley. It created another dimension to the Nile hydropolitics and attracted the attention of the major Nile states. Water has remained central to Sudan's politics. However, the 2005 Comprehensive Peace Agreement (CPA), which ended the longest civil war on the African continent, has yet to address the Nile issue. Indeed, this fact continues to affect relations between the two countries and Nile water management as a whole (Berouk, 2015). Thus, the section discusses water use regimes before July 2011 and then afterward, when the country was divided into two states.

The majority of Sudan's water resources (77%) originate outside the country. According to UNEP (2007), the total renewable flow of water in Sudan (both north and south) is estimated to be 149 BCM/year, of which 80% originates outside the country, i.e., 119 BCM, and only 30 BCM is produced internally from the rainfall. The Nile is an important water resource for the Sudanese population, as the majority of the country's population lives within the Nile valley and its tributaries. The country's water management has still emphasized the enhancement of water supply, with limited recognition of increasing water use efficiency, though the Sudanese water

policy sets water efficiency as one of its objectives (Mason, 2004). The Sudanese diplomat[22] in Ethiopia openly outlined the multiple challenges the country's water management has faced. The challenges include high sedimentation rates in the canals, reservoirs, and dams. The country's reservoirs lost 50% or more of their water-holding capacity. The infestation of canals with weeds and Nile tributaries with water hyacinths, the uneven distribution of precipitation, poor irrigation water utilization, and low investment in water technology are some of the challenges the country is struggling with. Moreover, the fragmentation of government institutions and the inability to enforce water regulations that encourage water saving in the country are the other challenges the country struggles with. He further noted the inadequacy of the regional governance regime to deal with common challenges that affected Sudanese reservoirs and canals.

The Sudan has been the land of attraction for foreigners during the period of the Scramble for Africa and before that. Mohammed Ali of Egypt and the Egyptian elites viewed Sudan as one of their provinces, which should be brought under the control of the country as a broad strategy to control the Nile water through a doctrine of Nile Valley unity. During the Anglo-Egyptian condominium rule, most of the water laws and policies evolved. During that period, most of the laws and policies emphasized controlling the Nile for development purposes, a policy that continued after the independence of the country. However, following the discovery of oil, the water sector was neglected only until the South seceded, and following the secession of the South, the water sector was revitalized as a critical factor for economic growth strategy (Salman, 2011b). Indeed, the country's water use policy gives little attention to the issue of water conservation. In Sudanese water reservoirs like Jebel Aulia, up to 50 percent of the water lost to evaporation from the reservoir, undermining pump irrigation along the reservoir (Mason, 2004).

The newly formed Republic of South Sudan, though it has adopted a water policy, has not started the extensive utilization and management of water as the country faces political instability following its independence. However, the geographic location of the country made the country an important Nile state, whose commission and omission affected Nile use and management issues (Berouk, 2015).

[22] Interview with Sudanese Diplomat based in Ethiopia, February 13, 2020.

4.3.2. Water Governance in Sudan during the Colonial and Post-Colonial Period

The Sudan is a larger country with a lower population density, less than 10 people per km2. From this, more than two-thirds of the land lies within arid or semi-arid zones with low precipitation. The country's rainfall is unreliable and varies considerably from one year to another. As a result, the country relies heavily on irrigation to produce crops for food and export. In Sudan, though the population density is low, more than 50 percent of the Sudanese population lives in the area adjacent to the Nile and its tributaries. This area, which supports more than half of the Sudanese population, accounts for only 15 percent of the total Sudanese area. Given the present and future water use plans, this physical water is not sufficient to meet future demand with the growing population and economic activities. According to Frenken (1997), the country's water has suffered from inadequate storage facilities, low investment in the abstraction of groundwater, and access to alternative sources like conservation of seasonal streams, sedimentation of the storage, and canals. The country's storage facilities can store only 20 percent of the Sudanese water demand, with their carrying capacity dwindling over time (Adam et al., 2017).

The flow variability indeed requires the development of storage facilities on the Nile system and non-Nile streams, which account for 7 BCM of Sudan's water resources. Storage facilities are in great demand in the country to deal with water shortages during the dry season. Thus, in Sudan, the lack of adequate storage facilities is a serious problem that affects the economic progress of the country. Since the water facilities store inadequate water for the dry season, irrigation activities are negatively affected during this season. The water harvesting of the seasonal run-off and wadis has yet to be developed in the country to be utilized during the dry period. In fact, in Sudan, rainwater harvesting has been the tradition of the Sudanese in the water-scarce areas, though such traditional facilities experience failure and low hydraulic efficiency. The Nile issue has not yet settled with South Sudan and also allows Sudan to compromise and reach an agreement with Ethiopia over siltation problems (Salman, 2011b; Ali, 2003).

The Sudan utilized 91 percent of its available freshwater resources for irrigation, 2 percent for domestic uses, 6 perecent for livestock and the remaining 1 percent for other uses (FAO, 2021).

Khairy et al. (2019:244) estimated the total water loss from the Nile alone through evaporation to be around 4.80 BCM annually. In the other reservoirs, for instance, Jebel Aulia, which stores about 5.5 BCM, an estimated 2.86 BCM was lost to evaporation, indicating a high rate of water loss in the Sudanese storage facilities (Khairy, 2019: 244). Thus, any effort that aims to save water in Sudan should give much emphasis not only to the irrigation sector as the lion's share of the water withdrawn is used for irrigation in the country but also address water loss from reservoirs.

The Sudan has a serious problem with floods and droughts, which affect the country frequently. The flood caused widespread loss of property and damage to irrigation and drinking water facilities. Moreover, the floods that affected the country caused water-related health problems and disruptions of social and economic activities in the country. On the other hand, the expansion of droughts towards the south has multifold impacts that range from environmental degradation to the disruption of social and economic activities. In the country, climate change and population growth contributed to the intensification of droughts (Mahgoub, 2014).

The first Sudanese water legislation was enacted in 1939 as the Nile Pump Control Act during the colonial period. It served as the main piece of water management legislation in Sudan until the 1995 Water Resource Act. In the Sudan, ten fragmented laws were enacted, mostly in the post-independent Sudan, to govern Nile use and management. The 1960 Water Hyacinth Control Act, the 1975 Environmental Health Act, and the 1990 Irrigation and Control Act have made significant contributions to water use efficiency, protection, and prevention of water loss. The other laws that dictate water use in the country include the 1950 River Transport Act, the 1954 Freshwater Fisheries Act, the Public Health Act of 1975, and the 1980 Regulation of Inland River Navigation Act. However, Sudan adopted a comprehensive legal regime that coordinates water use and management in 1992 (Taha, 2010).

In general, three overlapping legal regimes govern Sudanese water use and management: First, the 1939 Nile Pump Control Act and its regulation of 1951; the second legal regime that regulates irrigation and drainage water was the 1990 Irrigation and Drainage Act. The second legal regime complements the first legal regime, which aimed to control the pumping of water from the Nile and its tributaries. However, the second legal regime broadened its scope to

include drainage and also made changes to the organ that runs the implementation of this law, the Board, chaired by the Minister of the People's Local Government, an entity that no longer exists. As a result, this authority was transferred to the Ministry of Irrigation and Water Resources (MOIWR) to implement the new legal regime. The third regime that evolved to govern water resources in Sudan is the 1995 Water Resources Act (Ali, 2003).

Even though the third legal regime repealed the 1939 Nile Pumps Control Act, the 1951 Regulation and the 1990 Irrigation and Drainage Act have remained intact. Moreover, the third legal regime is more comprehensive than the previous legal regimes, which apply to the Nile and its tributaries as well as, for instance, in the area of coverage; unlike the 1939 Nile Pump Control Act, which focused on the use of water for irrigation alone, the new law is comprehensive in the sense that it applies to all water resources and the use of water for all purposes, not just agriculture. Thus, in Sudan, three major legal regimes govern water use and management (Ali, 2003).

The proposed water policy review shows the inconsistency and overlapping power of local and federal governments in the country. According to the 1990 Irrigation and Drainage Act and also 1995 Sudan's Water Resources Act, the power to issue licenses for pumping water was given to MIWR. However, the 1951 Regulations still bestowed the power of issuing licenses to pump the Nile water on the local authorities. The new proposed Sudanese national water policy, while conceding the gap in water use efficiency, also recalls the huge potential for saving water in the county. Conserving water in irrigation agriculture can be achieved through various measures, such as maintaining conveyance canals, removing weeds, and enhancing water application in irrigation fields. These efforts help save water and promote water conservation. The effort to reduce water misuse and wastage should also apply to the water that goes for domestic and industrial use by tackling the problem of seepage and the limitations of wasteful practices in the country (MOIWR, 1999).

According to a South Sudanese scholar[23] who used to work at Khartoum University before the independence of South Sudan, these laws and regulations helped little in avoiding wasteful Nile

[23] Interview with a South Sudanese scholar who used to work at Khartoum University and moved to Juba University after the independence of South Sudan on December 10, 2019.

water use practices. Moreover, according to the views of the Sudanese water officials, there is a widely held belief that the country has not yet used its quota of Nile water, and they worry little about investing to address water mismanagement in the country. The scarce funding to introduce water-saving technologies in the conveyance system and the effort to rehabilitate old irrigation canals are also an uphill task for water authorities to initiate water conservation in the country.

Most development programs were geared towards North Sudan, abandoning the South both during the colonial and postcolonial periods. Most of the water developments were undertaken in the North, despite the recognition of the South's potential for irrigation by colonial authorities (Verhoeven, 2015). Even those projects identified to enhance the water supply through the construction of canals were not considered for the environmental and economic interests of the South Sudanese population. The water holding capacity of the water reservoirs in Sudan is not more than 17% of the 1959 Sudan-Egypt agreement (Mason, 2004). To address this gap, the Sudanese government has embarked on different measures, like the heightening of the existing reservoirs and the construction of new reservoirs.

4.3.2.1. Water Governance during the Colonial Rule

The British, which control the downstream regions of the Nile Valley, make vital decisions and policies with regards to Nile water use. The British colonial authorities had the view that the over-year water storage for constant flow to Egypt could be achieved with the damming of the upstream lakes to secure the regulated flow for Egypt. In Sudan, as part of this strategy, they began the construction of the Sennar dam in 1918 to provide Egypt with a regulated water supply, as well as the use of water for cotton development in the Gezira scheme. The desire to meet the demands for raw material through the growing of cotton in the Sudanese plains influenced the British water policy in Sudan (Taha, 2010). The first regulation that governs the use of Nile water and its tributaries was enacted in 1939 as the Nile Pump Control Act, which attempts to introduce Nile water use regulations. Under this act, the 1951 Regulations were enacted with an emphasis on granting permission for water use licenses to users that withdraw water from the Nile (Ali, 2003).

The Sudanese diplomat[24] in Ethiopia has a view that the British water policy in Sudan emphasized the unimpeded water flow to Egypt in addition to the development of agricultural commodities for the home industries by growing cotton. To satisfy the Egyptian need, the British signed an agreement on behalf of Sudan concerning the terms of Nile water use, in which the British offered the Egyptians the overriding authority to approve or disprove water projects on the Nile in Sudan in 1929. Thus, Egypt was given the power to veto water development projects in the Sudan. Despite the veto power of Egypt over water development matters in the Sudan, modern irrigation schemes have been expanded in the country. The 1929 water agreement prohibited Sudan from withdrawing water from the Nile during the low season, which extends from January to mid-July.

He further noted that the 1929 agreement unfairly allocated the water for Egypt based on the principle of the acquired right claim, in which it allocated 48 BCM for Egypt and 4 BCM for Sudan. In support to the view of this Sudanese diplomat, Taha (2010: 187) reported that the British imposed another restriction on the Sudanese water use regimes: "from 15 July to 31 December, without limitation; from 1 January to 28 February, enough to irrigate 38,500 *feddans*; and from 1 March to 15 July, enough for 22,500 *feddans*". According to the diplomat, the Sudanese resented this agreement that limited their aspiration to use Nile water and sought better terms through renegotiation. The Sudanese resentment and rejection of the 1929 agreement resulted in the renegotiation and improvement that gave the Sudan better terms with the 1959 agreement.

A hydrologist[25] from South Sudan contends that the British colonial authorities had better managed the Nile water than post-colonial Sudanese authorities. They installed experts for managing the water and also undertook periodic maintenance.The colonial authorities had undertaken not only the construction of dams but also the construction of canals in phases to expand the irrigated area. Accordingly, irrigated agriculture had expanded from the original planned 500,000 *feddans* to 667,000 *feddans* by 1931 and 876,000 *feddans* by 1944. After the

[24] Interview with Sudanese Diplomat based in Ethiopia, February 13, 2020.

[25] Interview with South Sudanese hydrologist who worked in the Sudanese Ministry of Water Resources and Irrigation for more than two decades now work as a lecturer at Juba University on December 10, 2019.

dam construction and canalization, an agency that runs the water control and maintenance of the canals was set up. Thus, this agency was responsible for governing water use and management at all levels and also for the maintenance and clearing of the silt canals. It governs the system from the Sennar dam regulation to the application of water in the Gezira fields (Taha, 2010: 184).

Mahgoub (2014) contended that the Geziera Scheme not only supplied raw materials for British textile industries but also contributed a lot to the economic development of Sudan. The revenue from irrigated agriculture filled the government's coffers and served as an important source of foreign exchange for the country. The livelihood of millions of Sudanese people also depends on working in the fields of the scheme.

The second project that was realized during British colonial rule was the Jebel Auliya dam, which was dubbed the 'Egyptian reservoir' (Taha, 2010: 184) and was constructed to provide regulated water for Egypt during the low seasons so that it would support irrigation agriculture in Egypt. The dam caused livelihood disruption and the dispossession of the land in the area. Even though the dam was constructed as a water reservoir for Egypt, modern irrigation flourished using the water from the dam. It also contributed to the expansion of the Gezira scheme in Sudan. Hence, the relevance and importance of the dam continue to exist, though Egypt no longer relied on the dam for its water security after the building of the Aswan High Dam within its territory. The irrigation activities around the dam have forced Sudan not to abandon the reservoir, despite the decline of its importance for Egypt. An estimated 200,000 ha of land is cultivated using the water from the dam (Mahgoub, 2014).

4.3.2.2. Water Governance in the post-independent Sudan

This section elucidates the evolution of Sudanese water governance in the post-independence period based on the evolution of water laws and policies in the country. The 1999 draft National Water Policy categorizes the country's water governance as pre-1992 and post-1992. The year 1992 was considered a landmark because, before that date, laws and policies that govern water use and management were scattered across different sectors. It was with the 1992 National Comprehensive Strategy for Development (1992–2002) that legislation and laws that deal with the governance of water resources were brought under this document. Therefore, the post-1992

water legislation is comprehensive and paved the way for the preparation of the draft Sudan National Water Policy (MOIWR, 1999).

Colonial-era water use and management legislation and policies highly influenced post-independent Sudan's water governance. Post-independence Sudan had inherited colonial-era water development plans, policies, and legislation. Moreover, the colonial-era hydropolitics of Sudan's water development were influenced by colonial-era treaties with Egypt, like the 1929 agreement. According to this agreement, Egypt was granted the veto power to approve or reject water development projects in the country (Taha, 2010).

Accordingly, the leaders of independent Sudan aggressively embarked on water development projects. They emphasized the implementation of a colonial-era water development plan with an accompanying expansion of the irrigation scheme. However, the 1929 water agreement required the approval of Egypt to realize this goal. As a result, the new leaders demanded new negotiations over using the Nile with Egypt (Mahgoub, 2014). The Sudanese diplomat[26] in Addis indicated the focus of the post-independent Sudan was to enhance water infrastructure, and the issue of efficiency and environmental consideration received little attention. The Sudanese focus on water supply enhancement in the post-independent period, thus the hydraulic mission, though it seems to abate for a brief moment during the oil boom season in the late 1990s; the heyday of the oil economy came to an end with the withdrawal of South Sudan from the country in July 2011.

The informants at IWIM and ECA also shared the views of the Sudanese diplomat that the focus of the post-independent Sudan is on the expansion of hydraulic infrastructures with less attention to the life span of the dam due to siltation problems from the Ethiopian highlands (IWIM expert, March 23, 2020; ECA Staff, February 22, 2021). Similarly, previous studies conducted by Wallach (1988) and Elgilany et al. (2007) underscored the focus of post-independence Sudan on the expansion of irrigation farms and water storage facilities. In post-independent Sudan, irrigation agriculture continued to hold its centrality. The irrigated field has kept growing. The size of the irrigated land had grown from 2 million *feddans* before independence to 4 million *feddans* in the second half of the 1980s, with a plan to further extend the irrigated area mainly

[26] Interview with a Sudanese diplomat based in Ethiopia, February 13, 2020.

through donor support. The Sudanese political economy heavily relied on irrigated agriculture as the main source of foreign exchange and also supported the non-agricultural economic sectors up until the discovery and pumping of oil in 1999. Irrigation agriculture has not only expanded through the development of major water reservoirs but also through the extensive network of pumped irrigation mainly run by the private sector (Wallach, 1988). As a result, the irrigated area in the country had grown from 1.48 million hectares in 1961 to 3.7[27] million hectares in 2002 (Elgilany et al., 2007:3).

The other two projects undertaken after the independence of Sudan were the Kashm El Girba dam on the Atbara and the Roseires reservoir. The Kashim El Girba dam was the only Sudanese water infrastructure built outside the White and Blue Nile rivers. Despite the high expectations laid on the project to cultivate the fertile clay soil, the dam lost a third of its water storage capacity within the first decade of its construction. By the end of 2010, it had lost 60% of its storage capacity. The South Sudanese scholars stated that the Sudanese policy to deal with the siltation problems in most cases involves the flushing of the dams, which has its drawbacks and causes, including the destruction of fish stocks (Interview with South Sudanese with hydrology and International Relations backgrounds, 2019). Studies by Taha (2010: 195) even documented that an estimated 300,000 metric tons of fish are lost every year due to the flushing of the dams. These scholars believe that the Sudanese measures only provide a temporary solution rather than a lasting one and suggest that a lasting solution could only be achieved with cooperation with Ethiopia.

The Republic of Sudan has four major water reservoirs on the Nile system. However, the water-carrying capacity of the reservoirs has declined from time to time due to siltation. The carrying capacity of these four major reservoirs was reduced from 8.73 BCM to 6.9 BCM due to the effect of the siltation (Swain, 2008: 205). In response to this challenge, the Sudanese government adopted measures that ranged from the heightening of the reservoirs to trying to clean the silt storage of the reservoirs. This challenge harms the water supply to the irrigation fields, where 70% of the country's population relies on irrigation agriculture (Swain, 2011: 694). As the

[27] According to Swain (2011:694), the figure of cultivated land through irrigation systems has never exceeded 1.9 million hectares in the Sudan. This shows the lack of reliable data regarding the size of irrigated land in Sudan.

informants implied above, all these measures have temporary solutions; without tackling them through joint measures, unilateral action seems inadequate to deal with this water management problem in Sudan.

Table 4.2 Sudanese Dams and their storage capacity

Dams	Year of completion	Utilization	River	Original Storage Capacity(Km^3)	Present Storage Capacity (Km^3)
Sennar	1925		Blue Nile	0.93	0.37
Jebel Auliya	1937	Regulate Flow	White Nile	3.50	2.54
Khashm El Girba	1964	Irrigation	Atbara	1.30	0.60
Roseires	1966	Irrigation and HEP	Blue Nile	3.00	2.20
Merowi	2009	Hydro Electric Power	Main Nile	-	1.25

Source: Adapted from Taha, 2010: 194

In the Sudanese irrigation fields, a huge amount of water is lost during the distribution and application of the water to the fields, indicating water use inefficiency in the country. According to the FAO (1999) estimate, 15 percent of the water is lost during distribution, 25 percent is lost during the application of the water to the irrigation fields, and another 15 percent is lost because of different sectors, implying that only 45% of the irrigation is effectively utilized to grow crops in the country. The Sudanese diplomat (February 13, 2020) conceded that despite the desire to enhance water use efficiency in the country, expressed through the various water-related legislation and policies, the country still struggles to reverse water mismanagement in the country. On the other hand, South Sudanese scholars (2019) stated that instead of improving water use efficiency, the Sudanese government prefers to make investments in projects that enhance the country's water supply.

In the Republic of the Sudan, agricultural policy determines water use patterns more than other factors. Irrigation agriculture is by far the most extensive use of water withdrawn in the country. For instance, cotton production, which serves as the main export commodity, has dominated the country's irrigation since the advent of colonial rule in the late 19^{th} century. Thus, the Sudanese agricultural policy depends on the ever-expanding of this important export commodity until the policymakers decide to reduce the cotton plantation area and shift to the production of cereals to achieve the goal of food self-sufficiency in 1997 (Mahgoub, 2014).

The ECA staff[28] stated that in Sudan the importance of irrigation agriculture has grown because the country has abundant land that is conducive to agriculture, but also new trends on the ground necessitate the expansion of irrigated land in the country. According to Sullivan and Nasrallah (2010: 9), “Sudan’s northern desert boundary has shifted 50 to 200 kilometers south since the 1930s and average precipitation levels have dropped 40 percent since the early 1980s, resulting in less pasturage and reduced agricultural productivity." Thus, to cope with these challenges and to provide food for the ever-growing population, the expansion of irrigation agriculture has no substitute in Sudan.

However, the shortage of irrigation water to grow water-intensive crops like cotton also led policymakers to consider reducing cotton production to achieve the goal of food self-sufficiency. The new agricultural policy, introduced in 1997, favored the production of wheat and sorghum with a lower water requirement than cotton production, which relatively consumes more water. The policy shift thus helps both the idea of addressing the water shortage problem and also helps to attain the goal of greater food self-sufficiency in the Sudanese agricultural policy (FAO/EWSFA, 1997).

According to an ECA expat (February 22, 2021), this fragmented policy reaction to the water management challenges appears inadequate to deal with the problems of desertification and water mismanagement during storage, distribution, and application to the irrigation fields. Moreover, the response lacks strategic insight, as most of the water resource management problems in Sudan cannot be addressed without cooperation with upstream states, particularly Ethiopia. Despite the successive post-independent Sudanese governments' recognition of the fact that water is a limiting factor for exploiting the agricultural potential of the country, none of them have taken policy or legal measures that save water. They neither invested in water-saving techniques nor in maintenance works that could have saved water wastage for domestic use.

Sudanese irrigation agriculture consumes 94 percent of the total water withdrawal in the country. The four major irrigation schemes in the country consume more than 60% of the irrigation water.

[28] Interview with ECA staff who work on water resources management including in the Nile basin on Feburary22, 2021 at Addis Ababa.

The Gezira scheme alone consumes about 6-7 BCM of Nile water (Adam et al., 2017: 041). Moreover, the country's water reservoirs are inadequate to store sufficient water for an extended period. The storage capacity of the reservoirs keeps deteriorating as a result of siltation problems, though mitigation efforts were taken to lessen the adverse effects. However, according to Frenken (1997), if all the water available in Sudan is allocated to irrigation agriculture, foregoing the other sectors, the available water in the country can develop only less than 5 percent of the irrigable land in the country. This shows the need for conserving water and the development and use of non-conventional water resources through investing in the treatment of sewage water from industrial and urban effluents and means to reuse drainage water from irrigated fields (Ali, 2003).

According to ECA staff (February 22, 2021), in Sudan, government documents and public debates barely emphasized the saving of water, but the ways to exhaustively utilize what had been allocated to the country by the 1959 agreement or the unfairness of the agreement towards Sudan, except the new draft policy that was proposed in 1999. In the country, the voice for water conservation has been so thin so far. This is because of the country's focus on various pressing matters, including political instability and international pressure. The successive Sudanese government development agenda relies on water development. They emphasized the development of water projects to achieve the expansion and development of agriculture. As a result, the country's water legislation and policy give little attention to water conservation. In addition, water conservation measures demand the allocation of resources for the rehabilitation of conveyances, the replacement of more improved irrigation technologies that reduce the loss of water during field application, and the expansion of drainage infrastructures that collect irrigation water for reuse, which the country can barely afford.

The Sudanese Ministry of Water and Irrigation receives the responsibility to protect and conserve the water resources of the Nile in addition to increasing the supply of water through the implementation of water projects that help expand irrigated lands. The ministry is also responsible for the operation and maintenance of large-scale irrigation schemes as well as the domestic use of facilities. The protection and conservation of the water and its environment are also bestowed on this ministry (Ali, 2003). Taha (2010: 192) concluded that since the independence of Sudan, none of the Sudanese water institutions have accomplished their

responsibilities because of a "lack of economic and organizational capacity, inadequate planning, civil war, and the priorities of successive governments.

The Sudanese diplomat (February 13, 2020) contended that after the 2005 accord and following the independence of South Sudan, irrigation agriculture took on a central role as an engine of economic growth in the country. Long before the diminishing oil revenue, the Sudanese government sought to diversify its income sources beyond oil. According to Verhoeven (2015:5), “the hydro-agricultural mission” remained the core of the Al-Beshir government's economic policy. Verhoeven (2015:5) further noted that "water is a central node of a whole range of state-building activities.” The government also showed its commitment to this hydro-agricultural mission with its shelved plans and in its draft new policy.

Unlike the previous legislation and policies, the post 1999 draft policy calls for water use efficiency and also clearly states the strategy to achieve the water-saving goal to meet the presumed future demand of the country. For now, the country has emphasized the enhancement of water supply projects that enable the country to store its water. The proposed policy document hardly mentioned ways to deal with water losses due to the high evaporation rate (Mason, 2004). As part of the water conservation promotion, there has to be a means to deal with the high water loss, which probably includes the decommissioning of reservoirs like Jebel Aulia to save water in partnership with neighboring countries to replace the lost water when the wasteful reservoir gets decommissioned. Tesfa (2013), for instance, implied that the construction of water reservoirs like GERD made the importance of reservoirs like Jebel Aulia irrelevant, as most of the precious water resources were lost to evaporation from the surface of the water impounded behind the wall of the reservoir. Collaboration and joint projects with South Sudan also offer Sudan and Egypt the opportunity.

4.3.3 The Nile Water Governance Challenges in the Sudan

In Sudan, Nile water governance has multiple challenges. The geographic location of Sudan as a central state through which all the Nile water passes and the Nubian aquifers, which are shared among Sudan, Libya, Egypt, and Chad, made the Sudanese water policy an international policy framework to govern the shared resources. Accordingly, Sudan established a joint advisory committee with Ethiopia for information and also for bilateral efforts that include watershed

management, hydropower interconnection, and wildlife protection, among others. In the same manner, preparations are underway to extensively investigate and jointly manage the Nubian aquifer in association with Egypt and Libya (Idris, 2016).

However, Sudan international cooperation shows policy fluctuations based on the regimes that assume power in Khartoum and Addis Ababa, and also their relations in non-water issues have impacted their relations in Nile water governance. After the EPRDF came to power in 1991, Ethiopia and Sudan enjoyed a cordial relationship, but the friendship was severed after the attempted assassination of the Egyptian president in Ethiopia in 1995. The episode made the relations severe up until 1998, when the two countries normalized their relationship. Since then, the two countries have jointly worked on a common agenda that promotes cooperation between the two countries (Medhane, 2004). This marks Sudanese policy shifts and support for Ethiopia's Nile project, like the GERD, though Sudan started to oppose the Ethiopian project and also severed its relations with Ethiopia after government changes in Ethiopia and the Sudan. The current Sudanese coalition government adopted a pro-Egypt policy and changed the decade-old Sudan policy towards Ethiopia. According to Kalpakian (2015), Sudan's interests were best served when it aligned its policy with Ethiopia.

The Sudanese scholar, Ali (2003), asserted that in the era of globalization, national water policies for international rivers like the Nile have to take into consideration the international nature of such resources. The newly proposed Sudanese Water Policy (which has not yet been approved) also recognizes the importance and desire of the Sudanese state to cooperate with the neighboring states over the development and protection of the Nile as long as that cooperation does not undermine its sovereignty (AfDB, 2015).

The country's water policy underscores the need to tackle water-related disasters first by establishing an institution that deals with disaster management and prevention, and second, it calls for the need to coordinate efforts with neighboring countries to prevent and effectively deal with the challenges of floods and droughts in the country. The other issue where Sudan requires regional cooperation is the mitigation of the impacts of floods and droughts. Such regional cooperation over transboundary problems demands the establishment of institutions to monitor developments through early warning systems in order to mitigate the impacts it caused not only

in the Sudan but also across the region. Regional blocks like IGAD could have played a vital role in dealing with these kinds of problems in the Eastern Nile basin and beyond. Unfortunately, there are rare cases where IGAD has dealt with these problems of the early warning system and public preparedness in the Eastern Nile basin (Tawfik, 2019).

It is difficult to overcome the siltation problem through some intervention measures, like flushing the reservoirs during the rainy seasons. This intervention has not saved the dams from losing their water-holding capacity. The above table 4.2 shows how the dams in Sudan lost their water-holding capacity over the course of time. The attempts to mitigate the siltation problems in the Sudanese reservoirs continued to worsen despite the intervention, thus demanding an alternative solution that can address the problem on a long-term basis (Mahgoub,2014). Unlike Egypt, Sudan still continues to suffer from drought and flooding. These challenges alone cannot be addressed without cooperation with Ethiopia. The effort to deal with these challenges demands the cooperation of Sudan with Ethiopia, as most of the silt originates from Ethiopia. To deal with the root cause of the problem, Sudan demands a bilateral cooperation framework that extends beyond energy cooperation and tackles the problem at its origin (Ali, 2003).

The investment in the environmental restoration program not only helps the recovery of degraded lands and thus the reduction of sediment loads, but it also helps the watersheds retain rainfall that falls during the rainy season (Whittington and McClelland, 1992). Indeed, such investments would not only arrest the deforestation of the Nile basin, but they may also create alternative livelihoods so that the affected ecosystems can fully provide their ecological services.

The idea of environmental protection in Ethiopia should also attract other beneficiaries of the Nile water on its bandwagon, as such interventions also help the sustainability of the Nile and help to mitigate the impacts of climate change in the future. The environmental protection program in the Ethiopian portion of the Nile basin has to be comprehensive in nature, as degradation is caused mainly by population pressure, which cleared forest lands and utilized the marginal lands for food production (Whittington and McClelland, 1992). The silt load that affected the Sudanese reservoirs originates mainly in the Ethiopian Abbay (Blue Nile) and Tekeze (Atbara) basins, which account for 16% of the total Nile basin area (Mason, 2004). This

fact implies that a huge investment in the environmental protection of the Nile has to concentrate in these two basins to get a lasting solution for poor-performing Sudanese dams.

4.3.4. South Sudan's Water Policy for Sustainable Water Use and Conservation

The South Sudanese diplomat[29] indicated the way the country has commenced governance of its affairs, including the water sector. According to him, in the CPA agreement, the water issue has not received much attention, as it rarely indicates the share of South Sudan in the total 18.5 BCM allocated to Sudan in the 1959 agreement. The question remains: how the country can use its share or whether the Sudanese share will be left only for North Sudan is not yet clearly determined. The South Sudanese scholar (December 10, 2019) explained that though 98 percent of the land in South Sudan was located within the Nile basin, SPLM representatives refrained from raising the Nile water sharing as it could potentially complicate the negotiation process. He further indicated that, though the issue was not addressed in the 2005 accord, the country has a right to use its natural resources with no detrimental effect on downstream states.

Salman (2011b) corroborates the view expressed by South Sudanese scholars regarding why the representatives of the SPLM shy away from the Nile issue during negotiations. He noted that in the CPA, the governance of transboundary rivers like the Nile was reserved for the Khartoum government under the power-sharing agreement instead of dealing with the water resources under the wealth-sharing protocol. According to this agreement, the South Sudanese were granted only the right to administer the water at the local level. Thus, in the CPA, South Sudan failed to claim the 1959 Sudan's water share, thus postponing the issue of the struggle for the Nile for the future (Salman, 2011b). According to Salman (2011b:161), such a cautious move from the SPLM/A originates from two beliefs: "First, the SPLM/A apparently feared that its hard-won right to self-determination could be endangered if it became too involved in Nile politics." The SPLM/A did not want to signal that; it also emerged as another competitor for the Nile in already tense Nile hydropolitics. Thus, it preferred not to be considered as another potential threat that could jeopardize the entire negotiation process for self-determination, which

[29] Interview with a South Sudanese diplomat in Ethiopia on December 14, 2019.

further undermines its aspiration for self-determination. By abandoning the Nile politics, it avoided the risk of attracting Nile states against its move for self-administration.

Second, the fact that irrigation projects that require water are either under construction or need rehabilitation works during the negotiation means there is no reason for South Sudan to demand the sharing of the Nile water as subsistence agriculture can be cultivated using rainfall (Salman, 2011b: 161). Even though the South Sudanese abdicated the governance of international rivers for the Khartoum government, they opposed any idea of the Jongeli Canal project until further comprehensive investigation was conducted. This position of the SPLM contradicts the provisions of the CPA, which give full jurisdiction over the Nile to the Sudanese government.

The South Sudanese diplomat (December 14, 2019) indicated how this Nile issue was identified as one of the pending issues identified in the South Sudanese Referendum Act. The act identified 10 pending issues that need serious negotiation. From those, it identified the issues of international agreements and treaties and water resources. The 1959 Sudan and Egypt Full utilization of the Nile water being one of the treaties and governance of the transboundary rivers are the issues that need to be resolved in addition to the border dispute with Sudan, as the two countries share more than 2000 kilometers of land border. Although muted about the water issue during the negotiation process and the entire period of the interim period, South Sudan started demanding a fair share of the Sudanese water quota under the 1959 Nile water agreement after her independence (Salman, 2011b).

However, for South Sudan to achieve meaningful development and social progress, the country ought to use its water resources for domestic use, irrigation, and energy production. The 2007 South Sudan water policy also envisages the use of its water resources to achieve sustainable development. Ashok Swain (2016) argued that the issue of water management in post-conflict fragile states like Sudan helps not only the goal of achieving development goals through water development; it has a paramount importance for the peacebuilding process of such fragile states.

Ethiopian academia[30] has a view that in the Eastern Nile Basin, South Sudan was important not only for its geo-strategic position but also because it is home to the potential source of additional

[30] Interview with Ethiopian International Relation Professor at Addis Ababa University, on February 4, 2021.

water supply increase for downstream states. It is unthinkable to increase the Nile water supply without considering the potential contribution of South Sudan to such an increment. According to some scholars if water conservation project implemented, the project of the canalization of South Sudanese wetlands can increase the water supply of the Nile by 18 BCM per year by constructing the canals through phases: Jongeli I: 3.8 BCM; Jongeli II: 3.2 BCM; Machar Marshes: 4 BCM; and Bahr el Ghazal: 7 BCM (Whittington and McClelland, 1992:148; Mason, 2004: 107; Salman, 2011).

According to Whittington and McClelland (1992:149), the idea of the Jongeli Canal was fiercely opposed by the SPLA and environmentalists. The fact that the South Sudanese marshes are home to international migratory birds and the environmental considerations that have "many ecological consequences" have been opposed by the international community. The draining of the wetlands has left little water for the people and wildlife in the area. Thus, the project threatened the lives of the migratory birds as well as large herbivore animals that used the area as their habitat. Moreover, the impacts of the project on the livelihood of the local population were not properly investigated, as the project was solely intended to benefit North Sudan and Egypt (Mason, 2004).

Even though South Sudan is one of the most sparsely populated countries in sub-Saharan Africa, with 13 people per km2, the average population growth exceeds 4%. Moreover, the return of refugees from neighboring countries puts pressure on the freshwater resources of the country. By sub-Saharan standards, the population that has access to clean water is less than 14%, even in major urban centers like Juba, Wau, and Malakal (AfDB, 2013). According to FAO (2020), the population of South Sudan was estimated to be 11.8 million in mid-2020; this puts pressure on natural resources, including the freshwater system. To meet the food, energy, and domestic water consumption of the population, the government of South Sudan drafted the South Sudanese water policy in 2007. The people of South Sudan relied mainly on the water of the Nile for their livelihood. There is a close relationship between people in South Sudan and the Nile water system. The South Sudanese wetlands are one of the largest wetlands in the world, with fluctuating sizes (Mason, 2004).

From the 149 BCM per year of the entire Nile flow of the Sudan, the UNEP (2007) estimated the South Sudanese share to be 49.5 BCM per year. Due to the erratic nature of rainfall and recurrent droughts in extremely severe cases, the share of the domestically generated flow of water in South Sudan is 15% of the entire Nile flow. This made the reliance on rainfall very challenging to achieve food security (African Studies Centre, Leiden, 2014). As a result, the South Sudanese diplomat (2019) implied an urgent need to expand irrigation schemes in the country to overcome the chronic food shortage. Despite the intention of South Sudan, the reaction of the two downstream countries to the development of irrigation schemes in the country remains unknown, even though they have known for a long time that no other nation can use the Nile as they shared the entire Nile flow among themselves.

According to South Sudanese scholars (2019), the wetland system of South Sudan accounts for 7% of the country's total area. The people of South Sudan are highly dependent on the natural environment for their survival. The Nile water and its ecosystem have provided the people of South Sudan with pasture for their animals, food for the people, and materials for building their homes. Like most traditional societies and approaches, the action of the people towards the water resource has adopted a sustainable approach. They have traditional mechanisms to conserve their environment.

The South Sudanese scholars (2019) added that despite the existence of water policies and laws that govern water use, owing to the political turmoil immediately after the independence of the country, the water use of the country is extremely limited. So far, the country has tapped the water of the Nile for domestic consumption in major towns, small-scale irrigation, and hydroelectric generation. The political turmoil and then the civil war that ensued in December 2013 inhibited the world's youngest country from engaging in meaningful socioeconomic development. As a result, the water development plan as well as the effort to protect its water resources from degradation caused by environmental and climatic changes have never gotten the attention of policymakers.

South Sudan is home to the Sudd swamp, which is an important feature of the Nile biophysical. The Sudd swamp releases only half of its inflow (Elmam, 2010). As a solution to overcome the loss of water due to the evaporation of the Sudd swamp, Garstin proposed the

construction of the Jongeli Canal to bypass the swamp and deliver water to lower riparian states in 1904. However, the implementation of the plan only started in the 1970s, which later halted because of the civil war in South Sudan after the French company completed about 250 km of the entire 320 km of the project. The attack by SPLA in 1984 halted the hope of increasing the Nile water yield by 4.7 BCM (Swain, 2011). According to Swain (2011: 691), the project marks "the first serious effort to increase the yield of the Nile." Thus, the project denotes the effort made by Sudan and Egypt to conserve the Nile water by reclaiming the swampy area of the Nile, despite the criticism of the project from environmentalists.

The South Sudanese diplomat (2019) has a view that South Sudanese perceive the Jonegeli Canal as a project designed to benefit Egypt and northern Sudan without any plan for local development and also without proper assessment of the environmental impacts of the project. As a result, the project was unpopular among the South Sudanese population and the international community as a result of its negative impact on the environment. After the signing of the Comprehensive Peace Agreement (CPA) in 2005, the hope for the implementation of the project by reconsidering the environmental impacts and the interests of the local population has not made much progress since then. Indeed, in 2008, Sudan and Egypt attempted to revive the project after 24 years without making corrections to the previous errors (Ahmad, 2008). Taha (2010) also indicated the signing of the memorandum of understanding between Egypt and South Sudan officials who visited the country along with officials from North Sudan for the resumption of the Jongeli project. According to Ahmad (2008:575), the Jongeli Canal construction goes beyond its impact on the local population's economy; the project "as interfering with the wetland ecosystem could trigger abrupt and far-reaching ecological changes." Ahmad (2008) further warned of the impacts the implementation of the Jongeli Canal can have on the entire region, including ecosystem disturbances and the expansion of the desertification process further south.

According to ENTRO staff[31], the water use plan and its implementation are also in the formative stage. Indeed, the country has made clear its intention to use the Nile water for hydroelectric power generation. The SPLM, the party that struggled for the independence of South Sudan for over 20 years since 1983, had a vision to develop and prosper the resource-endowed country.

[31] Interview with ENTRO staff on November 24, 2019 at Addis.

Accordingly, after they concluded a Comprehensive Peace Agreement (CPA) with the government of Sudan in 2005, the party embarked on water development projects for domestic consumption by the urban centers and hydroelectric power generation. The water use plans for domestic consumption and hydropower generation are at different stages of implementation to supply energy and water. South Sudan relies heavily on underground water for domestic consumption. However, according to the AfDB (2013) report, the salinity level of the groundwater in some areas of the country exceeded allowable limits for drinking water in Jonegli and Unity states. In Unity, oil exploration activities made the groundwater unsafe for domestic consumption, as such activities impacted the quality of the groundwater in the areas that surround the area.

South Sudanese scholars (2019) underscored the importance of the Nile and its tributaries as a source of livelihood and as a means of transportation. They used the water for domestic consumption, animal watering, navigation, and the ecosystem of the river as a source of food (fish), shelter, and grazing land. The customary law that governed water use in the country allowed every member of society to use water as a God-given resource that everybody was entitled to use. In South Sudan, the poor condition of road infrastructure and the presence of land mines in vast areas made water transport the most cost-effective and practical transport mode that connects almost all the 10 states of Southern Sudan based on seasonality. It also connects the country with North Sudan and Ethiopia. Moreover, in addition to the main White Nile, a number of the White Nile tributaries are navigable during the rainy season on certain stretches of land. Thus, in South Sudan, the Nile has been serving the population as an alternative means of transportation.

The majority (about 95%) of South Sudanese people depend on fishing, hunting, livestock rearing, and subsistence farming. However, the irrigation coverage is very low, and farmers face crop failure because of erratic rain, which needs the expansion of irrigation infrastructure. Even though the country has enormous agricultural potential (75% of the country’s total 330,000 km2), the country has a huge food deficit because of political instability, low productivity in the agricultural sector, and erratic rainfall. The country has managed to develop only 4% of this potential (AfDB, 2013). FAO/WFP (2020) reported that the Republic of South Sudan faced an estimated 482,500 metric tons of food deficit. The food security of the country keeps

deteriorating instead of showing improvements, as the country is unable to tap its water and other natural resources, at least to achieve food security. Indeed, the country imports half its food needs from other countries to feed the country's population. This report also revealed that 77% of the country's households are food insecure.

According to the African Studies Centre (2014), the country is still unable to produce enough food for its citizens as a result of political instability and conflicts that sap the country's productive population. The dire food insecurity the country faces is not only because of the conflicts and weak institutions but also because of the absence or limited investment in water reservoirs and irrigation infrastructure. As a result, in South Sudan, access to food is "seasonal and location-dependent" (African Studies Centre, 2014: 7). In South Sudan, the livelihood of people depends on the seasonal movement of people from one area to another in search of food for themselves and livestock, but the presence of conflict interferes with this mode of livelihood, which reduces their resilience and increases their vulnerability to droughts and floods, which in turn undermine the food security of the populations (AfDB, 2013).

The abundant water resources in the country also caused floods that displaced people from their homes and devastated their livelihoods. In Jongeli State alone, more than 40,000 people were displaced by floods, creating an additional burden on the problem of IDPs in the country (FAO/WFP, 2020:8). Thus, the lack of water infrastructure exposed the country to another challenge instead of benefiting from the resources.

The South Sudanese water policy (2007) aimed to make South Sudan the bread basket of the continent and envisaged cultivated crops using the water resources of South Sudan. The policy encouraged the expansion of irrigation for small-holder farmers as well as large-scale agricultural operations, mainly through FDI. Moreover, the leasing of large chunks of land, estimated to be 2.64 million hectares, to foreign investors not only disposes of the local communities but also contributes to the pollution of the Nile environment in the country. However, the post-independence political turmoil undermined the realization of this vision and caused huge food deficits in the country.

The South Sudanese diplomat (2019) has a view that his country's has not only huge irrigation potential but also with a potential for generating electricity. Currently, South Sudan generates less than 1 % of its electricity potential despite the huge hydroelectric potential of the country. Access to electricity is one of the fewest, even by sub-Saharan African standards, i.e., only 4% of the population has access to electricity. The electricity supply is limited to the major towns in the country. This low access to electricity shows that the majority of the population in the country (estimated to be 8.3 million in 2013) depends on biomass as a source of energy, which leads to deforestation in the country (World Bank, 2013).

The South Sudan state was not only affected by years of neglect but also by the civil war, which caused much damage to water resource data collection networks. Prior to the outbreak of the war, there were 113 hydrological stations installed in the region; however, only 10 of these stations are functional nowadays, causing water data paucity that made water management difficult in the country due to a lack of data. Moreover, the integrated river basin master plan has not yet been developed for the country in order to undertake water infrastructure for irrigation, hydropower generation, or the construction of multipurpose projects (AfDB, 2013).

In spite of the fact that the river basin master plan has not been developed for the major basins in the country, the government of South Sudan has proceeded with a plan to develop the river basin of the country for energy production. Accordingly, the 2007 South Sudanese water policy clearly stated the importance of generating hydropower in several areas of the country for rural electrification and supported the industrial basis of the country. It advised the strategy of developing small-scale hydropower stations throughout the country. The energy development plan of the country (2011–2013) also identified five big hydropower potentials with an estimated capacity of 2,590 MW. These include Bedden (720 MW), Fula (1,080 MW), Lekki (420 MW), Shukoli (250 MW), and Juba Barrage (120 MW) (South Sudan Development Plan, FY 2011–2013). Unfortunately, none of these projects commenced to generate electricity as a result of the civil war that broke out in December 2013 (South Sudan Academic, 2020).

The idea of reviving the Jongeli Canal for water conservation, which has been on the agenda for more than a century now, remains controversial, and no agreement has yet been reached over its resumption by concluding agreements with the South Sudanese government. There is much hope

for increasing the Nile flow, though the canal now seems to be internationalized as more upstream states start to claim stakes in any initiatives regarding the Jongeli Canal project, further complicating the hope for the immediate commencement of the project to enhance the Nile water supply.

4.4. Ethiopia's legal and policy Response to bring water conservation and environmental protection in the Eastern Nile Basin

4.4.1. The context of transboundary water management in Ethiopia

Ethiopia is endowed with an estimated 122[32] BCM/year of surface water resources, and an estimated 2.6 [33] BCM/year of renewable groundwater resources can be developed and utilized (UNESCO, 2006; Moges et al., 2010; Calow et al., 2013:26). From the surface water resources available in Ethiopia, the Nile (Abbay, Tekeze, and Baro Akobo) accounts for the majority of the water, 85.8 BCM/year. The annual discharge of the Abbay (Blue Nile) basin alone is estimated to be 54.4 BCM. The western basin in general accounts for 85% of Ethiopia's water, though only 10% of the Ethiopian population resides in the basin (Negash, 2012: 8–10). However, the country manages to utilize only less than 5% of the available water resources in the country (Moges et al., 2010: 64). From this, 91.84% is utilized by agriculture, 7.68% for domestic and municipal uses, and 0.4844% of the water in the country is utilized by industries (FAO, 2017). In Ethiopia, water availability and distribution vary across time and space. The uneven water distribution in space and time has posed significant challenges to water availability in the country, though the Ethiopian water per capita is estimated to be 1900 m3/year (Negash, 2012: 10; Calow et al., 2013). The figure is well above the threshold that categorizes the country as a water-scarce country, less than the 1000 m3/year benchmark (Falkenmark, 1989).

Ethiopia is a primary source of Nile water, contributing about 86% of the total Nile water. The western part of the country, from where the Nile system originates, receives the highest precipitation, unlike the other parts of the country. The majority of these rivers are transboundary. The country has not yet developed adequate water control infrastructure. As a

[32] Negash (2004) estimated the total renewable surface water of Ethiopia to be 123.6 bcm.

[33] The Ethipian Institute for Strategic Studies estimated the available ground water resources in Ethiopia at 2.6–6.5 BCM per year (see https://ethiopianinstitute.org/water-resources/).

result, the country couldn't grow crops more than once a year, an industry that heavily relies on rainfall. This extreme dependence on rainfall exposed the country to crop failures and, thus, food insecurity (Awulachew et al., 2007).

The inadequacy of water control infrastructure forced Ethiopian farmers to depend on rain-fed agriculture. In the Nile basin, water infrastructure has not yet evolved, and thus, Ethiopian farmers rely on the arrival of rainfall to practice rain-fed agriculture once a year. In the basin, soil erosion also undermined soil fertility and moisture, affecting agricultural productivity. As a result, farmers in the region clear forests for horizontal expansion of farmlands to produce enough food for households and also for markets. These practices harm not only the Nile environment but also the livelihoods of millions of Ethiopians (Moges et al., 2010).

According to Ethiopian academia[34], population pressure and the government policy to expand rain-fed state farms caused widespread deforestation in the tributaries of the Abbay Basin in the past. Previous studies also indicated how population pressure destroyed wetland ecosystems in most of the highland areas of the Nile system (Hailu, 2003). Hailu (2003) reported that 35% of the wetland area in Iluabor has been destroyed because of the expansion of agriculture into wetlands. The destruction of this vital ecosystem remains in Ethiopia because of a lack of national wetland policy (UNESCO, 2006). In recent times, the country has also faced a problem of water weeds in its freshwater system, including Lake Tana. The federal and regional governments struggle to effectively deal with this challenge because of technical incompetence and inadequate financial resources. The government hardly mobilized external resources from within the Nile basin and from other international stakeholders.

Drought is a recurrent phenomenon in Ethiopia. It occurs "every 3 to 8 years in the northern part of the country and every 8 to 10 years in the more humid regions" of the country. Reports from more than 40 meteorological stations implied the minimum and maximum temperatures had increased in the period between 1952 and 1997, showing the impacts of global climate change (Moges et al., 2010:66). Even though the availability of accurate data is a problem with regards to the impacts of climate change on water availability, Moges et al. (2010: 67) reported that "a

[34] Interview with an environmental historian at Nekmte on April 29, 2020.

10% reduction in rainfall would produce a 30% reduction in catchment runoff and a 1.5°C increase in air temperature and a 15% reduction in simulated discharge." The World Bank (2006), on the other hand, predicted the increase of floods and droughts by frequency and intensity over the coming decades because of climate change.

Moreover, poor watershed management in the Nile basin as well as the other Ethiopian transboundary rivers contributed to soil erosion in the Ethiopian highlands. The Ministry of Water Resources estimated the average loss to be 1.3 billion tons every year because of poor land management and farming practices in the country. This contributed to the decline of soil fertility and, hence, the poor performance of agriculture (MoWR, 1993).

Ethiopia has adopted laws and policies that govern water use and management. This law and policy apply to the Ethiopian Nile basin and govern the use and management of the river. The Nile basin remained underdeveloped despite its huge development potential. As a result, the country's water management policy focuses on the enhancement of water supply for development. Despite the huge potential of the water sector, the country's water development remains one of the least developed. The demand for exploiting the Nile potential has remained high on the agenda for a long time. In recent times, the country's population and economic growth have necessitated the exploitation of the basin's potential for agriculture and energy. While exploiting the Nile River potential, the Ethiopian government has developed laws and policies to protect the Nile environment from the ever-growing threats of desertification and droughts. Moreover, the policy incorporated mechanisms to promote water conservation when using the Nile for development purposes (Berihun et al., 2020).

With few exceptions, Ethiopian river water governance is essentially the governance of transnational rivers, as most of the major rivers of the country flow beyond their boundaries. The analysis of the Ethiopian water policy provides highlights on how the states along the river govern the Nile River basin water and its environs. This section reflects on the governance of the Nile River in Ethiopia and beyond. Indeed, the study focuses mainly on the Blue Nile and its surrounding tributaries to reflect on the governance of this important river. Moreover, the interaction of the Ethiopian state with riparian states over the management and use of transnational freshwater, particularly in the context of the Nile River, also requires a fresh look,

provided that the states that share the Nile water are competing and struggling for the Nile water, which intensified after Ethiopia commenced Grand Ethiopian Renaissance Dam (GERD) over the Abbay (Blue Nile) River.

4.4.2. Ethiopian water policy and Law for water conservation and Environmental protection in the Eastern Nile Basin

In Ethiopia, both customary and statutory tenure influence water governance. In modern times, they reinforce each other when it comes to water utilization and management. The Nile basin has remained underdeveloped so far in Ethiopia; however, there are ambitious plans to develop the Nile for development purposes. The national water law and policy are supposed to govern the use and management of Nile water. Despite the low level of Nile water exploitation, the Ethiopian state has given much emphasis to the protection of the Nile environment and its water (Berihun et al., 2020).

The national water laws and policies aim to maintain a balance between using and safeguarding the Nile River to ensure its sustainable use. The Ethiopian water law and policy exhibit limitations governing international rivers. Human actions can help preserve and safeguard the Nile ecosystem amidst climate change and increasing droughts in the area by stopping additional damage and restoring the Nile environment (Berihun et al., 2020). This amounts to what Barnes (2014: 4) calls the "making of water," which means human intervention is very vital to maintain the flow of water to downstream states and to offset drought and desertification. Without such intervention by Ethiopia, there would have been changes in the water flow regimes due to environmental degradation.

4.4.2.1. Traditional Water Governance and Conservation Practice in Ethiopia

In Ethiopia, there were traditional water institutions that govern water use among the different Ethiopian societies: the Xela among the Konso, the Idiriya among the Wolaita, etc. These traditional institutions remained intact until some of them were replaced by the Peasant Association during the Derg regime. They used to govern the water resources, mainly for irrigation, very effectively. The Peasant Association introduced by the Derg was nowhere to replace the role these traditional water institutions used to play for effective water governance

(Yacob, 2007). However, these traditional institutions were revitalized again and started to play their traditional role in some places, like Tigray (Teshome, 2003). In Ethiopia, water governance from a bottom-up approach has been tried in a way that encourages the participation of irrigators. The management of water was and is an affair that was run by government bureaucracy in a top-down approach under successive Ethiopian regimes, neglecting the relevance of traditional water institutions to govern water uses (Kloos et al., 2010). Thus, water use regimes are highly influenced by government bureaucracies without significant changes under successive regimes.

The Derg regime's effort to promote small-scale irrigation as proof against drought and famine had not made much progress. Desalegn (1999) and Teshome (2003) stated that the program's poor performance was due to interference from politicians and bureaucrats who controlled water rights access and disrupted traditional irrigation systems by involving producer cooperatives. This state intervention continued under the EPRDF regime through Agricultural Development Agents, undermining the decision-making capacity of individual farmers and also creating challenges to the sustainability of the system (Kloos et al., 2010).

The EPRDF government aims to enhance 127,000 hectares of small-scale irrigation by building microdams from 200 to 2016 in 315 woredas and 3,500 kebeles, along with water harvesting tanks, ponds, and hand-dug wells. This initiative is intended to support water supply for irrigated areas nationwide (MOWR, 2002). Before the commencement of this plan, the Tigray region adopted the policy of developing small-scale irrigation in the 1990s with the support of FAO and UNDP, though the plan failed to achieve its intended goal of both achieving food security and the intended number of such schemes throughout the region (Teshome, 2003).

According to Eguavoen (2009), the tradition of water conservation dates back to the period of the Axumite civilization, and there was also a practice of water storage during the 16^{th} and 17^{th} centuries. However, water conservation got the attention of policymakers after the 1970s and mid-1980s severe famine (Natea et al., 2010). The government intervention to conserve natural resources failed during the civil war or the transition period from the Derg to the EPRDF in the 1980s and early 1990s (Yeraswork, 2000).

In Ethiopia, it is not only the state that has developed laws and policies to govern the water sector, but also the different Ethiopian societies that have developed codes that govern human relations with fresh water. For millennia, the different Ethiopian communities have developed customary laws that govern water use among their respective communities. It is through these codes that they manage and sustain water and other natural resources for generations (Yacob, 2007). Traditional water governance extends beyond the sustainability of the water and also deals with a fair allocation of resources among the users. As documented in Yacob (2007, 2010), pastoralists like Borana Oromo have had customary laws that regulate access rights to Eela (deep water wells) that belong to the community in general. By the same token, the traditional laws have incorporated laws to regulate water use in Ethiopia.

Ethiopian society's traditional codes encourage water saving at the household level. In Ethiopia, so far, people use the Nile for domestic consumption, with a low level of traditional irrigation. Despite Ethiopian society's cultural variety, more or less all societies that inhabit the Nile basin share the code that encourages water conservation. Scholars cited several traditional codes that encourage water saving for both domestic consumption and agricultural purposes. The Ethiopian societies in the Nile basin as well as outside the basin have established mechanisms for how to live in harmony with nature without destroying their environment (Yacob, 2007). However, there are circumstances where people transgress the traditional codes and destroy their environment by contravening the traditional codes as a result of population pressure (Badege and Zebene, 2010).

Ethiopian societies that live within the Nile basin and beyond have traditional laws for water and other natural resource use. It is these laws that govern the use and management of resources. Scholars documented how these laws promoted water conservation and protection of the environment for centuries. In Ethiopia, despite the belief that water is a natural gift from God, no society in Ethiopia's culture promotes water waste. There are circumstances when water use efficiency can serve as a parameter for choosing a bride, because if the would-be wife can take care of the 'abundant' water, she could wisely handle household affairs, thus demonstrating her good quality for being a wife.[35]

[35] Interview with a local elder on May 2, 2020 at Nekmte.

It is this customary law that has governed and managed the Nile environment for centuries. However, the booming population size and expansion of economic activities put pressure on the functionality of the customary law, which led to extensive degradation of the Nile environment. In response to environmental degradation, the Ethiopian government adopted an environmental policy. This is the moment when modern environmental law and policy govern environmental use and protection, more or less replacing or complementing the traditional approach as a result of its failure to cope with the new reality. In the Ethiopian part of the Nile, environmental governance is enforced through administrative orders instead of the application of existing environmental laws.[36]

In the Nile basin of Ethiopia and other basins, the relationship between customary law and modern state law is vague. In the Nile basin, despite the relatively weak nature of the structures, modern environmental protection and rehabilitation programs have been spearheaded by state structures rather than the motivations of the traditional authorities. When the Ethiopian state begins extensive utilization of the Nile water potential, it could, however, tap into both its customary and statutory laws to enhance water saving. The traditional codes are more important than the modern rules and regulations to conserve the rehabilitated environment of the Nile basin through government programs. This is because the farmers own government conservation programs, and the programs incorporate farmer preferences and interests while also protecting the environment. Without the recognition and incorporation of the farmers' preferences and interests, regardless of the technical sophistication needed to rehabilitate the environment, any government interventions that aim at rehabilitation are doomed to fail (Law lecturer, May 7, 2020).

4.4.2.2. The modern Ethiopian state water law and policy for water conservation in the Eastern Nile Basin

According to Fattovich (1990), water conservation in the form of rainwater harvesting dates back to the preaxumite period. This water conservation tradition also persisted during the Axumite civilization, and to this end, dams, ponds, and cisterns were constructed to store water both for agriculture and domestic water supplies (McCann, 1999). This tradition of water conservation

[36]Interview with International Law lecturer at Addis Ababa university on May 7, 2020

extended to the medieval period, and the water harvested during the rainy season was stored for irrigation, domestic use, and religious rituals (Alem, 1999). In modern times, as a response to mitigate the droughts and famine of 1973/1974 and which occurred again in the mid-1980s, the Derg regime introduced and revitalized water conservation to grow crops and utilize water during the dry season. However, due to the top-down approach of the regime, the programme was not successful (Kloos et al., 2010).

The EPRDF-led government has promoted the idea of water conservation since 2002. During the first phase of the program (2003–2006), 342,846 storage structures were constructed in Ethiopia. Nonetheless, it is difficult to obtain data on the long-term viability of these water-saving structures. Furthermore, despite the fact that the country's water development is still in its early stages, water use inefficiency has been widely reported in large-, medium-, and small-scale irrigation schemes. The water efficiency rates have sometimes been as low as 20–30% (Natea et al., 2010: 133). According to Zewdie (1994), this low level of water-use efficiency is due to low water-use charges and the fact that users are required to pay based on hectares cultivated rather than the volume of water used. For instance, in the Awash Valley, because of poor water management, more than 2000 ha of land was rendered unusable because of over-irrigation that caused salinization (Hasan, 2004). Other studies on water use efficiency have indicated similar challenges in Ethiopia (Behailu et al., 2004; Tolosa et al., 2018). Despite the introduction of policies and legislation that encouraged water conservation in 1999 and 2000, respectively, water policy and legislation have brought little change in terms of water conservation. The experts at the Ministry of Water Resources and Energy have the opinion that "it is difficult to determine the impacts of the policy as well as the subsequent legislation on water use patterns, but obviously they brought little change when it comes to water conservation."[37]

As a result, water management specialists and scholars alike have argued that the Ethiopian effort alone has proven inadequate, hence calling for collective actions of the Eastern Nile Basin countries. For instance, a transboundary river management specialist[38] at IWMI believes that

[37] Interview with an expert in the Ethiopian Ministry of Water Resources and Energy, transboundary desk, February 2, 2021.

[38] Interview with IWMI tansboundary water expert in Addis on 23 March 2020.

effective water management, including its conservation, should take place in the Ethiopian highlands through collaborative means. Nevertheless, this require collaboration among all the Eastern Nile basin states. A scholar[39] from Ethiopia also agreed that it was critical for the Nile states to work together to maintain the shared watersheds of the basin states and to promote water conservation. The professor[40] noted, however, that Ethiopia needs to i) evaluate its water management strategy, particularly with regard to its management of transboundary rivers, including the Nile Basin, and ii) advocate for the NBI joint framework's functionality or push for a new framework.

However, a scholar[41] with knowledge of past negotiation for cooperation in the Nile basin has a pessimistic view of collective actions. He stated that "the reactions of the downstream states for the proposal to undertake multipurpose dam projects in Ethiopia rejected by downstream despite its advantage for conservation of the [Nile] river water under auspices of NBI environmental facility framework." However, Ethiopia, as a country with a great stake in water conservation and watershed protection activities, has the responsibility to engage the downstream states parallel to the negotiation to secure a fair share of the Nile water resources. In addition to the formal diplomatic engagement, parallel discussion networks among academic and bureaucrats similar to the 'Nile 2002' should be reconstituted again on the importance and urgency of water conservation and watershed protection in the Eastern Nile Basin.[42] This reluctance of the Eastern Nile Basin states to cooperate for Blue Nile water conservation align with the assumption of collective action theorists which argues that the existence of common interest alone is not a sufficient condition to bring collaboration over common challenges like water conservation (Waterbury, 2002).

A diplomat[43] from Sudan emphasized the importance of collaboration in preserving watersheds. He stressed the importance of expanding joint NBI environmental projects to benefit all basin states. He agreed that issues with Nile River water conservation and watershed protection are

[39] Interview with Ethiopian International Relations Professor in Nekmte on April 4, 2019.

[40] ibid

[41] Interview with Ethiopian International Relation Professor at Addis Ababa University, on Feburary 4, 2021.

[42] ibid

[43] Interview with Sudanese Diplomat based in Ethiopia, February 13, 2020.

under serious scrutiny, and that the best course of action is to jointly handle these common problems. On the other hand, the Egyptian diplomat[44] stressed the value of collaboration with regard to issues of water conservation and environmental protection in upstream areas, emphasizing Egypt's prior participation in a number of regional initiatives to eradicate invasive weeds, particularly in the equatorial lake region, by providing financial and technical support to upstream countries. He also mentioned the potential for discussing cost sharing when upstream governments, such as Ethiopia, are open to Egyptian specialists participating in water management within Ethiopia and agreements being reached on disagreements over the operation and management of the GERD project.

An experienced Ethiopian diplomat[45] with knowledge of transboundary water management believes that the Ethiopian government's diplomatic efforts have fallen short in addressing the problem of cost-sharing for environmental protection, despite the fact that such practices are common in other international river basins. However, Ethiopia hardly brought the agenda of cost sharing for environmental protection during negotiations over the management and development of the Nile River water since the agenda, like a fair share of Nile River water use, has taken primacy over other water management issues.

The views of Ethiopians, Sudanese, and Egyptian diplomats as well as Ethiopian scholars and bureaucrats agree on the need to address collective action problems. Moreover, they all appeared to agree on the need to negotiate a deal with collective action problems. This statement seems to agree with the views of collective action theorists as indicated above. Moreover, diplomats from Egypt and Ethiopia raised the possibility of maintaining compliance through the formation of supranational institutions, including the provision of incentives for the production of public goods. However, the view expressed by Ethiopian scholars with the knowledge of past negotiation track records on multipurpose projects proposed by the World Bank and other donors implied that there were circumstances in which negotiation and external imposition seemed unable to resolve collective action problems.

[44] Interview with Egyptian diplomat, May 5, 2020.

[45] Interview with an Ethiopian diplomat familiar with Nile diplomacy, March 23, 2020.

Ethiopian diplomacy has been focused on claiming the fair share of the Nile and that of the downstream states like Egypt to protect its historical rights claim (Swain, 2011; Yacob, 2007) leaving aside common problems that posed threats to the Nile water sustainability. The struggle over the Nile subsumed the energy and attention of the basin countries denying the attention and collaborative effort to tackle the common challenges of Nile water conservation and environmental degradation.

According to Ethiopian academia[46], Ethiopia has a view that its projects on the Nile, like GERD, should be viewed not only as a project that focuses on the enhancement of water supply for energy production but also as a project that helps the conservation of Nile water where the water lost to evaporation is relatively low, in addition to the other purposes of the dam for lower riparian states. Probably that was the reason the late Ethiopian prime minister Melese Zenawi called for cost sharing of the GERD project by the basin states during the inaugural speech of the dam, estimating half of the project cost to be covered by downstream states; Egypt to cover 20% of the project cost; and Sudan to cover 30% of the project cost based on the benefits accrued from the project (The Ethiopian Reporter, 2011).

However, Egypt vehemently and consistently opposed the GERD project from the very beginning, even to the extent of threatening to take direct military action against the dam under construction (Wheeler et al., 2020), let alone considering the project to serve its interests and thus to make a contribution to its realization. It seems that the suspicion and hostility of Egypt towards the dam may come from the lack of Ethiopia's diplomacy to negotiate over its intention to commence the project by notifying and even communicating about its potential benefits to downstream states, including Egypt, in terms of storing the Nile water in a relatively cool place where water lost to evaporation is low and assuring Egypt that Ethiopia intends only to produce energy with no impact on the quantity of the water flows downstream. Nevertheless, the Ethiopian diplomat[47] has a different opinion on the prior notification of the project to the downstream states particularly to Egypt; as the country would have obstructed the project since Egypt sees itself as the only legitimate user of the Nile. He further noted that there are also issues

[46] Interview with project management expert at Ethiopian Ministry of Water Resources and Energy on June 6, 2020

[47] Interview with Sudanese Diplomat based in Ethiopia, February 13, 2020

of sovereignty and above all prior notification holds security risks for Ethiopia and appears to attract unnecessary pressure from the international community before the commencement of the project.

Regardless of the different opinions on the lack of engagement between Ethiopia and Egypt, Ethiopia's GERD project further fueled tension and at least temporarily remained a bottleneck for the cooperation of the basin countries to conserve the Nile water and jointly engage in watershed protection programs. The lack of collaboration for water conservation may not only attributed to the disagreement over a single water project, GERD, as the struggle and disagreement over Nile water among the basin states dates back to a much earlier period before the commencement of the Ethiopian GERD project (Salman, 2016).

Sudan, which had historically sided with Egypt on the Nile water issue, accepted and recognized the importance of the GERD project as it helps mitigate the country from devastating floods and siltation of the Sudanese dams. The country hoped that the new dam over the Blue Nile would replace the role of the Sudanese dams as "siltation basins" which would save millions of dollars for the Sudan (Salman, 2016; Swain, 2008: 206). Moreover, they also saw the advantage of the project, as it provides another opportunity to expand irrigation fields (Wheeler et al., 2018) and increase the energy generation capacity of the Sudanese reservoirs (Wheeler et al., 2020). Beyond the securitization and politicization of issues, scholars such as Whittington et al. (2014) corroborated the significance of the project in providing regulated water flow during the period of extended droughts for lower riparian states. On the other hand, Hamd (2018) expressed fear that the project could withhold water during 'critical periods' (quoted in Wheeler, 2018: 9228).

The challenge of siltation can best be tackled through environmental restoration before the commencement of water reservoirs to enhance their life span of the water reservoir and water-holding capacity (Behailu et al., 2004). The afforestation program is very critical not for the conventional understanding that the forests serve as water storing 'sponges' that release water during the dry period, but "at the regional and continental levels, forests appear to promote high precipitation and runoff due to their function as atmospheric moisture pumps, mitigating against desertification" (Badeg and Zebene, 2010: 194). Generally, Ethiopian water development

programs and designs failed to incorporate appropriate strategies that protect reservoirs from siltation problems, as well as the adoption of appropriate water conservation programs to overcome the challenges faced by water schemes encountered in many water development schemes across the country (Kloos et al., 2010). However, as the experience in the recent past shows following the commencement of the GERD project, state intervention through popular mobilization has brought changes to the ground.

4.4.2.3. The modern Ethiopian state water law and policy for watershed protection Intervention in the Eastern Nile Basin

In Ethiopia, the conservation of natural resources has existed for centuries. However, the conservation of natural resources in general and water conservation has received the attention of policy makers only after the 1973/74 devastating famine that affected millions of lives and caused the country's regime to collapse. Since then, environmental rehabilitation has continued in the country in collaboration with donor agencies under the Food-for-Work (FFW) program. As a result of the program, hundreds of thousands of soil and hillside terraces have been built to reduce soil erosion and help regenerate degraded land (Wegayehu, 2003). Wegayehu Bekele (2003:21) indicated that in the period between 1976 and 1988 "…conservation and afforestation undertaken by Ethiopian peasants, under the FFW program, amounted to some 800,000 km of soil and stone bunds on croplands, about 600,000 km of hillside terraces for afforestation of steep slopes, some 100,000 ha of closed areas for natural regeneration, and many activities of land rehabilitation." However, many consider this intervention in environmental restoration programs a failure because of its top-down approach and lack of sense of ownership by the community, which undermines the sustainability of the successes achieved (Badege, 2001; Teshome, 2003; Badege and Zebene, 2010).

In the past, efforts to protect water projects through environmental protection were not well planned ahead of the project or simultaneously with water projects; as a result, most water projects have lost their planned service years (Teshome, 2003). On the other hand, Desalegn (1999) documented the weakness of environmental protection measures that caused the failure of at least 11 large-scale irrigation schemes in Ethiopia. In Ethiopia, many other water projects fail to incorporate watershed protection in their planning exposing them to siltation including the Koga dam and Tekezze reservoir in the Nile system, Koka dam water holding capacity was

reduced from 1.8 BCM to 1 BCM, Gibe I, and Melka Wakena were all affected by the siltation problems, reducing their water holding capacity (Ayalew, 2007; Devi et al., 2008).

Accordingly, following the commencement of the Grand Ethiopian Renaissance Dam (GERD) project in 2011, the Ethiopian government mobilized the masses for environmental protection in the Nile catchment areas to protect the dam under construction from the challenge of siltation. Since 2011, the Ethiopian government has implemented environmental protection programs by designing a community-based participatory watershed protection program, which has been implemented every year since then (Oromia Bureau of Agriculture, 2017). Unlike previous water projects, the Ethiopian government mobilized the public for watershed protection in tandem with the commencement of the project.[48]

Consequently, large areas of degraded land have been restored and covered by vegetation. Mountains and hillsides have been protected from human and animal reaches. Moreover, the river ecology in most of the areas visited by the researcher was protected and wetland areas were restored, although additional work needs to be done. The dried springs and streams were revived and began to flow. The cumulative effect of all these local interventions not only contributed to the reduction of the silts taken to the GERD but also contributed to the health and sustainability of the ecology of the Nile River basin. However, the experience from previous environmental rehabilitation shows that the restored areas can be sustained with the will as well as when the local communities receive benefits from environmental protection programs (Yeraswork, 2000). Given the dwindling of landholdings per household, prohibiting the local community from utilizing their natural environment responsibly and in an environmentally friendly manner would undermine the sustainability of environmental protection activities.

Nevertheless, in the Nile basin of the Ethiopian portion, no matter how the investments made for the environmental protection of the Nile environment in comparison to the complexity and extent of the degradation, the intervention is still inadequate, calling for further resource commitment. Despite the Ethiopian government's intent and efforts, the growing population and economy,

[48] Interview with project management expert at Ethiopian Ministry of Water Resources and Energy on June 6, 2020.

combined with poor land use practices, have undoubtedly continued to cause widespread land degradation. This inevitably has the potential to increase the frequency and intensity of drought and the expansion of desertification, with implications for the flow regime of Abbay (Blue Nile) water to downstream states. Without proper investment in environmental recovery in the Nile basin, the recurrent drought that affects Ethiopia could worsen and create the 1980s, such as water shortage in the Nile basin, when only little water reaches the gigantic Egyptian dam that slashed the water holding of the dam by more than half (Stoner, 1994). Unfortunately, the downstream states hardly recognized the looming threats to Nile River water and never valued Ethiopian farmers' efforts to protect the Nile River basin.[49] The intensity of the intervention to protect the watershed has increased since the commencement of GERD in 2011. Whittington and McClelland (1992:147) long noticed and stated that downstream states have "zero value" for the Ethiopian effort to rehabilitate and protect the Nile River Basin.

4.4.3. The challenges of collective action in water conservation and protection in the Ethiopian Highlands

Ethiopian state water policy expounds the relevance of governing shared water resources cordially. Beyond that, it has not spelled out how to deal with basin states regarding water use and management. Even though the Ethiopian water policy discusses the issues of equitable use and also benefit sharing as indicated in the NBI document, it rarely discusses the issue of sharing responsibility to rehabilitate the Nile environment and thus the efforts to contribute toward the Nile 'water making'. According to an Ethiopian academic, [50]"advocating for such cost-sharing may be crucial for the river's sustainability and to prevent the perception of "free riding," but policymakers in Ethiopia "shy away for fear that such assertions could invite the criticism of Ethiopia commoditized the river water".

However, except for Meles Zenawi's inaugural speech on the GERD, where he stated the need to share the costs of the GERD project as the project benefits the downstream states, Ethiopia so far is not known to systematically present institutional frameworks to share costs or request compensation for environmental services or the provision of regional public goods, as the

[49] Interview conducted with staff of Wollega University, Department of Political Science and International Relations on 23 June 2020 at Nekmte.

[50] Interview with International Law professor at Addis Ababa university on May 7, 2020

experiences in other international river basins show. In the Nile Basin itself, a study by Thuo and Riddell (2015:226) indicated that Sudan alone incurred an annual cost of “around 300 million dollars, accounting for 70% of the total Sudanese water budget”, indicating the need for Sudan to collaborate with Ethiopia. Another Study by Tesfaye and Brouwer (2016) indicated the willingness of Sudanese farmers to compensate for watershed intervention by Ethiopian farmers due to the lack of a clear mechanism in the Eastern Nile Basin. This shows that if Ethiopian policy makers and diplomacy come up with a clear institutional framework and strategy, the country can collaborate for the sustainability of the Abbay (Blue Nile) basin environment.

The data in this study suggest the need to jointly plan, execute, and operate water projects with a clear intention of basin-wide water conservation and also to jointly invest in watershed protection programs that may include compensation of the local communities’ watershed program which undoubtedly further strengthen and motivate the communities. In line with the findings of this study, previous studies by Zaho et al. (2022) indicated the growing demand for environmental compensation in the Lancang-Mekong Basin, Yu et al. (2019) in the Elbe River Basin, and Krutilla (2019) also reported the existence of such practices in the Columbia River Basin. Thuo and Riddell (2015) also indicated such programs within the national boundary between upstream and downstream users to enhance water use efficiency and encourage watershed protection in Indonesia.

On the other hand, Tesfaye Tafesse (2010:330) stated the weakness of the Ethiopian Water Resources Policy in governing transboundary rivers as follows:

> The Ethiopian Water Resources Policy failed to mention and underline the need for the establishment of a permanent legal and institutional framework on shared river basins, most particularly on the Blue Nile (Abbay), which could entitle Ethiopia to equitable and reasonable share of the common water resources. It is incumbent up on any future water policy or the revision thereof to take this framework into consideration.

Furthermore, although the policy recognized the need for regional cooperation and therefore the joint and efficient utilization of the Nile River, it hardly discussed the topic of cost sharing, as it entertained the issue of sharing the benefits of the Nile. This Ethiopian water policy document also underlined the vulnerability of Ethiopian tranboundary river basins to natural disasters. This has a far greater impact on the quantity and quality of water that reaches the downstream states,

justifying the need for engaging the downstream states in Nile water making by rehabilitating the Nile environment.

As a collective action concept indicated in the absence of supranational institutions, it is impossible to coerce sovereign states to contribute towards public goods, but the model implied the need to negotiate and present the matter to ensure the compliance of sovereign actors to act (Waterbury, 2002). However, in the case of the Abbay (Blue Nile) Basin, no evidence is available regarding Ethiopian efforts to negotiate on sharing the costs of water conservation and environmental rehabilitation as a primary country affected by the absence of intervention. Moreover, Ethiopia has made little or no diplomatic move to shed light on the inadequacy of its efforts due to the sheer magnitude of the problem.

As indicated in the above section, Ethiopian farmers have contributed towards what Barnes (2014) called 'water making', at least for the last four decades, through environmental rehabilitation programs (Mengistu and Assefa, 2019). Nevertheless, Ethiopia has never uttered the cost-sharing of Nile water making as Ethiopian farmers have now contributed to Nile water making for the last four decades. An IWMI transboundary river expert[51] stated the fact that the basin countries have limited financial resources to allocate for cost-sharing may be one reason that potentially prevents the basin countries from negotiating on issues that involve financial commitments but if the basin countries act jointly they could raise funds for such projects by working with donor agencies that interested in mitigating climate change impacts.

According to an Ethiopian academia[52], Ethiopia during the different rounds of GERD negotiation and before has rarely brought the agenda of the overall Nile basin management from the Ethiopian highlands where the Nile originates and to where it ends. He noted that:

> Surprisingly, I never heard Ethiopia utter a word about its effort to rehabilitate the Abbay (Blue Nile) basin and other tributaries of the Nile at least for the last four decades plus, despite the enormous amount of resources committed for the program. The Ethiopian public, in fact, doubled its efforts since 2011, following the commencement of GERD. This shows the loophole in Ethiopian water management

[51] Interview with an expert in the Ethiopian Ministry of Water Resources and Energy, transboundary desk, February 2, 2021.

[52] Interview with project management expert at Ethiopian Ministry of Water Resources and Energy on June 6, 2020

policy that lacks a clear strategy to govern transnational rivers, and the loophole in its foreign policy to guide diplomatic engagement on the subject.

Unlike the above assessment, however, previous studies by Cascao and Nicol (2016) argued a that Ethiopia led the push for the Cooperative Framework Agreement (CFA) among upstream countries, aligning with equatorial riparian nations and signing the CFA despite objections from downstream neighbors. This strategic move solidified Ethiopia's position as a leader in the upstream bloc. By ratifying the CFA in 2013, Ethiopia showcased its enhanced bargaining power. Furthermore, Ethiopia's involvement in the Grand Ethiopian Renaissance Dam (GERD) process transformed a national project into a tripartite effort with Sudan and Egypt, underscoring its growing influence in the Nile Basin. Ethiopia's diplomatic prowess has allowed it to advocate for a new legal framework and highlight the benefits of water infrastructure development upstream, shaping the region's current dynamics effectively.

On the other hand, the diplomat[53] at the Ethiopian Ministry of Foreign Affairs has a view that Ethiopian foreign policy concerning shared resources like the Nile needs a revisit as it lacks the issue of joint management of water infrastructures to conserve the Nile water, the Nile watersheds protection for ensuring the Nile water, and its environmental sustainability, and fair allocation of the Nile River water. Ethiopia, which invested billions in watershed protection of the Nile River water, has the right to enjoy a reasonable fruit of its efforts to safeguard the Nile ecosystem from desertification and other impacts of climate change, all of which have a responsibility to join hands with Ethiopia in environmental rehabilitation and protection of the Nile environment for the common good of all basin states.

A veteran water bureaucrat[54] who used to work in the then Ethiopian Ministry of Water Resources stated that environmental rehabilitation program of Ethiopia has been challenged as it lacks resources to enhance agricultural intensification or create off-farm income streams to prevent farmers from encroaching on rehabilitated marginal areas or expanding farmland, as these actions have the potential to reverse the achievement of the watershed protection programs

[53] Interview with an Ethiopian diplomat familiar with Nile diplomacy, March 24, 2020.

[54]Interview with Water management consultant (Working in the MOWR for several years at senior levels) on July 23, 2020

implemented so far. However, as witnessed in many areas in the Nile Basin and beyond, Ethiopia lacks institutional and financial resources to ensure the sustainability of the rehabilitated environment and prevent encroaching on additional marginal lands, such as hillsides. Despite these challenges, Ethiopian water management policy and regulation have not addressed the loophole of engaging basin states to address these problems collaboratively in the Eastern Nile basin.

The experiences in other transboundary river basins, such as the Mekong, Columbia, and Rhine Rivers, have shown that upstream states design and implement policy regimes that benefit downstream states. This, in turn, has helped upstream states receive compensation from downstream states to encourage upstream states. In the Mekong River Basin, when China decided to release water from its cascade of reservoirs to alleviate the critical droughts the downstream states of the Mekong faced in 2016, the downstream states agreed to provide both tangible and intangible benefits in the form of diplomatic support and trade concessions. Similarly, in the Colombian River Basin, Canada demanded more compensation for its efforts in environmental and flood protection activities from the United States, and the latter offered a package of compensation for the former (Yu et al., 2019).

Unlike the trends in these major river basins, in the Eastern Nile Basin, the upstream state like Ethiopia rarely pushed for compensation, and the downstream states on their side are also unwilling to recognize and appreciate the Ethiopian effort that helps to conserve the Nile water and environmental protection programs that safeguard the basin from the impacts of climate change. Studies conducted by Basheer et al. (2018) and Yu et al. (2019) corroborate the importance of Ethiopian action for the downstream states. According to Basheer et al. (2018), the lack of cooperation in the Eastern Nile Basin is attributed to the lack of mechanisms to share benefits and the weak attempt made to build confidence.

Similar to the findings of this study, previous studies by Okoth-Owiro (2004) and Lupu (2002) underlined the importance and necessity of providing incentives for upper riparian countries, even for their cooperation of ‘reasonable and equitable’ utilization of shared water. In the words of Okoth-Owiro (2004), “As upper riparian states, and considering the absence of reciprocity, what can East African countries demand from the lower riparian states, especially Egypt? Quite apart from the legal and moral obligation to share the cost of “maintaining” the quality of the

Nile basin, it makes sense to demand a share in the resources of Egypt and Sudan in exchange for an “equitable utilization” pact” (Okoth-Owiro, 2004: 33).

Previous studies by Moges et al. (2010) indicated the need for collective actions for the Eastern Nile basin countries, as a lack of intervention may result in serious consequences for all basin countries. If the Nile River environment is not well protected in the Ethiopian highlands from desertification and droughts, the volume of water flowing to downstream states is reduced significantly. According to Moges et al. (2010:66), Ethiopians experience the phenomenon of drought “…every 3 to 8 years in the northern part of the country [Ethiopia] and every 8 to 10 years in the more humid regions”.

Furthermore, their study also indicated that reports from more than 40 meteorological stations implied that the minimum and maximum temperatures increased between 1952 and 1997, indicating the impacts of global climate change on Ethiopia. Even though the availability of accurate data is a problem with regard to the impacts of climate change on water availability, Moges et al. (2010: 67) indicated that “a 10 % reduction in rainfall would produce a 30% reduction in catchment runoff and a 1.5°C increase in air temperature, a 15% reduction in simulated discharge”. However, the policy framework that provides space for the engagement of the lower states lacks clarity, and the policy network among the policy community in the basin has not evolved (Luzi, 2008).

Olson (1971: 46) argued that collaboration among sovereign states can be challenging to achieve through "coercion," but "outside incentives" may aid in fostering cooperation among the Nile states concerning water conservation issues. The experience in the Nile basin supports the notion that outside incentives played a significant role in promoting collaboration among the basin states. Key actors like the World Bank, Canadian Development Cooperation, and other donor agencies were instrumental in establishing the NBI in the past. These findings align with the perspective of collective action theorists, emphasizing the importance of regional institutions in facilitating regional collaboration. The absence of such institutions hampers collaborative efforts and increases the likelihood of unilateral decision-making.

4.4.4. The Impacts of Ethiopian Water Conservation and Watershed Protection in the Eastern Nile Basin

Even though the unilateral actions of Ethiopia are inadequate to safeguard the Nile environment and conserve the Blue Nile water, the Ethiopian action mitigates the threats partially. An expert[55] on the transboundary river at the Ethiopian Ministry of Water Resources and Energy stated that with the commencement of the GERD project, the Ethiopian government made a concerted watershed protection movement by mobilizing the local population throughout the country, unlike the previous watershed movements, which were limited to selected areas. The commencement of the GERD induced a new impetus for watershed programs throughout the country in general and the Upper Blue Nile Basin in particular. The Ethiopian effort not only reduces the siltation of Ethiopian hydraulic structures like GERD but also reduces the siltation of Sudanese reservoirs and irrigation canals, which reduces the potential of the Sudanese energy production and irrigation sectors. This Ethiopian effort in the upper catchment of the Blue Nile and the GERD itself relieves the Sudan of the costs of removing silt from its reservoirs and irrigation canals (Thuo and Riddell, 2015).

In spite of Egypt's opposition to water control structures on the Blue Nile for fear that they affect the quantity of water that reaches the country or are manipulated by Ethiopia for political reasons (Wheeler et al., 2020), Ethiopian intervention in the form of watershed protection and the construction of water storage structures is predicted to help "mitigate both the considerable inter-year and intra-year variations in the flow of the Blue Nile" (Whittington et al., 2005: 228), which could motivate the downstream state, Egypt, to abandon its opposition towards the water infrastructure development in Ethiopia after observing its practical benefits. This also helps to gradually lessen the current tension and come to terms with better cooperation over the management and sustainable utilization of the river's water.

Moreover, the practical benefit in the long term may motivate not only better cooperation and the contribution to watershed protection and water conservation efforts from their national coffers but also the search for additional financial resources from donors as environmental rehabilitation programs in the Ethiopian highlands also mitigate the extreme climate change impacts in

[55] Interview with Ethiopian International Relations Professor in Nekmte on April 4, 2019.

addition to their role in protecting and safeguarding the Eastern Nile Basin from environmental degradation effects. An Ethiopian International Relations professor[56] has the view that such understanding and collaboration have the potential to pave the way for non-water cooperation among the Eastern Nile Basin countries, strengthening regional integration in North East Africa with far more economic, security, and geostrategic repercussions. He further noted that this understanding and cooperation also enhance the idea of NBI's benefit-sharing idea from the Nile water resources as the countries could be interconnected through the power grid for power trade and the trade of commodities, making every country participate as a beneficiary of the engagement.

The expert[57] from IWMI expressed optimism that the protection and conservation of Ethiopian watersheds could lead to beneficial outcomes for downstream states. This positive development has the potential to reduce current tensions surrounding the use of the Nile, particularly regarding the GERD. It could also foster a gradual understanding among riparian states and encourage them to resume negotiations. By addressing the issues related to Article 14(b) of the Cooperative Framework Agreement (CFA), the creation of basin-wide institutions can be pursued. Ultimately, this could result in the establishment of supranational institutions that effectively govern the Nile, ensuring sustainability and tranquility for all countries in the basin.

The Egyptian diplomat[58] stationed in Addis Abeba, however, holds the opinion that while Ethiop ia's environmental protection initiatives are beneficial for protecting the country's water control structures from silt, they are insufficient on their own to address Egypt's water security concerns because no legally binding agreement that protects Egyptian interests is in place. He emphasized that although Egypt is aware of the advantages of Ethiopia's environmental interv ention, the issue of managing the Nile's water is far more complicated than water management o perations.In the absence of a legally enforceable agreement regarding Egypt's concerns, it is chall enging to predict the next step by Ethiopia or another upstream state. Therefore, he stated that

[56] Interview with project management expert at Ethiopian Ministry of Water Resources and Energy on June 6, 2020

[57] Interview with an expert in the Ethiopian Ministry of Water Resources and Energy, transboundary desk, February 2, 2021.

[58] Interview with Egyptian diplomat, May 5, 2020.

this Ethiopian action would promote more confidence and understanding if it supported with some concrete legal documents.

4.5. Overall Reflection on the Unilateral Responses to Conserve the Nile Water

The chapter demonstrated the inadequacy of the individual states responses to conserve Nile water through nationally confined water laws and policies for a challenge that is transboundary in nature. While downstream states like Egypt have introduced laws and policies that encourage water conservation, there is room for further improvement by introducing water-saving technologies and reducing wasteful practices in the country. This chapter amply indicated the Egyptian plan to conserve the Nile only for reclaiming additional desert lands outside the Nile river basin rather than using the saved water to make compromises with other riparian states. Moreover, this Egyptian water conservation effort has little to do with the water lost from the Aswan High Dam, which could be much lower if such storage structures were built upstream, leading to wastage of the common Nile water. And therefore, when it comes to Nile water conservation and its sustainable utilization, it appears difficult for countries like Egypt to conserve the Nile water through national means without cooperating with other basin states. To deal with these challenges, Egyptian policy made little effort to address the Nile water conservation issue through joint mechanisms, despite the insufficiency of their efforts to conserve the Nile River water.

This chapter highlights the insufficient legal and policy frameworks in Sudan and South Sudan to address the extensive water wastage throughout the Nile river water irrigation process. Despite calls for water conservation and enhanced efficiency in water use, both countries have yet to transition from supply-to-demand-oriented water management. While water conservation is a fundamental principle in both the draft Sudan water policy and the 2007 water policy of South Sudan, the focus remains on water supply projects. In North Sudan, the construction of reservoirs for rainwater and seasonal stream storage shows promise for water conservation to support the country's development, particularly during dry seasons.

In the 2007 South Sudanese water policy, the government highlighted the importance of efficient water use in the country. However, with limited water development, discussions on water conservation are challenging. South Sudan, home to the world's largest marshland, is positioned

to potentially contribute additional Nile water through conservation efforts, an idea considered for over a century. Consequently, South Sudan plays a significant role as a Nile state, influencing the management and hydropolitics of the Nile basin in the long term. The proposal to rehabilitate the Jongeli Canal for water conservation has been debated for more than a century. Despite attempts to secure agreements with the South Sudanese government, the project remains unsettled. Plans to boost Nile flow through the canal have attracted global attention as upstream nations assert their interests, complicating future initiatives linked to the Jongeli Canal project and causing delays in its anticipated commencement to enhance the Nile's water supply.

The chapter also tries to shed light on Ethiopian water conservation and rehabilitation of the Nile watershed in an effort to conserve Nile river water. Despite the Ethiopian government's recognition of conserving freshwater resources, including Nile water resources, this chapter indicates the inadequacy of the Ethiopian effort to conserve the Nile water resource through the construction of storage facilities. Moreover, the Ethiopian effort to rehabilitate the Nile watershed since at least the 1970s has helped mitigate the southward expansion of desertification and climate change effects. Ethiopia has made minimal diplomatic efforts to showcase its actions, which have increased significantly since 2011 with the start of GERD. Despite Ethiopia's efforts in water management, downstream states have not acknowledged or compensated for the benefits they have received. The Ethiopian government has not highlighted its initiatives to safeguard the Nile basin ecosystem or the expenses it has incurred for neighboring countries. Moreover, the Ethiopian water laws and policies are myopic concerning transboundary river basins since there is no room for the engagement of the riparian states that rely on the water that originates from Ethiopia.

The downstream Nile states continue to enjoy the efforts of the Ethiopian farmers and also the sacrifices the Ethiopian farmers suffer from, as Ohlson (1965) calls ‘free riders” of the farmers’ collective action without contributing a penny. The sustainability of the Nile requires a collaborative effort where every state that benefits from the river ought to contribute its fair share for the sustainability of the river and its environs.

In general, the chapter illustrates the insufficiency of individual state water laws and policies in governing water resources in the Eastern Nile basin. Challenges in Eastern Nile water

management arise from their transboundary nature. Unilateral efforts, such as Ethiopia's intervention, are inadequate for addressing large-scale issues like environmental degradation in the Nile's upstream region. This situation challenges regime theorists' belief that states unable to tackle common issues individually would resort to collective solutions through supranational agreements like the NBI. Similarly, downstream states' failure to mitigate water loss from evaporation has not prompted collaboration with upstream states to address the problem effectively. Egypt's attempts to preserve the Nile have primarily resulted in reclaiming desert lands without compromising their stance on Nile monopolization. This scenario in Egypt mirrors Hardin's tragedy of the commons, where each actor prioritizes self-interest, risking the sustainability of the shared resource.

Chapter Five: Regional response through laws and institutions for Sustainable water use and conservation in the Eastern Nile Basin

5.1. Introduction

This chapter offers the regional response to sustainable water use and water conservation through basin-wide legal and institutional mechanisms in the Eastern Nile basin. The chapter highlights the challenges and opportunities of collective action in the sub-basin.

It also attempts to explore the evolution of regional legal regimes and environmental policies to govern water use regimes during different periods at the regional level. Moreover, the chapter examines the efficacy of the regional agreements and institutions for water conservation and the protection of the Nile environment from degradation. The riparian states of Nile have tried to conclude agreements that govern the Nile water resources at different times. However, most of the agreements in the Nile basin in general and the Eastern Nile basin in particular have been characterized by partiality and non-inclusivity. Thus, this chapter analyzes how the different agreements in the basin have impacted water use patterns and conservation in the Eastern Nile

basin during different historical periods by national governments (through a quasi-intergovernmental approach) and colonial powers from outside the region.

To overcome the challenge of cooperation in the post-independence period, the countries along the Nile basin tried to come up with different agreements that enabled these countries to deal with the challenge of river degradation and allocate the water resource among the riparian states or the benefits thereof, as proposed in the NBI Shared Vision. The effort to overcome cooperation problems also helps to coordinate water use policy and the much-needed conservation of the river by member countries, as well as mobilize resources from the international community jointly. Indeed, the existing international law to govern shared water resources was biased towards the development of the shared river rather than giving attention to conservation of the river water (Tarlock, 2000).

In the Eastern Nile basin as well as the entire Nile basin, the water regime that is supposed to govern the Nile water resources is made up of treaties and agreements that are not recognized and acceptable to all the riparian states (Kimenyi and Mbaku, 2015). This lack of all-inclusive regional water agreements not only complicated the aspirations of the millions of people in the basin to fairly and equitably utilize the river but also the capacity of the regional states to deal with the natural and man-made threats to the Nile water and its ecosystem. The different agreements and associated institutions that came into being during the different historical periods by both colonial powers and postcolonial states have rarely encouraged water and ecosystem conservation in the basin except with the newly negotiated CFA and the NBI shared vision, which have given emphasis to water conservation and sustainable water use in the basin (NBI, 2012). Therefore, this chapter analyzes and interprets how the various Nile treaties affected water use patterns and conservation. Moreover, the chapter also tries to uncover the way these agreements affected the laws and policies of the riparian states in the Eastern Nile basin.

Furthermore, it tries to compare the achievements and challenges of the agreement with the achievements and challenges of EU water directives and the SADC region water protocol. This helps to shed light on the missing elements in the Eastern Nile basin to protect the river and its ecosystem, as well as lessons learned from the experience of these regional agreements as they significantly contributed to the safeguarding of the major river system in their respective regions.

To shed light on the evolution of regional agreements and associated institutions and their impact on water conservation, this chapter is divided into four sections, including the introduction part. After the introduction section, the second section attempts to describe the way regional governance regimes affected water use patterns and tranboundary water management in the Eastern Nile basin. This section tries to shed light on the impacts of colonial and post-colonial water management regimes on water use patterns. For this analysis, the post-independence period is divided into two periods: the period from the 1950s to the 1990s and the post-1999 period marked by the historical NBI. The NBI is a landmark since that interim agreement is the first multilateral agreement in which all the riparian states, except Eritrea, have participated. The third section tries to analyze the role of regional water institutions in Eastern Nile governance. Finally, the last section summarizes the main themes discussed in the chapter.

5.2. The Impacts of Regional Agreements on Water Use and Conservation in the Eastern Nile basin

5.2.1. The Impacts of Regional Agreements on Water Use and Conservation in the Eastern Nile Basin during the Colonial Period

The attempt to forge regional agreements on the utilization of Nile water has a long history in the basin that dates back to the colonial era, when Britain was a colonial power in the Eastern Nile basin. Britain had tried to develop a regional framework to regulate water use and ensure the unimpeded flow of Nile water. The British plan for the entire Nile River was partly expressed from the perspective of the global political economy, where Britain was attracted to North East Africa not only because of the opening up of the Suez Canal that subsequently led to the occupation of Egypt in 1882 but also because it had to do with the search for alternative sources of cotton for their textile mills. The American civil war forced the British to look for alternative sources of cotton for their textile mills (Kimenyi and Mbaku, 2015). So, in addition to securing the Nile to stabilize Egypt, which was vital for the security of the Suez Canal, the logic of acquiring cotton through large-scale irrigation was in the minds of British policymakers (Samaan, 2019; Kimenyi and Mbaku, 2015).

Before the efforts to establish regional agreements, the countries in the Eastern Nile basin had interacted with each other for millennia. This interaction between the countries in the basin had

both spiritual and material aspects. Despite such interactions between the countries in the basin for millennia, the effort to form comprehensive, all-inclusive cooperation in the Nile basin has materialized with the NBI. Indeed, the history of regional agreements over the Nile River started during the colonial period and was pursued in the post-independence period; the first such agreement over the Nile was the 1959 agreement (Kefyalew, 1999).

According to a historian from the Institute of Ethiopian Studies (IES)[59], the British intention to sign a set of treaties could be viewed as an effort to ensure the Nile's flow to Egypt for development reasons. But from a conservation angle, their hydrologists have realized the need to store the Nile in cool areas with low evaporation rates. Several previous studies, despite conceding the intention of the British to secure water for their irrigation agriculture, hardly reported the importance of the British plan to conserve water in the upstream states, regardless of for whom they try to store the water. In this regard, Wuhibegezer and Shiferaw (2014) contended that during the colonial era, the British colonial empire, which ruled over the entire Nile region except Ethiopia, tried to carve up a water use regime for all the societies along the Nile River basin. The primary objective of water agreements during the colonial period was to dissuade the upper riparian societies from the use of Nile water as well as store water to ensure the flow of the river by establishing reservoirs in the upper catchment areas. The British were preoccupied with securing the continuous flow of the Nile River to Egypt to strengthen their hold on the lower riparian countries. To achieve their objectives, the British signed a series of agreements with European as well as non-European countries to embark on large-scale irrigation farms.

Recent works by Hashiru and Tüfekç (2022) and Jacobs (2012) also underlined the British intention to regulate water use and management in the basin through series of treaties on the Nile water. According to these authors the British colonialists were well aware of the importance of the Nile for political stability and economic growth in their colonies of Egypt and Sudan. Hence, they came up with a policy that prevents any hindrance to the flow of the river. Moreover, to maximize the exploitation of the natural resources of these colonies, the availability of water at the right time and in the right amount is essential. To realize the aim of maximum exploitation of the natural resources of the colonies, they developed infrastructures of different sizes at different

[59] Interview with IES staff at AAU on July 21, 2020.

places. In Egypt, they built a series of dams to provide sufficient water for their irrigation projects. In Sudan, they set up a large irrigation scheme in Gezira for cotton production. In essence, the British water policies and laws were all designed to guarantee the flow of water to irrigation projects, which in turn allowed them to supply cheap raw materials to the mammoth textile industries back home. The colonial-era water treaties in the Nile Basin have to do with preventing the upper riparian countries from using the Nile water, denying them the right to use their water resources for their development.

Similarly, a law lecturer [60] from Bahirdar University has a view that though the colonial water agreements in the Eastern Nile basin lacked the major principles of international water laws regarding Nile water conservation, the British had a better idea with their plan to undertake the project of Century Storage at Lake Tana. This is a result of strategic thinking, unlike the leaders of independent Egypt and Sudan, who have a myopic vision for storing the Nile water within their national boundaries. The idea of regulating the flow of Nile water by building reservoirs upstream where the evaporation is relatively low was not realized in the case of Lake Tana due to several factors. Similarly, Wuhibegezer and Shiferaw (2014: 55) declared that these colonial time agreements were full of “fraud, coercion, exclusivity, and the deficiency of many of the precepts of international law." However, the idea of having a perennial flow was inherited by the post-independent states of Egypt and Sudan, which led to the construction of the Aswan High Dam (Cascão, 2019).

However, the Egyptian policymakers were only interested in building such perennial storage within their territory without due regard to the vulnerability of the water of the Nile to evaporation as the dam was built in the middle of the desert. The British had tried hard to sign an agreement with the Ethiopian imperial regime, though the latter became reluctant to sign the agreement for fear of the British intentions and the inundation of the monasteries on Lake Tana. In this regard, the British were more sensitive to water saving than the post-colonial downstream states of the Nile, who solely rushed to control the storage infrastructure within their territory rather than reduce the wastage of Nile water, which is estimated at 10 BCM annually (Swain, 1997).

[60] Interview with a law lecturer at Bahirdar on June 15, 2020.

The IWIM expert (March 23, 2020) and Ethiopian International Relations scholars (2020) indicated the negative impacts of the colonial time treaties, which significantly affected relations among independent states and also Nile water management. These colonial treaties have had an enduring impact on water use and water management/mismanagement in the basin. These colonial legacies and bilateral agreements among Egypt and Sudan created the prospect for cooperation and hence complicated the management of the Nile water. In the Eastern Nile basin, colonial-era agreements tried to allocate water use between Sudan and Egypt, leaving behind the upper-riparian country of Ethiopia. After the independence of the two countries of the British colony, the trends continued in the same manner.

Tvedt (2004) who extensively studies the British Colonial experience in the Nile valley reported the legacy of the British colonialism over the Nile water. The agreements over Nile water use among European powers date back to the end of the 19th century. These agreements over Nile water were made between Britain, a colonial power that occupied most of the Nile valley, and other European powers on behalf of their actual and would-be colonies. At the dawn of the 20th century, a series of agreements were negotiated between Britain and Ethiopia, as well as other European powers. These treaties left a lasting legacy regarding Nile water use. The laws and policies have impacted water use to this day, particularly among the lower-riparian states of Egypt and Sudan. Tvedt (2004:16) vividly expounds this fact in the following ways: “The legacy of the colonial period is still relevant and still has an impact.”

The colonial era treaty in the Eastern Nile basin began with the April 15, 1891, Anglo-Italian protocol, which claims to be a territorial delineation, though it raised the Nile issue in Art. III of the protocol. Despite its camouflage as a boundary treaty, this protocol prohibits Italy from undertaking any water projects or allowing water projects over the Atbara River. The Italian government committed itself not to construct a dam or any project that sensibly modifies the flow of the river to the Nile, whose upper reach fell within the newly acquired Italian colony of Eritrea (Swain, 1997). Ferede (2014: 068) stated this protocol was the first British “practical move... to protect the Egyptian interests at any cost by guising it in territorial protocol concluded with another colonial power”.

The second colonial treaty was the Anglo-Ethiopian Treaty, which was signed on May 15, 1902. This treaty came into being after a negotiation held between British diplomats and Ethiopian officials to delimit the territorial boundary between Anglo-Egyptian Sudan and Ethiopia. This treaty had different meanings in its Amharic and English versions regarding Nile water use. Moreover, the treaty was never ratified by Ethiopia (Kefyalew, 1999). It was one of the most controversial water treaties over the use of Nile water since there had been a substantial difference between the Amharic and English versions of the agreement. Ullendorff (1967: 646) quoted the difference between the two versions as follows: the English versions of the agreement on Article 3 stated that Emperor Menelik II “engages himself [...] not to construct, or allow to be constructed, any work across the Blue Nile, Lake Tana, or the Sobat”. On the other hand, the Amharic versions clearly state "the impossibility of completely arresting the flow of the waters” (Ullendorff, 1967: 642). According to Kefyalew (1999), despite the insistence of Sudan on this agreement, it had little impact on Nile water use in Ethiopia. However, the treaty has impacted the cooperation of the riparian states to jointly utilize and protect the ecology of the Nile water.

In the Eastern Nile basin, the third colonial time agreement over the Nile (Gash) was signed between Britain and Italy in 1901, which was later further elaborated through the “Anglo-Egyptian Exchange Note” in 1925. According to Kefyalew (1999), the 1901 Anglo-Italian agreement over the River Gash was dubbed an equitable agreement over water utilization. In his own words, "Of all the treaties and agreements made during the colonial period, it could be said that this agreement was the most equitable” (Kefyalew, 1999: 1). Nevertheless, this agreement has a limited effect on water use efficiency and conservation. In the same manner, the 1906 tripartite agreement between Britain, France, and Italy had no impact on water use efficiency, but it tried to prevent Ethiopia from using Nile water, though Ethiopia rejected the agreement based on its sovereignty claim (Ferede, 2014). As a further clarification and detailing of the 1901 agreement, the 1925 exchange of notes between Italy and Britain allowed Britain to construct barrages on the mouth of Lake Tana. However, Ethiopia opposed the idea of the note and appealed the case to the League of Nations (Kefyalew, 1999).

The other important colonial time agreement was the 1929 agreement between Britain (on behalf of Sudan) and Egypt, which allocated 48 BCM to Egypt and 4 BCM to Sudan. The agreement also granted Egypt the right to monitor the flow of the Nile in upstream countries and veto any

Nile water projects that affect its interests. The most important passage of the agreements reads as follows: "No works should be constructed or measures taken on the Nile or its branches or on the lakes from which it flows, in the Sudan or the territories under British administration, which would affect the flow of the river in such a way as to cause prejudice to the interests of Egypt" (quoted in Shahin, 1985: 11).

Moreover, the flow of the Nile during the dry season was reserved for Egypt, which was allowed to undertake any water projects on the Nile without the will and notification of the upper riparian countries. This colonial time agreement has remained a stumbling block for the cooperation of the co-basin states and thus the joint management and regulation, which is vital for the sustainability of the river water (Whittington and Guariso, 1983). The agreement was based on the same logic of securing the Nile for Egypt by denying the other riparian states the right to use the water. However, this agreement granted Sudan limited rights to use the water of the Nile, with which the Republic of Sudan was dissatisfied and demanded the renegotiation of this agreement on the Sudanese share of the Nile water (Elmam, 2010).

The South Sudanese hydrologist[61] and IWIM expert[62] argued that the series of colonial treaties that Britain concluded with the different powers of the time aimed at securing the flow of water, which led to the building of a series of barrages and storage facilities. These facilities aim to meet the growing demand for water in Egypt due to the expansion of water-intensive crops through irrigation and the reclamation of additional lands for growing foodstuffs and industrial raw materials. Therefore, this demonstrates that the agreements ensured the building of storage facilities, which are beneficial for expanding irrigation farming operations and temporarily meeting water needs. Thus, this shows the treaties guaranteed the construction of the storage facilities, which are helpful for the expansion of irrigation agricultural activities and temporarily addressing the water demands.

In line with these views, Sutcliffe and Parks (1999) indicated how the series of colonial treaties helped both Egypt and Sudan to build storage facilities that provide water during the season of

[61] Interview with a South Sudanese hydrologist who worked in the Sudanese Ministry of Water Resources and Irrigation for more than two decades and now works as a lecturer at Juba University on December 10, 2019.

[62] Interview with an IWIM tansboundary water expert in Addis on March 23, 2020

low flow. During the colonial era, storage facilities kept being upgraded to increase their water-holding capacity and provide water for the ever-growing water demand in both countries. Before the implementation of the idea of over-year storage facilities, the Egyptian authorities kept upgrading the existing facilities. For instance, the Aswan Dam was upgraded twice to increase the water holding capacity of the reservoir: from 1 billion cubic meters in 1912 to 2.25 billion cubic meters in 1912 and five billion cubic meters in 1934. The building of the storage facilities helped to grow water-intensive crops and reclaim additional lands, which led to the expansion of agricultural lands in both countries.

The IWMI expert (March 23, 2020) emphasized the ongoing significance of British water policy and diplomacy concerning the Nile River, despite resistance from independent upper Nile riparian states. Egypt and Sudan continue to cultivate water-intensive crops such as cotton, favored by the British in the past, leading to inefficient water usage in desert environments. While efforts have been made to promote water conservation and efficiency through regulations and policies, outdated wasteful practices from the colonial period endure in Egyptian agriculture.

Moreover, to artificially keep the prices of agricultural products low, the value of water was not included in the price of products for British buyers. The undervaluation of freshwater resources among lower riparian states encourages and maintains the wastage and inefficient utilization of water among water users in Egypt and Sudan. Again, at the time, water conservation was not a concern of British policy; hence, they inundated the irrigation fields with water, subjecting this precious resource to wastage and misuse. Water productivity and efficiency were not policy concerns at the time of British rule. The post-independent states of Sudan and Egypt made little or no modifications to water use regimes in their agricultural fields. The wastage and misuse of water are not only limited to agricultural fields but also to all the sectors that use water, ranging from domestic to industrial uses (South Sudanese hydrologist, December 10, 2019).

In diplomacy, the downstream states seldom stray from colonial-era practices that do not accommodate the concept of fair and equitable use. This has hindered the potential for mutually beneficial outcomes for all the states in the Eastern Nile basin. The difficulty in rectifying colonial-era water allocation among the Nile riparian states till now shows the stubbornness of the policy of the lower riparian states. The utilization of water for growing cash crops like cotton

in the irrigation schemes in Sudan and Egypt also marks the continuation of the British policy to grow cash crops. More importantly, the wasteful water application practices in the agricultural fields have not changed much since the British left the region (Swain, 2011).

Although there had been an interaction between the Nile riparian countries, regional agreements to govern the water use of the Nile came out only during the era of the scramble for Africa by European powers. These European powers made a series of treaties on behalf of their colonies and the Ethiopian rulers at the time. To maintain the Nile flow regime, Britain made agreements and treaties with other European powers, the French, Belgian, and Italian. They also agreed with the Ethiopian imperial regime of the time. These agreements are merely interested in the uninterrupted flow of Nile water to their downstream colonies of Sudan and Egypt. These agreements are neither intended for fair and equitable allocation of Nile water nor sustainable utilization and conservation of the water. By denying Ethiopia the Nile water for her development, the British denied the Ethiopian people's welfare. The 1902 British agreement to build the century dam might be intended for sustainable utilization of the river that helps to regulate the flow of the river to downstream countries. Moreover, these agreements were not all-inclusive and had no sense of equity for the societies along the river (Jacobs, 2012).

In contrast to the UN documents and the then-OAU Charter, which unequivocally upheld the sovereignty of states, these colonial-era agreements undermined the sovereignty of upstream states. However, colonial-era agreements unfairly favored downstream states like Egypt. These colonial time agreements prohibited upper-riparian states like Ethiopia from developing and using their water resources in the Nile basin. The British Nile policy had an enduring impact on Nile water use, management, and allocation after they left the region. According to Oestigaard (2012), the British Nile Vision legacy impacts water development and water use in the entire basin. In his own words, "today's premises for agricultural development are partly shaped by the British colonial legacy and by Britain's vision for the Nile Basin. The previous agreements on water distribution and usage and the British water systems still effectively structure agricultural practices and water management (Oestigaard, 2012:10).

The colonial time agreements restricted the use of the Nile water to the lower riparian countries of Sudan and Egypt. The other riparian states were prohibited from using this shared resource in

one way or another. The 1929 agreement, which was negotiated between Egypt and Britain on behalf of its colonies, stated that “no irrigation or power works or measures are to be constructed or taken on the Nile and its branches, or on the lakes from which it flows... in such a manner as to entail any prejudice to the interests of Egypt, either reduce the quantity of water arriving in Egypt, modify the date of its arrival, or lower its level (as quoted in Oestigaard, 2012: 26).

According to Ferede (2014), colonial state engineering had affected the water use regime in the Eastern Nile basin. Sklar (1994) argued that colonialism had been the mechanism through which Western ideas and institutions diffused to Africa. One of the institutions diffused to the continent has been the notion of the Westphalia nation-state system, which sliced the continent into their colonies without due regard to "cultural, national, historical, and geographical consideration in setting the borders of their respective spheres of influence” (Ferede 2014: 065). Moreover, Ferede (2014) argued that this introduction of the Westphalia notion of the state system "change [d] from fluid interconnection to separate geopolitical space complicated the communal ownership of resources such as international rivers” (Ferede, 2014: 065).

Indeed, the introduction of the Westphalia notion of the state system in the basin because of the idea of sovereignty over their respective territories undermined the communal ownership of the Nile water; however, in the Eastern Nile basin, mutual mistrust and suspicion far preceded the arrival of colonialism in the region (Yacob, 2007). Therefore, mutual mistrust and suspicion, which defined the relations between the upper and lower riparian states in the Eastern Nile basin, were reinforced by the arrival of colonialism, which further complicated the communal ownership and use of the water in the Eastern Nile basin. In other words, poor cooperation among the Nile states and colonialism affected the conservation of the Nile water and its ecosystem, as the conservation of shared water resources demanded meaningful cooperation and the setting up of regional institutions that coordinate water use and water management across the basin.

The water use regime imposed by the European powers indeed undermined the spirit of cooperation and the natural interconnections between states in the Eastern Nile basin as they introduced the Westphalia notion of the modern state system in the basin, which gives primacy to sovereignty more than anything, undermining the possibility of cooperation in the basin. He also

stated that the notion of a state system undermined the traditional water use arrangements in the basin, replacing them with a European legal conception. However, in the Eastern Nile basin, the Westphalia notion of a state system imposed on Africa partly affected the possibility of cooperation between the Eastern Nile basin riparian states, but this alone cannot explain the full picture of the challenge to the Nile water system. In contrast to this assertion of externalizing the cooperation problems in the basin, historical records show the presence of mutual mistrust and suspicion between Ethiopia and Egypt long before the arrival of European colonialism in the Nile Valley (Yacob, 2007).

All the colonial water use agreements were more concerned with the unhindered flow of the Nile River to the lower colonies and establishing their hegemony over water use regimes. The agreements did not focus much on protecting and conserving the river or ensuring its sustainability while using the Nile water resources. Moreover, the British had given little attention to water use efficiency when applying it to irrigation fields. These biased water policies of the colonial power have an enduring legacy on the subsequent water use regimes in the basin. As a result, though the lower riparian states along the Nile River basin are water-stressed, they have so far given little or no attention to ensuring sustainable water use in the basin (Jacobs, 2012).

These colonial-era water treaties not only prohibited the upper riparian states from using the water resources of the Nile but also did not set any incentives for the upper riparian states to protect the river ecosystem from which the Nile water originates. As a result, the Nile River ecosystem degraded, particularly in the Ethiopian highlands, because of a lack of alternative sources of income for the subsistence farmers in the highlands of Ethiopia and population growth (Haileslassie et al., 2008). The post-independent state of Egypt pursued the same policy of intimidation and undermining the efforts of the upper Nile states to utilize the Nile water using their diplomatic and political clouts (Cascao and Nicol, 2016).

5.2.2. The Post-Colonial Water Agreements and Its impact on Water Use and Conservation in the Eastern Nile Basin

In this section, several treaties that range from the 1959 Egypt-Sudan full utilization of the Nile agreement to the TECCONILE agreement are briefly discussed in relation to their impacts on

water use efficiency and conservation in the Eastern Nile basin. According to Homer-Dixon (1999), it is not only technological advancement that enhances water resource conservation but also the quality of legal regimes and policies. Based on this concept, the following part of this section elaborates on the status of regional legal and policy regimes in the Eastern Nile basin. The fact that a huge gap exists between available water and demand for water shows the need to practice water conservation throughout the Nile basin to cope with the challenge of water scarcity in the basin, in addition to the need for joint regulation of the river along all reaches to avoid both violent conflict and water crises in the basin (Wu et al., 2016).

In the post-colonial period, the desire for regional agreement has been pursued in different forms with the main objective of Egyptian hegemony over Nile water use. The post-colonial period can be divided into two phases: the period from independence to 1999 and the post-1999 period when NBI came into existence. Sustainability and conservation of the basin have not been part of the regional agreement until at least the 1999 All-Inclusive Nile Basin Initiative (NBI). However, in the Eastern Nile basin, none of the riparian states incorporated the NBI provisions, though most of them, except Eritrea, are signatories to the interim agreement. In May 2010, the CFA was presented for signature after lengthy negotiations. Nevertheless, the downstream states raised objections to Article 14(b) of the CFA, despite being involved in the negotiation. On the other hand, the upstream countries adopted the CFA agreement and ratified it by their respective parliaments. This time again, the effort to form a basin-wide multilateral agreement to govern the Nile basin water and its ecosystem remains a futile effort (Cascao and Nicol, 2016).

5.2.2.1. The 1959 Full Nile Utilization Water Agreement between Egypt and Sudan

In the Eastern Nile basin, the major water agreement after the states gained independence was the 1959 Egypt and Sudan Full Nile Utilization Agreement. This agreement allocated all of the Nile water between the two countries, leaving none for the upper riparian states. During the negotiation and signing of the agreement, they neither invited nor consulted the upper riparian states that contribute the lion's share of the water to the lower riparian states. According to the agreement for the total 84 BCM of Nile water, Egypt received 55.5 BCM, and Sudan agreed to receive 18.5 BCM. They allocated the remaining 10 BCM for evaporation. This agreement paved

the way for the implementation of the idea of over-year storage to guarantee the water security of Egypt. Accordingly, the Aswan High Dam was constructed to withhold the annual flow that provides regulated water during the seasons of low flow (Said, 1993).

The World Bank expat[63] has the view that no other treaty has complicated Nile water management in modern times as much as this 1959 bilateral agreement between Sudan and Egypt. This treaty has posed a stumbling block to negotiation among the upstream and downstream states in how to use and manage the Nile water, as its effect was revealed during the recent negotiation, which forced upstream states to lose any hope of continuing multilateral negotiation. Once countries like Ethiopia lost hope in this multilateral negotiation and the possibility of undertaking joint multipurpose projects in the upstream areas, Ethiopia embarked on unilateral water management, which resulted in the commencement of the GERD project in 2011. Moreover, this treaty has exposed the common Nile water resources to unprecedented water loss as a result of massive evaporation from Aswan High Dam.

According to Mckenzie (2012: 572), the 1959 and 1929 agreements "form the basis of Egypt's legal position." The 1959 agreement led to the construction of the largest manmade lake in the world, with a holding capacity of 169 BCM (Cascao, 2019). The water control of the Nile was aimed at the expansion of irrigation agriculture, power generation, and protection against floods (Teshome, 1997). The dam allowed perennial irrigation in the areas of basin irrigation. The dam allowed the flow of regulated water, which enabled the expansion of irrigation agriculture in Egypt in the Nile valley and beyond. Egypt is implementing development projects outside the Nile basin on the Sinai Peninsula called the 'North Sinai Development Project' to develop 2,510 km^2 (620,000 acres). The other project outside the Nile basin is the 'Toshka, South of Egypt Development Project', which aims to develop 2,185 km2 (540,000 acres) (Elmam, 2010: 220). Thus, the 1959 agreement that led to the construction of the high dam enabled water storage for periods of higher demand during the low-flow seasons. Rashid Said (1993) reported that the water of the Aswan High Dam shielded Egypt from the impacts of the 1984–1985 drought.

[63]Interview with a World Bank expat in Addis on February 21, 2021

An Ethiopian hydraulic engineer[64] claims that in the contemporary world, because of population growth, high per capita consumption, and expanding industries and agricultural fields to feed millions of mouths, this traditional way of saving water during periods of surplus and using it during shortages is no longer adequate to provide adequate and the required quality of water. Even though the 1959 agreement temporarily addressed some of the water challenges of Egypt, it has no lasting solution to address the water management challenge in the basin. Therefore, the Aswan High Dam, which came into being because of the 1959 agreement, no longer suffices to deal with the growing challenges. This shows the inadequacy of the existing bilateral regime to meet the water needs in the basin.

According to the Egyptian diplomat[65], despite all the criticisms against the dam, he stated that, from an Egyptian and a Sudanese perspective, the 1959 agreement enormously contributed to developing their economies by providing electricity, which powered other sectors of the economy. Moreover, the regulated water supply also enabled the expansion of perennial irrigation in the country. Nevertheless, the South Sudanese scholar[66] has a view that the dam's construction in the middle of the desert not only exposed this shared river water to tremendous evaporation of 10–13 km^3 but also has not brought efficient utilization of the water resources in the country. In the Republic of Sudan, too, the agreement has not changed water use practices except for allowing the country to use the river water to expand irrigation agriculture by building an additional reservoir, which was completed in 1966.

The colonial-era treaties and the agreement made by the independent states of Egypt and Sudan in 1959 say little about the sustainability of the river and how to protect it from degradation. The exclusive nature of the agreement significantly hampered its potential contribution to the conservation of Nile Basin water resources and its ecosystem. Indeed, these two countries contribute little or no water to the flow of the Nile, and they are mere receivers of the Nile's blessing. In these two countries, neither the colonial-era agreement nor the post-independence

[64] Interview with hydraulic Engineer lecturer at Ambo University on April 1, 2019 at Ambo.

[65] Interview with Egyptian diplomat on May 5, 2020.

[66] Interview with a South Sudanese hydrologist who worked in the Sudanese Ministry of Water Resources and Irrigation for more than two decades and now works as a lecturer at Juba University on December 10, 2019.

agreement of 1959 spoke about how to protect the river from degradation, despite their dependence on the Nile for their livelihood (Whittington et al., 2014).

The IWMI expert [67]has an opinion that the best these two lower-riparian countries could have done in the direction of water resource conservation would have been ensuring the efficient utilization of each drop of water that reaches their territory and contributes towards the conservation of the environs from where the Nile originates. Logically, these two Nile states should care much more about the conservation and sustainable use of the river than the other riparian states that have alternative water resources. Contrary to this logic, the two countries have been showing little interest in mobilizing resources for the conservation of the Nile ecosystem. Egypt, which is almost dependent on the Nile for its freshwater demand, has so far shown little interest in conserving and protecting the Nile River from degradation. Their adherence to the outdated and unfair 1959 agreement hindered Nile basin countries' collaboration to deal with current transboundary challenges. This has impeded efforts to ensure the river's sustainability.

In the Nile river basin, water tribunals established through agreements, like those seen in the EU and South Africa, are notably absent. These tribunals play a crucial role in promoting the efficient use of limited resources such as freshwater. Unlike in more successful basins, there is a lack of institutionalized regional agreements in the Nile basin that would create water tribunals responsible for holding those who harm the river system accountable. The failure to establish a legal framework has left the Nile's freshwater ecosystem vulnerable to degradation. In successful regions like the European Union, both regional and national laws make it a criminal offense to violate water usage and pollution regulations. However, in the Nile basin, there has been no enforcement or penalties imposed on those who have harmed the river's ecology. Currently, the agreements in the Nile basin have not been formalized into a water tribunal system, as is customary in other thriving water management systems (Jacobs, 2012).

In this regard, Jafroudi (2018) further argued that international agreements could survive and stay long if they were believed to promote the welfare of all the stakeholders and parties to the agreement. If such international agreements are no longer believed to serve the interests and

[67] Interview with IWIM tansboundary water expert in Addis on 23 March 2020.

welfare of all, it is difficult to expect compliance from member states. In the Eastern Nile basin during the colonial period, Britain managed to impose its will on the upper riparian states in its effort to safeguard the water for the two lower riparian countries. However, such an effort by Britain to impose her imperial aspiration over the region crumbled once these countries in the region decolonized. All the post-independent states rejected the colonial-era treaty as it didn't serve their interests and demanded the replacement of the colonial-era agreement with a new all-inclusive agreement for a long time (Awulachew et al., 2012). Despite the demand from these newly independent states for fresh negotiation and agreement, no meaningful regional agreements have been reached over Nile water use because of Egyptian military and economic hegemony, which prevented the upper riparian states from utilizing the water resources of the Nile (Whittington et al., 2014).

According to the World Bank expat,[68] the World Bank and UNDP facilitated the conditions for the riparian states to negotiate to form permanent legal regimes that govern Nile River water use and water management in order to deal with common challenges that are transboundary. The riparian states seem to realize that no individual country effort could ensure the sustainability of the Nile water. As a result, they were forced to sit together and discuss the Nile issue, and they adopted different initiatives and treaties. It is in this context that the NBI, its shared vision, the CFA, and its different provisions for sustainability in the Nile came into being.

Some analysts rejected the regional approach to addressing the problem in the Eastern Nile through cooperation. According to Kalpakian (2015:49), the opportunity for cooperation was missed when Egypt decided to build the Aswan High Dam on the Nile and wasted about "20 to 50 percent of the water that flowed in its irrigation system." In his wording, "This fact suggests that it is too late for ideas like "benefit sharing" and "cooperation" in the Nile basin. Egypt chose self-help at the implicit expense of others in terms of externalities, and now Ethiopia is doing the same."

[68] Interview with a World Bank expat in Addis on February 21, 2021

Ethiopian IR professor[69] stated that the insistence of the downstream states on the 1959 agreement forced upstream states like Ethiopia to continue to use the Nile water through unilateral means, at least using their own financial resources. Financing projects from domestic resources will be the rule, and the insistence of the downstream states on the 1959 agreement is no longer a sufficient condition for prohibiting upstream states like Ethiopia from developing the water resources. But such unilateral endeavors hinder any meaningful cooperation among the states to deal with common challenges. Even unilateral water development projects appear to benefit the downstream states without any contribution on their part. Such intervention allowed these downstream countries to regulate the flow of Nile water and shield the Sudanese reservoirs from siltation.

In the same manner, previous studies indicated the way the 1959 agreement reinforced unilateral water development and hindered any meaningful cooperation and hence regional means to deal with water management challenges that undermine the sustainability of Nile river water. Ethiopia had no choice but to utilize its water resources to feed its burgeoning population through irrigated agriculture. Subsistence agriculture based on rainfall no longer feeds the population and sustains the growing economy of the country. Thus, to pull people out of poverty and change the structure of the economy, Ethiopia planned several irrigation schemes of different sizes that hoped to change the livelihoods of millions of people (Beyene, 2019). The remaining countries in the Eastern Nile basin have their own plans for exploiting the water resources of the Nile. Egypt had a plan to reclaim millions of hectares of land in different areas using this dwindling resource of Nile water. Such competition over the utilization of water resources not only jeopardizes the livelihood of the societies that directly rely on Nile water but also complicates the goal of achieving sustainable utilization of water resources (Hansson *et al*., 2012).

One then raises a logical question: if all those development projects were continued in such a unilateral direction by all the riparian countries of the Eastern Nile Basin, following their respective national interests, where did that process lead these countries of the Eastern Nile Basin? That trend of water utilization is no longer sustainable, and the livelihood of millions of

[69] Interview with Ethiopian International Relation Professor at Addis Ababa University, on February 4, 2021.

people relying on the Nile resource would be jeopardized, leading the riparian countries to inevitable tension and violence at different scales in the region (Thuo and Riddell, 2015).

Common property resources like the transboundary river system demand joint efforts to develop and protect them. International river system exploitation by one state would diminish the benefits of the resources of other countries. To avert such a scenario, Aaron Tesfaye suggested what he believes is an 'ideal' solution as follows: "The ideal solution to this collective action problem, a solution that would satisfy competing needs and conflicting interests, maybe basin-wide development of water resources under some system of supranational authority. However, he warned that "such a lofty objective can be reached only incrementally" (Aaron, 2008:5). His suggestion conforms to the European Union's approach to resolving the collective action problems of European international rivers through phases (Dellapena and Gupta, 2008).

The nations of the world cooperate on a wide range of issues. In Africa, there were regional arrangements over several issues, the quest for economic cooperation being the largest one. Unfortunately, their cooperation over the use and conservation of shared resources like water is at a nascent level. In Africa, there were regions that showed much progress in cooperating over resource uses, like the SADC region, as we have seen in Chapter 2. In the Eastern Nile basin, countries in the region showed a great willingness to cooperatively harness the resources of the Nile in a sustainable manner. To achieve this noble goal, several agreements came into being, either in a multilateral or bilateral modality. Moreover, they set up institutions with a stated mission to achieve the goal of cooperative use of the resources. The agreements that led to the formation of regional institutions to govern the shared resources of Nile have accumulated experiences of governing resources in such complex settings. The support from the international community for the evolution and functioning of such institutions is also of vital importance (van der Zaag, 2009).

5.2.3. The Post-1990s Multilateral Cooperation and Its Impact on Water Use and Conservation in the Eastern Nile Basin

During the 1990s, all countries along the Nile River joined forces to create a collaborative effort aimed at better managing the water resources in the Nile Basin. The primary objective was to transition from a history of conflicts over water usage to a new era of working together

regionally. This initiative received strong backing from both the participating countries and the global community. Various key partners provided financial support for joint projects, including the Canadian International Development Agency (CIDA), UNDP, the World Bank (starting in 1997), and several European donors from 2001 onward (Tesfaye, 2003). Before the 1990s, the Nile region was characterized by uneven development of water resources and ongoing diplomatic disputes between downstream and upstream nations, rooted in differing stances on historical agreements concerning Nile water allocation. Until the mid-1990s, the situation remained a hydro-hegemonic stasis where downstream countries held more power in hydropolitical interactions due to stronger material, bargaining, and ideational capabilities. Upstream countries, on the other hand, could not alter this status quo because of factors such as low economic development, limited regional and international influence, and the global political environment of the Cold War era. Previous efforts to encourage multilateral cooperation were unsuccessful as they did not tackle the main challenge: the absence of a multilateral framework agreement involving all countries along the Nile (Cascao and Nicol, 2016).

After the imbalanced colonial treaties and a long period of piecemeal bilateral agreements, a multilateral, basin-wide framework for cooperation came into being in 1999 with the creation of the NBI. With the active involvement and support of the international community, the NBI aimed to introduce a new approach to ‘equitable and reasonable’ Nile water use. Initially, nine of the riparian states signed this multilateral framework agreement. Eritrea was absent from the process, and South Sudan emerged as an independent state much later, in July 2011. After lengthy negotiations, a draft of the Cooperative Framework Agreement was presented for signing to replace the NBI. Seven of the upper riparian states signed the agreement, while the two lower riparian states opposed it due to a disagreement over the wording of Art. 14(b). As a result, the agreement has not been operational, though three of the upstream states have already ratified it by their parliaments, regardless of the opposition from lower riparian states (Cascao and Nicol, 2016).

These agreements have emphasized the conservation and sustainability of the river. The deadlock over the allocation of the river among the riparian states has remained a stumbling block, though encouraging progress has been made towards cooperation over the use and management of the river. Neither the NBI nor the CFA have brought an end to the struggle of the

upper and lower riparian states over the utilization of Nile water in the Eastern Nile basin. A law lecturer from Bahirdar[70] stressed that the more an all-inclusive agreement over the allocation and utilization of the river was delayed, the more the river became vulnerable to the different threats to its water and ecosystem caused by man-made threats and natural disasters. The first effort to come up with multilateral agreements like the NBI and CFA had provisions that committed the states part of the agreement to the conservation of the river basin (see, for example, Art. 6 of the CFA).

The riparian states in the Eastern Nile basin have been part of the NBI, which is supposed to work with subsidiary institutions like ENTRO and also implement practically the provisions of the NBI. Let alone incorporating and implementing the provisions of the NBI, states in the basin have not assigned a focal person or department that supervises the implementation of the NBI principles and provisions.[71]

5.2.3.1. The Nile Basin Initiative (NBI)

The Nile Basin States attempted cooperation through initiatives such as Hydromet, Undugu, and TECCONILE before the establishment of NBI. Undugu (1983–1993) and its successor, TECCONILE (1992–1998), involved countries like Uganda, the Democratic Republic of the Congo, Egypt, Sudan, Rwanda, and Tanzania. Both Undugu and TECCONILE were initiated by the Egyptian government. Ethiopia chose to be an observer in Undugu and refrained from participating in TECCONILE due to the bilateral and sub-basin nature of the agreements. Egypt reportedly influenced the motivations of Undugu and TECCONILE members through a mix of threats and incentives. The focus on technical cooperation in these initiatives led to the deliberate neglect of legal challenges (Cascao, 2012).

Informants all agreed on the initial optimism placed on these multilateral agreements. They also acknowledged the significant strides towards cooperation in managing Nile water use. The

[70] Interview with a law lecturer at Bahirdar on June 15, 2020.

[71] Interview with ENTRO staff on May 30, 2019 at the ENTRO head office.

World Bank expat[72] stressed that people who cannot see eye to eye about Nile water use rights sitting in one room to manage their common resource are unthinkable, provided the political rhetoric that existed in the basin for a long time. It is remarkable when countries upstream and downstream of the Nile come together to identify shared projects that benefit all basin nations. The exchange of ideas and views is a success by itself, and the fact that these basin countries moved beyond that and started the implementation of the commonly identified project is tremendous progress. Despite the reluctance of basin countries to deviate from old agreements and make compromises, this does not erase the progress achieved in fostering cooperation. Future negotiations will build upon the existing foundation rather than start anew.

Similar to this view the NBI (2014) document revealed that since 1999, all the Nile countries have been collaborating under the Nile Basin Initiative (NBI) to establish a shared vision for the Nile Basin. This collaboration involves jointly identifying, studying, and planning investment projects aimed at benefiting Nile countries and their populations. This cooperative effort stands out for its constructive nature and depth of engagement, especially given the historical conflicts and mistrust among upstream and downstream riparians. For instance, the NBI has curated a comprehensive portfolio of investment projects focusing on energy production, trade, agriculture, watershed management, and environmental protection to bring about tangible socioeconomic advantages. In the Eastern Nile Basin, a region marked by complex hydropolitics, the three riparian states have collaborated on the ambitious Joint Multipurpose Project (JMP), which includes the potential development of hydraulic infrastructure in the Blue Nile Basin. Notably, this marks a significant departure from past practices, as Egypt, Sudan, and Ethiopia have jointly participated in this process under the Eastern Nile Subsidiary Action Program (ENSAP) (Cascao and Nicol, 2016).

Ethiopian academia[73] indicated that this multilateral cooperation process was launched to encourage transboundary cooperation in the complex Nile Basin. This process had two main tracks: a technical track led by the NBI as a transitional cooperative arrangement, and a political track focused on negotiating a CFA to establish a basin-wide framework for legal and

[72] Interview with a World Bank expat in Addis on February 21, 2021

[73] Interview with Ethiopian International Relation Professor at Addis Ababa University, on February 4, 2021.

institutional arrangements. The aim was for countries to adopt the CFA, leading to the replacement of the NBI with a permanent river basin commission. Countries were also expected to develop cooperative norms through joint activities under the Shared Vision Program (SVP) and two Subsidiary Action Programmes (SAPs) for the Eastern Nile (ENSAP) and the Nile Equatorial Lakes (NELSAP). Progress was made over a decade, with collaborative actions, experience sharing, and capacity building strengthening regional cooperation. The ultimate goal was to create an environment conducive to investments and on-the-ground actions. As a result of the SVP, the NBI took on three core functions: water resources management, water resources development, and promotion of basin cooperation. For him, the major normative changes in water resources management and development at a transboundary level occurred under the two SAPs. The SAPs aimed to identify cooperative investment projects at the sub-basin levels to benefit all involved parties and support transboundary development projects on the ground. ENSAP and NELSAP facilitated joint identification, study, and planning of hydraulic projects, including large-scale infrastructure, to benefit countries in the Eastern and Equatorial Nile sub-basins.

The NBI (2020) technical report corroborated the arguments expressed by academia, with a particular emphasis on the achievements of these SAPs. The report indicated that these SAPs created a portfolio of investment projects with the potential for socio-economic benefits in energy, agriculture, and environmental protection. The establishment of a joint platform by upstream and downstream countries in the Nile Basin allowed for discussions, consultations, and the implementation of optimal approaches to common water resource development. ENSAP/ENTRO led to agreements and joint implementation of region-based projects such as the Regional Power Trade Study, Watershed Management, and Irrigation and Drainage by Ethiopia, Egypt, and Sudan.

The formation of NBI was applauded by scholars as well as development partners as a step forward in the cooperation of all the riparian countries. Since its inception in 1999, it has achieved a great deal, particularly by serving as a platform for engagement among riparian countries. Moreover, its attempt at building confidence among the riparian countries, at least locked the riparian countries within the diplomatic engagement with one another. Despite the appreciation extended to the achievement of the NBI for strengthening cooperation among the

riparian countries (Awulachew et al., 2012), the NBI keeps facing hurdles even that amount to the reversal of its achievements so far as the lower riparian countries have started to distance themselves and withhold their financial contributions temporarily since 2010 as a result of the disagreement on CFA article 14(b). The disagreement escalated and Egypt and Sudan suspended their regional engagement even though Sudan rejoined the NBI in 2012 as Egypt insisted on its historical rights claim and refused to make concessions to its centuries-old Nile water use policy (NBI, 2020).

The proclaimed mission of NBI has been stated as "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources". To this end, the initiative outlines its achievement as follows: "So far, the Initiative has created platforms where countries from the Nile Basin can come together and talk so that they get to know the realities about their neighbors and how they utilize the waters of the Nile" (NBI, 2020:7). More importantly, the NBI has undertaken tangible projects that enhance the collaboration of the Eastern Nile Basin countries through power grids that facilitate power trade and watershed management projects with regional impacts. The NBI also conducted several studies, the notable one being the Nile Basin Decision Support System (NB DSS) which helped member countries to apply the tools to their domestic water resources management decisions (NBI, 2020).

There are also projects at the stage of identification, preparation, and also under implementation with a capacity to further enhance the collaboration among the Eastern Nile Basin countries.[74] The other most cited success of NBI was that it successfully negotiated and implemented projects of the Nile Basin Interim Procedures for Data and Information Sharing and Exchange in 2009 and the Operational Guidelines for Implementation of the Nile Basin Interim Procedures for Data and Information Sharing and Exchange in 2010 (Paisley and Henshaw, 2013).

However, after two decades of its operation, the influence of the NBI on member states' water resource policies has remained weak. Even though the member countries' water resource policies recognized the importance of collaboration, the suite of NBI transboundary policy packages was rarely adopted by member states in the Eastern Nile Basin (NBI, 2020). Similarly, previous

[74] Interview with ENTRO staff at Addis on May 30, 2019.

studies by Bernauer (2002) and Gerlak (2007) show the poor implementation of international agreements by member states.

IWIM expert[75] revealed that in the Eastern Nile Basin, the severity of existing and emerging water management problems calls for either the effectiveness of NBI's suite of transboundary river policies or the adoption of a new adaptive policy framework that evolves as the problems get complicated. According to this IWIM expert (2020), the Nile River water conservation is one of the areas that receive less attention despite the growing risks that the water demand outstrips the supply of water in the basin unless mitigation measures are taken. The 2015 NBI Strategic Water Resources Analysis also corroborates the view expressed by IWIM expert (researcher) as the analysis indicated, that without the intervention and coordination of member states the water shortfall could go as high as 50% of the current Nile River water supply (NBI, 2015: 23). On the other hand, this analysis also indicated the water demand for irrigation could increase by more than 160% from where it was in 2015 calling for basin-wide water conservation intervention. The irrigated area in the basin was estimated to increase from 5.4 million hectares in 2015 to 8.7 million hectares by 2050 (NBI, 2020).

Moreover, the NBI Strategic Water Resources Analysis estimated the loss of water from the Nile Basin reservoirs to be around 17.2 BCM (NBI, 2020). This estimation of Nile water loss doesn't include the extensive losses of water in the irrigation fields of Egypt and Sudan, the sector which has extensively used the Nile water with very backward irrigation practices where the losses are reportedly very high (Mahgoub, 2014; El-din, 2013). Moreover, this study didn't include the massive evaporation losses from the Sudd marshland in South Sudan.

To tackle the indicated water loss and mismanagement, the NBI and its Subsidiary institutions like ENTRO could have scaled up the good water conservation practices as well as augmented the member states water conservation measures by designing joint multipurpose reservoirs where the evaporation rate is very low like in the Ethiopian highland areas. With water saved because of the conservation measures, it is possible to fairly distribute the physical water as well as the benefits that accrued and in turn lessen the tension over the use of the Nile water among the

[75] Interview with IWIM expert at Addis on May 6, 2020.

Eastern Nile Basin States.[76] Whittington and McClelland (1992) called for conservation plans in Ethiopia that could include the construction of several reservoirs to capture every drop of rainfall runoff during the summer in different sites throughout the Nile catchment areas to release a regulated amount of water from every reservoir into the mainstream so that the flow of the river will be regulated. The reservoirs constructed for water conservation could also be used for generating electricity that can be used by member states through the already-developed power grid (ENTRO Staff, 2019).

In the Eastern Nile Basin, though no exact estimations were made as to how much joint development of the river could save, in central Asia the joint development of transboundary rivers by the riparian countries could save up to half the total annual flow of the Aral basin. The joint development addresses both water use inefficiency and loss of water to evaporation problems (Krutov et al., 2015). The NBI though proposed the need to look for strategic options that enhance water conservation in the Nile Basin; it has not yet conducted a study to identify how much it could save through the joint conservation measures (ENTRO Staff, 2019).

The regime theory states that water management regimes remain "paper tigers" if they are unable to resolve the problem structure they are created to address by bringing behavioral change to members of the regime (Bernauer, 2002; Young, 1999). This shows the ineffectiveness of the existing Eastern Nile Basin water regime in addressing common challenges of environmental degradation and the need for water conservation.

5.2.3. 2. The Cooperative Framework Agreement (CFA)

The CFA process began in 1997 when the Nile Council of Ministers of Water (Nile-COM) established a Panel of Experts (POE) with the support of the United Nations Development Program and the Canadian International Development Agency (CIDA). The POE consisted of three experts (two legal and one technical) from each Nile Basin country. They were responsible for creating a cooperative framework to guide the Nile countries in achieving fair utilization. Initially, twenty-five articles in the draft faced reservations, mainly from Egypt, Ethiopia, and Sudan. The POE convened ten times between 1997 and 2000, producing 36 provisions detailing

[76] Interview with Ethiopian International Relations Professor in Nekmte on June 23, 2020.

legal and institutional aspects to promote equitable use of the Nile Waters. Information on the eleven years of negotiations was sourced from Nile Basin officials, water ministers, and professional negotiators present at the negotiations (Zaepoor, 2019).

Even though the negotiations commenced in 1997 and concluded in 2007, not all basin states have accepted them. The primary points of contention continue to be the colonial-era agreements of 1929 and 1959. The Nile-COM endorsed the Terms of Reference for a Panel of Experts (PoE), whose members were designated by each Nile country to assist in drafting the initial text of the Cooperative Framework Agreement. The PoE convened nine times, from January 1997 to March 2000. The UNDP and World Bank facilitated informal discussions among PoE members by sponsoring their involvement in the Nile 2002 conference series from 1997 to 1999. This support was based on the belief that regular informal communication among experts would enhance understanding and trust. The CFA text drew heavily from the 1997 Convention on the Law of the Non-Navigational Uses of International Watercourses, also known as the 1997 UN Watercourses Convention or 1997 UNWC (Salman, 2013).

According to the Ethiopian diplomat[77] who participated in the process, the Nile-COM meeting that took place on May 22, 2009, in Kinshasa, DRC, marked a significant milestone in the CFA negotiations. During this meeting, the opposing 'upstream' and 'downstream' positions were officially separated. After the Kinshasa meeting, the NBI Secretariat, Nile-SEC, finalized the CFA document for signing on July 3, 2009. The Nile Basin countries were granted a one-year timeframe after the Sharm el-Sheikh meeting to sign the CFA. On April 13, 2010, the Nile-COM convened the day after the conclusive Nile-TAC and Negotiation Committee session in Sharm el-Sheikh, Egypt. The water ministers of the seven upstream nations restated their stance at the Kinshasa meeting. In contrast, the downstream countries once again pushed for the renegotiation of three specific points: Article 14(b) concerning water security, prior notification, and amendment through consultation. The upstream countries perceived these actions as a strategic maneuver by Egypt to delay the negotiations.

[77] Interview with an Ethiopian diplomat familiar with Nile diplomacy, March 23, 2020.

The diplomat (March 23, 2020) further noted that the failure to establish a permanent cooperative institution forced Ethiopia, Kenya, Tanzania, and Uganda to continue the move when they signed a Nile Cooperative Framework Agreement (CFA) in 2010, with Burundi joining in 2011. Despite opposition from Egypt and Sudan, who benefit from the status quo, the upstream states argue that the 2011 CFA supersedes the 1929 and 1959 agreements. This marked a shift as the upstream states united against the traditional downstream hegemon. Egypt and Sudan subsequently left the NBI, diminishing Egypt's power to dictate the agenda through threats and promises. In 2013, Ethiopia was the first Nile basin state to ratify the CFA, followed by Rwanda, Tanzania, and Burundi in March 2015. Even according to the reporter newspaper (November 25, 2023), Ethiopia has encouraged the other upstream states to ratify the CFA to bring it into full effect. South Sudan has expressed interest in joining, and the Democratic Republic of the Congo is expected to follow suit. However, Egypt and Sudan still refuse to sign, aiming to maintain the status quo. Ethiopia has been instrumental in leading negotiations and fostering the signing of the CFA.

For Abadir (2011), the CFA is important not for its international ‘legal’ consequences but for its symbolic importance in countering Egyptian centuries-old hegemonic position over the Nile and its political symbols. According to Abadir (2011), the CFA won’t have legal value until Egypt and Sudan sign the document, which has not happened till now, even many years after his argument. Despite the hesitation of the lower riparian countries, the upper riparian countries proceeded by signing the agreement, not because of its legal consequences but because of its political purpose of undermining Egyptian dominance over the Nile. Egypt and Sudan's rejection of the CFA comes from their demand for the recognition of the previous bilateral agreement, which the upper riparian countries rejected. Thus, the upper and lower riparian countries held a different position on Art. 14(b) of the CFA document, and because of this disagreement over this article, the CFA has not headed as far as hoped. Sticking to the old narration of historical rights by the two lower riparians neither helps them to stop the moment in Ethiopia from using the Nile water nor ensure their water claims for water security (Erlich, 2018).

According to Swain (2011: 696), “the introduction of the “water security” concept in the CFA has brought a serious impasse and a threat to its future as the upper riparian countries vehemently reject the Egyptian-Sudanese proposal for amendment." The incorporation of the security

concept in the CFA stalled the whole progress of the CFA and the idea of forming a permanent Nile Basin Commission to oversee the overarching Nile issue. Seven of the upper riparian countries have decided to proceed with the agreement, and five of these countries, namely Ethiopia, Kenya, Tanzania, Rwanda, and Uganda, have already signed the agreement regardless of the objections from Egypt and Sudan. Reportedly, Sudan and Egypt have come up with a proposal to set up the Nile Basin Commission without reaching an agreement on the CFA, though again, that proposal was rejected (Swain, 2011).

It is widely indicated that the reduction in volume and quality of the Nile River will increase the potential for "contestation over the Nile" due to "population growth and environmental degradation" (Abadir, 2011: 284). Scott Mckenzie (2012: 572) argued that the refusal of Egypt to sign the CFA agreement revealed its interest in monopolizing the Nile River water and that this position of Egypt was an act that "violated customary international water law." Moreover, McKenzie (2012:572) implied that the refusal of Egypt to ratify the CFA underscores its opposition to what he calls "trends in international water law towards multiparty basin management" and in no way helps the sustainable management of the Nile.

Egypt aspired to use the international agreement over the Nile as a legal instrument to proceed with its goal of hegemony over the Nile River. In the same manner, the upper riparian countries used the CFA as a legal regime through which they countered Egyptian hegemonic aspiration by aspiring for a fair share of the Nile water for their development demands. In general, Abadir (2011) portrayed the CFA as a political instrument to advance the political demands of the upper riparian countries, unlike the hitherto established agreements to promote the hegemonic position of Egypt over the Nile. However, other authors slightly differ from what Abadir (2011) tried to argue, considering the CFA solely for its political symbolic gesture rather than the real consequence of the agreement on the ground.

The NRBC incorporated certain principles, like equitable and reasonable use and no harm, as determined in international water law. Moreover, the NRBC incorporated the principles of IWRM. It accepted the ecological interdependence of states in a given region. Thus, the activities in one state have a wide-reaching effect on the ecology of other states. For states that are connected by nature, like societies along the Nile River, actions by the upper riparian countries

significantly impact the ecology of downstream countries. In light of this fact, river basin organizations are expected to regulate not only water use regimes among the members of the organization but also coordinate environmental protection activities and the efforts of environmental rehabilitation (Kalpakian, 2015).

It has been in the realization of this fact that countries in the basin negotiated a very long process of agreement over the utilization of the Nile Basin, though the process of negotiation has not culminated. Such a long negotiation process frustrated Ethiopian analysts and forced them to declare such a process an "Egyptian ruse" (Dereje, 2011: 363). Logically, Egypt and other lower-riparian countries would have benefited from the formation of regional organizations that coordinate water utilization and other environmental challenges that demand joint effort. Despite the material gains from such cooperation regimes, Egyptian leniency towards cooperation has more to do with ideational factors than purely material gains (Kalpakian, 2015). Thus, as the constructivists argued, countries' cooperation over an issue is not only motivated by material gains that are harnessed from the association but also has to do with the identities of the states; the self-image of states is also as important as the material gains (Kalpakian, 2015). Other scholars attribute this lack of cooperation over international rivers to risk perception (Subramanian et al., 2014) and water nationalism (Allouche, 2005) rather than the benefits this cooperation holds, particularly in terms of the benefits this multilateralism has over unilateralism in the Eastern Nile Basin.

5.2.3.3 Agreement on Declaration of Principles (DoP)

The DoP agreement was a result of the process which initially started as a technical talk immediately after Ethiopia announced the commencement of GERD in April 2011. In May 2011, Ethiopia and its neighboring countries decided to start trilateral discussions on technical matters related to the dam. By October, an agreement was reached to form a trilateral technical committee that would assess the potential impact of the dam, share technical knowledge, encourage collaboration, and improve regional development. Shortly after, the three water resource ministries from Eastern Nile countries reached an agreement on the terms and procedures for setting up an international panel of experts (IPoE). Within two months, each government appointed two national experts and chose four international experts. The IPoE

convened its inaugural meeting in January 2012, marking a significant milestone as the countries not only agreed but also successfully established a framework for a collaborative assessment of the new structure's impacts. From May 2012 to May 2013, the IPoE conducted six regular meetings and made four visits to the dam site. The final report was released on May 31, 2013, addressing various technical concerns, including downstream safety issues, and proposing two additional studies: an assessment of cross-border environmental and socio-economic impacts and a new hydrological model study (Cascao and Nicol, 2016).

Trilateral meetings at the end of 2013 and in January 2014 were either postponed or inconclusive. Productive discussions resumed after a new government took office in Cairo in May 2014 and President Al-Sissi agreed to revive tripartite meetings on the GERD with a collaborative mindset. This time, diplomats would actively participate, involving the water resources and foreign affairs ministries of the three nations. From August 2014 to December 2015, the three countries engaged in six trilateral meetings. Despite Egypt's initial willingness to engage in technical talks when the GERD was announced in 2011, the focus shifted to political concerns, complicating the technical and political processes. Nonetheless, the trilateral discussions did result in the signing of an agreement by the three riparian states. Therefore, the DoP was a result of rounds of ministerial-level tripartite negotiation among the three Eastern Nile basin countries. The three countries reached an agreement during the seventh tripartite meeting that occurred in Khartoum from March 3 to 5, 2015. The water resources ministers and foreign affairs ministers attended this meeting. The presence of all six ministers signified the three parties' agreement to engage in technical and political discussions regarding the GERD, showing their mutual desire to reach a consensus. Following the meeting, the six ministers announced that they had indeed reached an agreement on the GERD. The agreement, entitled "Agreement on Declaration of Principles between the Arab Republic of Egypt, the Federal Democratic Republic of Ethiopia, and the Republic of Sudan on the Grand Ethiopian Renaissance Dam Project (GERDP)," was signed in Khartoum on March 23, 2015, by Presidents Abdel Fattah El-Sisi and Omer Hassan Ahmed Elbashir and Prime Minister Hailemariam Desalegn (Salman, 2016).

The Declaration of Principles (DoP) on the GERD includes a preamble and 10 principles. Four of these principles pertain to the GERD, while the remaining six focus on fundamental principles of international water law. The preamble reaffirms the importance of the Nile as a vital resource for the livelihood and progress of the populations in the three countries, thereby reinforcing a key

principle of international water law regarding the equal participation of all riparian states in the management and utilization of shared water resources (Agreement, 2015).

Ethiopian academia[78] has a view that even though the DOP hardly raised the issue of Eastern Nile water conservation, the fact that the basin countries agreed on equitable utilization of the Nile holds great potential for the countries to cooperate over Nile water management, including water conservation, jointly. The next logical step is how to jointly operate and manage these reservoirs over the Nile and reinitiate the idea of starting the Joint Multipurpose Project, which helps Nile water conservation through joint investments. Similarly, Cascao and Nicol (2016) identified the potential of the DoP agreement in further assisting collaboration among the basin countries as it significantly tipped the power balance and forced the downstream state of Egypt to accept a new cooperation norm.

5.3. The Role of Regional Water Institutions in Governing Water Use and Conservation in the Eastern Nile Basin

This section provides the historical development of regional institutions and their impacts on Nile water management. It also sheds light on the challenges these water institutions faced while attempting to govern the Nile River and its surroundings.

5.3.1. Regional Institutions and Water Governance in the Eastern Nile Basin

In the Eastern Nile Basin, there have been efforts to establish basin-wide institutions for at least four decades (Tesfaye, 2018). Before the emergence of postcolonial states in Egypt and Sudan, the British had tried to forge cooperation among the Nile basin states through treaties and a series of dams. After their independence, Sudan and Egypt sought a comprehensive agreement as an extension of the 1959 bilateral agreement. To achieve this, they put forward a proposal for the formation of the Nile Basin Commission. The attempt was a continuation of British policy that aimed at providing water security for Egypt by prohibiting others from utilizing the Nile water (Moahmmoda, 2003). According to Mohammoda (2003: 20), they also confined the tasks of the organization only to “data gathering and technical analysis pertaining exclusively to water."

[78] Interview with an Ethiopian International Relations Professor at Addis Ababa University on February 4, 2021.

Despite the efforts, regional cooperation started to take shape only in the 1990s with the NBI agreement (Mohamoda, 2003; Brunnee and Toope, 2002).

The effort to establish basin-wide institutions started with the hydro-meteorological survey of the Equatorial Lakes (Hydromet). Hydromet was founded in 1967 due to the sudden increase of rainfall in the Equatorial Lakes region, causing the rise of lake levels and the flooding of the lower riparian countries because of the overflow of water from the lakes. Thus, to handle these challenges, the downstream countries, spearheaded by Egypt, tried to find a solution to the problem by establishing a basin-wide institution to collect and analyze hydro-meteorological data in the Equatorial Lakes region, tackling the dangers of flooding affecting the downstream countries. This shows the fact that states in the basin from the very beginning tried to deal with the challenge of the Nile River by establishing an institution that specifically deals with specific problems rather than handling the challenge of such a river in a holistic manner that addresses the problem to every society along the river. Such a piecemeal approach won't address the multifaceted challenges in the basin. From the beginning, the institutional premises upon which such challenges were handled were not comprehensive and strategic, at least from the viewpoint of the need for comprehensive and all-inclusive institutions (Tshimanga, 2010).

The conservation and protection of the Nile River basin are in the collective interests of all the Nile basin states in general and the Eastern Nile basin in particular. The regional institutional framework is a focal point for coordinating water use and management plans. The water resource development in one riparian state has an impact on the quality and quantity of the water in other riparian states, thus demanding the coordination of water development strategies and policies for sustainable utilization of the water and mutual understanding over Nile water use. The process of negotiating an institutional and legal framework for governing the use and management of the Nile River has been an incomplete project that maintains the vulnerability of the basin to natural disasters and potential conflict among basin states (Okoth-Owiro, 2004).

During the 1990s, the move towards cooperation with the assistance and encouragement of notably the World Bank and UNDP triggered the hope of the formation of cooperative regional institutions (Swain, 2011). Globally, the formation of cooperation on the environment in the 1970s and 1980s led to the formation of regional institutions to govern the specific issue areas

around which the institutions were formed. Thus, the formation of such institutions calls for a new approach to studying this new phenomenon. The institutionalist approach is first interested in understanding why such institutions are being created and later moves towards understanding the effectiveness of these international institutions (Schmeier, 2013). The rationale for such regional institutions has been understood to be "a response to coordination problems or situations in which the pursuit of interests defined in narrow individual terms characteristically leads to socially undesirable outcomes" (Young, 1982: 281). Schmeier (2013:4) has a view that regional institutions have means "for solving water-related collective action problems and jointly governing the basin's resources, helping to overcome collective action problems and/or adverse constellations of actors in the respective river basin."

To this end, several regional water institutions were set up in the Nile basin to address the increasing challenges that require collective efforts from the basin states. More than merely having these regional institutions is required; their effectiveness is crucial. Schmeier (2013:3) noted that despite the efforts to institutionalize cooperation in the Nile basin among the basin states, the water institutions in the basin utterly failed to reverse the threats to "political stability and the environmental health of the Nile River basin" because of "unilateral water use claims and development activities." On the other hand, Baligira (2010:56) claims that "it is too early to evaluate their [regional institutions] impact on water management" in the Nile basin.

The effective governance of the water of the Eastern Nile basin depends on the effectiveness of the international institutions with a mandate to govern the water of the Nile. Indeed, the effectiveness of river basin institutions relies on both the capacity of the institutions and the impacts of exogenous factors on them (Schmeier, 2013). These exogenous factors in general can be explained in terms of the hydropolitics of the Nile River as well as other regional contexts in the basin. The NBI aimed at the noble goal of establishing basin-wide water management institutions that govern the water resources of the Nile. The cooperative regional institutions believe they can end the political tensions over the utilization and sharing of water in the Eastern Nile basin that dominated the hydropolitics of the basin (Swain, 2011).

In the Eastern Nile basin, efforts were made towards the establishment of the Permanent River Basin Organization (RBO) in the 1990s. For the realization of this aspiration, since the 1990s,

countries in the basin, in collaboration with international actors, have tried to facilitate the creation of such regional entities. Accordingly, they managed to establish an intergovernmental initiative called the Nile Basin Initiative (NBI) to cultivate cooperation between the riparian countries. This transitional institution has been tasked with facilitating the implementation of joint projects and working on the creation of the Nile Basin Commission (NBC) to be a permanent River Basin Organization (RBO), which is hoped to be realized after the conclusion of a comprehensive agreement on the utilization of the Nile waters (Tawfik, 2018).

The NBI, with its three programs, the Shared Vision Program (SVP), the Eastern Nile Subsidiary Action Program (ENSAP), and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) are expected to facilitate the management and development of Nile water resources. The ENSAP, which is aimed at the development and management of the waters of the Eastern Nile Basin, has given much emphasis to watershed conservation in the basin. As a commitment to this vision, the ENSAP commenced four interrelated projects in 2008 in different Eastern Nile basin states. These projects were: i) Watershed Management of the Blue Nile, Baro Akobo, and Atbara basins; ii) the Ethiopian Power Export Project that connects Ethiopian power grids with those of Sudan; iii) the Regional Irrigation and Drainage Project, which emphasized irrigation rehabilitation and water conservation in the Egyptian Western Nile Delta and irrigation and drainage projects in Ethiopia's Lake Tana Basin as well as irrigation projects in the Atbara river basin inside Sudan; and iv) the Flood Preparedness and Early Warning Project (NBI, 2012).

Despite the appreciation from scholars and multilateral institutions regarding the achievement of the NBI (Mohamoda, 2003), Kalpakian (2015: 40) undermines the achievement of the NBI and previous cooperation efforts as a "false dawn," that is, the states in the basin have not moved as such in the direction of institutionalized cooperation. As proponents of regime theory argue, the members of particular regimes are very essential for the success or failure of that particular regime. The composition of NBI members is dominated by autocratic governments and poorer nations, and the relations among these countries are dominated by mutual suspicion and mistrust, affecting the effectiveness of the regime in governing the Nile River. In the Eastern Nile Basin, the regional subsidiary of the NBI has no different outlook when it comes to its effectiveness (Keane, 2003). The following paragraphs present the achievements, challenges, and opportunities of ENTRO.

5.3.2. The Challenges and Opportunities of Eastern Nile Technical Regional Office (ENTRO) as Eastern Nile Basin Water Institution

The Eastern Nile Technical Regional Office (ENTRO) is an institution dedicated to the development and management of water resources in the Eastern Nile Basin. Under the Nile Basin Initiative (NBI), a cooperation framework among the 10 Nile riparian countries, it was founded as an autonomous agency. The Eastern Nile Subsidiary Action Program (ENSAP), which seeks to advance collaboration and sustainable development in the Eastern Nile Basin, is supported technically by ENTRO. Ethiopia, Sudan, and Egypt are the riparian nations that are directly involved in the development and management of the Eastern Nile Basin and are members of ENTRO (Cascao and Nicol, 2016). For the first time in the Nile Basin's history, upstream and downstream nations have created a collaborative, inclusive forum to talk about, consult on, and even put into practice the best strategies for developing shared water resources. For instance, regional initiatives like the Regional Power Trade Study, Watershed Management, and Irrigation and Drainage were agreed upon and collaboratively carried out by Ethiopia, Egypt, and Sudan under ENSAP/ENTRO (NBI, 2012).

Through several programs, ENSAP has encouraged the collaborative identification, analysis, and development of hydraulic projects (including large-scale infrastructure) that will directly benefit the nations in the Eastern Nile sub-basin. The ENSAP created an amazing portfolio of investment projects that might have a positive socioeconomic impact on the environment, agriculture, energy, and other areas. The main responsibility of ENTRO is to support and oversee the execution of these regional initiatives and plans for the management and development of water resources in the Eastern Nile Basin. One of its main goals is to ensure the sustainable use and management of water resources by encouraging communication, collaboration, and coordinated action among the member nations (NBI, 2014).

The Eastern Nile Basin countries' decision-makers selected and approved eight ENSAP projects in 2003, including the JMP. The Joint Multipurpose Project (JMP) was a long-term, large-scale, multipurpose investment project that aimed to identify major optimal outcomes in terms of water resources management for all three Eastern Nile sub-basins (Blue Nile, Atbara/Tekezze, and Baro-Akobo-Sobat). The majority of the projects were fast-track, small-scale, and sectoral. The JMP's launch phase was initiated in 2005 by the Eastern Nile Council of Ministers, which is

composed of the ministers of energy and water affairs from Ethiopia, Sudan, and Egypt. The stated goal of the initiative was to "identify and prepare a major initial project, within a broader multipurpose program, to demonstrate the benefits of a cooperative approach to the management and development of the Eastern Nile" (Cascao and Nicol, 2016: 554). A Council of Ministers representing each member nation in charge of water affairs makes up the governing body of ENTRO. ENTRO receives policy direction and strategic guidance from the Council. The Executive Director of ENTRO oversees the daily administration and functioning of the organization (Tawfik, 2016).

ENTRO staff (2019) indicated that a group of technical specialists from ENTRO specialize in hydrology, engineering, environmental sciences, socioeconomics, and other domains linked to the management of water resources. These professionals carry out research, give technical assistance, and create tools and guidelines to help member nations make well-informed decisions on the development of their water resources. In the Eastern Nile Basin, ENTRO is essential to the identification, development, and execution of regional projects and initiatives. It makes it easier for member nations to coordinate and harmonize their efforts, ensuring that initiatives are in line with national goals and support the basin's overall sustainable development.

In the Eastern Nile Basin, ENTRO is in charge of organizing planning initiatives that span the entire basin. It makes it easier to create the frameworks, regulations, and strategic plans that direct the region's sustainable growth and management of water resources. This entails addressing transboundary challenges and supporting integrated approaches to the management of water resources. In order to gather, evaluate, and manage data and information on the water resources in the Eastern Nile Basin, ENTRO is essential. It creates and keeps an extensive database including meteorological, hydrological, and socioeconomic information. The member nations can evaluate the availability and possible uses of water resources with the help of this information, which also promotes evidence-based decision-making (Cascao and Nicol, 2016).

The IWMI expat[79] stated that though the ENTRO claims to resolve disputes and facilitate negotiations among its member nations, the lingering dispute over GERD exposed the weakness

[79] Interview with IWIM tansboundary water expert in Addis on 23 March 2020.

of the ENTRO in resolving conflicts over the use and management of the Eastern Nile basin. The ENTRO's principle of developing a mutually beneficial solution has limited worth in resolving disputes that arise among basin states. This is because the organization has played a minor role in facilitating negotiations and providing a platform for discussing differences and identifying the root causes of disputes.

Working in the water sector, ENTRO interacts with other regional and global organizations to harness resources, foster knowledge sharing, and exchange experiences. In order to promote regional cooperation and the sustainable development of water resources in the Eastern Nile Basin, it collaborates closely with the Nile Basin Initiative (NBI), the African Development Bank (AfDB), the World Bank, and other stakeholders. In order to carry out its operations and projects, ENTRO oversees the management of its financial resources. It raises money from several sources, such as international financial institutions, development partners, and member nations. To guarantee responsibility, openness, and effective use of financial resources, ENTRO has put in place systems and practices for financial management. Overall, these institutional features allow ENTRO to carry out its function as an Eastern Nile Basin water resources management technical and coordinating authority. ENTRO supports the equitable and sustainable use of water resources in the region by fostering collaboration, offering technical assistance, and encouraging sustainable practices (Cascao and Nicol, 2016).

In the Eastern Nile basin, institutional structures at different levels have tried to seek solutions to water problems in the basin. These regional institutions are understaffed and under-resourced. Member states barely made their contribution to these regional institutions. The small size of the workforce and meager resources to undertake the huge responsibility bestowed on the regional institutions significantly hampered their contribution and met expectations. Moreover, the impacts of regional politics also significantly undermine their relevance, as most of the states in the basin are unwilling to compromise their sovereignty (Earle and Neal, 2017). Despite all these challenges, regional institutions played a significant role in bringing together all the stakeholders in the basin, serving at least as a forum where confidence was built among the riparian states. The absence of strong and effective institutions that monitor and evaluate the compliance of the riparian states is one of the weaknesses of the regional institutions in the Eastern Nile basin.

The efforts of individual state water institutions to promote the safety of the Nile River depend on their effective collaboration with other sectors working on the management of natural resources, like the Ministry of Agriculture, the Ministry of Environment, and other related institutions like research institutes and universities. At the domestic level, the success of the institutions depends on the extent to which environmental issues in general and water issues are factored into the government decision-making process. The overall institutionalization of the environment issue is very critical for the water institutions' success in water conservation and introducing sustainable use of water in the Nile basin. Thus, the success of the water policies of the individual states and the regional water organizations depends on the level of institutionalization of the water policy to deal with the water problems in the basin. Moreover, the institutions are extremely important for monitoring and evaluating the implementation of water policy.

In the Eastern Nile basin, the existing regional institutions suffer from a lack of effectiveness despite the growing threats from human activity and climate change. The efforts to conserve the water resources of the Nile need to establish an effective organization to manage the water resources of the Nile. According to the World Wildlife Fund (WWF), freshwater systems are the most highly degraded ecology in the world, showing the ineffectiveness of transboundary river institutions (WWF, 2012).

The water institution in the Eastern Nile basin lacks an adaptive water management strategy. This is partly attributed to a lack of institutional flexibility for continuous experimentation with the policy implemented to manage Nile water. The institutions in the basin have no resources to conduct systematic monitoring and evaluation of the policies that could have served as input for further policy improvement and hence better river water management on the ground (Schmeier, 2013). The process of policy improvement is not a one-time cycle; the continuous changes and uncertainties of the natural environment because of human actions and climate change call for continuous improvements of the policy to better respond to the new reality (Holling, 1978; Pahl-Wostl, 2008).

According to ENTRO communication officer[80] the major challenge for the water institutions in the basin is their extreme dependence on donor funds. The regional institutions lack multiple sources of funding, which is the real bottleneck to progress in the future. Financially, regional institutions are supposed to be sound and remain viable in the long run. Indeed, most of these states demand sustainable donor support for both administrative and running projects. However, the challenge is that the donors support such initiatives if there is a degree of compliance with the principles, norms, and values of the regional organization. Unfortunately, some member countries have already suspended their financial contributions.

Similarly, an ENTRO official[81] stated that, as a result of historical, physical, and power relations that existed in the Eastern Nile basin, regional institutions like ENTRO barely succeeded in bringing collective action to conserve the ecosystem of the Nile River. In the Eastern Nile River, in addition to the efforts of the individual state to address water mismanagement and misuse through rules, regulations, and policies, regional institutions like ENTRO would have facilitated joint actions by the riparian states where it matters. So far, the stated goal of the ENTRO—to bring long-term collaboration to jointly develop the Nile water resource—has not been achieved. As an implementing arm of NBI in the Eastern Nile basin, it has not implemented joint projects of significant impact in the basin. The inadequacy of the regional institutions in handling some of the emerging issues, like disagreement over the GERD project, shows the fundamental structural shortcomings of the regional arrangements. Despite the active participation of multilateral institutions like the World Bank and UNDP in the coordination of NBI negotiations, regional organizations like IGAD and AU are seldom invited. The overarching principle of solving African problems through the framework of the AU is hardly implemented when it comes to the governance of transboundary freshwater resources on the continent.

Schiemer (2013) attributed the challenge of regional institutions, specifically the NBI, to the disagreement of values over how to govern the Nile among the riparian states, which challenged the desire for institutionalized governance of the basin. According to the author and other scholars, Egypt is solely interested in a skewed water use regime that favors the Egyptian benefit

[80] Interview with ENTRO communication officer on May 30, 2019.

[81] Interview with ENTRO staff on May 30, 2019 at the ENTRO head office

and opposes any water development plans in the upstream states. On the other hand, the upper riparian states rejected the present water use regime and demanded a more equitable and reasonable water use regime (Okoth-Owiro, 2004; Swain, 2008; Kimenyi and Mbaku, 2015).

Theoretically speaking, the effectiveness of regional institutions depends on several factors, the major factors being the state of relations among actors and the nature of the problem around which the international institution emerged. The geographical location of the most powerful state among the riparian states is also another important factor to consider in determining the effectiveness of the cooperation. If the upper riparian state is the most powerful, there is less likelihood that they favor institutionalized cooperation. On the other hand, if the lower riparian state is the most powerful, there is a greater likelihood that it will put all its energy into the realization of institutionalized cooperation. In the Nile basin, despite the rhetoric from Egypt (NWRP, 2005; Elmam, 2010), the most powerful state has never worked towards the formation of institutionalized cooperation but rather emphasized unilateral development, presenting obstacles to the formation of regional institutionalized cooperation in the Nile basin. "Institutional design" is also another important factor that determines the effectiveness of water institutions (Schmeier, 2013: 9).

Regardless of their apparent weakness and inability to achieve some of their major objectives, like the implementation of Joint Multipurpose Projects (JMP), the ENTRO is well regarded for its contribution to building trust among the riparian states (Swain, 2008). The NBI, through its subsidiary regional organizations like ENTRO, is able to plan and implement projects with regional ramifications. NBI also reported the lists of projects that are planned and under implementation in the Equatorial and Eastern Nile basins. Accordingly, ENTRO implemented watershed management projects in the Eastern Nile basin (in Ethiopia, Egypt, and Sudan). In Egypt and Sudan, ENTRO reported implementing a project that rehabilitated 40,000 ha of land (NBI, 2015:5). The report didn't indicate the number of people who benefited from the project.

On the other hand, the ENTRO watershed management project, which started in 2011, was reported to have benefited more than 400, 000 people and rehabilitated over 83,000 ha of land in the Tana-Beles basin, covering six districts. The project also reportedly reduced the siltation problems that affected the reservoirs of the downstream states by 50% (NBI, 2015:3).

The achievement of regional institutions depends on several factors, among them the nature of collective action problems. For the success of regional institutions, both the external and internal environments and factors are very decisive. Externally, despite the demand for region-wide environmental and water conservation, the degree of the problem has not provoked a regional response to deal with it. This is partly explained by the bad constellation of the states in the Eastern Nile basin. As indicated in the previous chapter that discusses the individual states' responses to conserve water and efforts to deal with the impacts of climate change, the member states hardly sought regional responses to collective problems like the impacts of climate change. Regional institutions like ENTRO have declared their intention to deal with the threats even by designing environmental projects; however, given the threats of environmental degradation, the projects designed and implemented by ENTRO are insignificant and do not take into consideration the magnitude of the problem the basin is facing (Thuo and Riddell, 2015; Mason, 2004). Indeed, many of these challenges are attributed mainly to what Schmeier (2013:11) called the "constellation of actors" and the weak institutionalization of cooperation over the Nile.

5.3.3. The Challenge and Prospect of Establishing the Nile River Basin Commission (NRBC) as a Permanent Nile River Institution

When the initial negotiations began in 1997, the aim was to establish an institutional mechanism for cooperation among the Nile Basin states. The initial phase of the agreement, known as the Cooperative Framework Agreement of 2010, focused on key legal principles. These included adopting established principles of international water law, such as equitable and reasonable utilization and the prevention of significant harm. The subsequent phase delved into more detailed principles concerning the structure of the proposed Nile River Basin Commission. Upon the finalization, signing, ratification, and adoption of the CFA, the Nile River Basin Commission would supersede the existing transitional arrangement. Negotiations hit a standstill due to a deadlock in 2007. The participants in the negotiation referred the issue to the heads of state, which led to a stalemate over the issue up until 2009 when upstream states decided to annex Article 14(b) to the agreement and present the remaining negotiated articles for signing. During this time, the upstream states opted to annex Article 14(b) to the agreement and put forward the remaining negotiated articles for signing. This decision left the downstream states of Sudan and

Egypt disheartened, leading to their withdrawal from the negotiation and ultimately halting any progress toward establishing a permanent Nile institution (Cascao and Nicol, 2016).

Ethiopian academia[82] has suggested that managing multiple mega projects in different countries on the Nile River, such as the GERD, is challenging without supranational institutions like the NRBC. Similar to his view, the reporter's new paper, in its November 25, 2023 edition, reported the desire of Ethiopia to establish NRBC. However, it is still undetermined whether Ethiopia pushed for the formation of the NRBC for the reason indicated by the scholar or for other reasons. The newspaper reported that upstream countries, particularly Ethiopia, have been actively working towards establishing the Nile River Basin Commission (NRBC) long after the process halted in 2010. Officials at the Ethiopian Ministry of Foreign Affairs recently confirmed the revitalization of this initiative during an interview with the Ethiopian Reporter newspaper on November 25, 2023. They expressed confidence that the final stages of forming the commission are almost complete and anticipate its establishment by year-end. Ethiopian diplomat Fisha Shawl emphasized that ratifying the CFA and establishing the commission would challenge Egypt's historical claims and usher in a new era of collaboration among Nile Basin nations. Shawl explained that the Commission aims to sustainably and equitably manage and develop the Nile's resources. Ambassador Reta Alemu, the Ministry's director of international law, shared his belief that Kenya and South Sudan will likely join the agreement soon, further bolstering the momentum.

It has long been debated whether international institutions are relevant in governing shared resources among states. Scholars of environmental politics have more or less understood the importance of regional institutions to effectively govern shared resources like international rivers. The international institutions of transnational rivers are supposed to address the problem of collective action and coordination in their respective river basins (Schmeier, 2013). In the Nile basin, the main purpose of such institutions would not be different. The river institutions have evolved gradually since the 1960s, but what remains obscure is to what extent these environmental (river) institutions are successful in achieving their stated goals. They are the

[82] Interview with International Law professor at Addis Ababa university on May 7, 2020

means through which collective action problems over shared water resources can be resolved. Despite the recognition of the relevance of international institutions in governing shared resources, many also implied the factors that determine their effectiveness. Schmeier (2013) revealed the institutionalization of many agreements to govern international rivers in many regions of the world. However, the effectiveness of such river basin institutions varies from one basin to another because of several factors. In the Nile basin, despite the move to institutionalize cooperation, the effectiveness of that institution has had mixed results. For instance, the NBI and its subsidiary programs are believed to build confidence and trust and thus diffuse mounting tensions among riparian states. However, it is not enough to solve the outstanding issues of water allocation and/or benefit sharing among the riparian states. Moreover, it has so far not been able to mobilize the member states to jointly manage the water resources of the Nile basin (Swain, 2008).

The institutionalization of cooperation was accomplished through the formation of river basin organizations (RBOs). They are there to govern water use and management. However, there is a huge variation in terms of the success of the institutions in addressing the problems of international rivers. Schmeier (2013:1) explained the variation in the achievement of these river basin institutions in the following ways: “While some River Basin Organizations (RBOs) have done well in cleaning up polluted river basins, sustainably allocating scarce water resources, or improving the use of the river’s resources for riparian populations, others have partly or completely failed.”

Indeed, there is a huge discrepancy in terms of the effectiveness of international river institutions to govern a specific basin. According to Schmeier (2013:10), the river basin institution attributes its differences mainly to what she called “exogenous and endogenous” factors. Regarding the institutions that manage transboundary rivers like the Nile, there is a clear governance deficit to achieve the goal of sustainable utilization (Delmas and Young, 2009). The crisis of governance has been long declared in the management of freshwater, of which transboundary rivers contribute about 80% of the freshwater. In light of this fact in the Nile basin, the effort to establish institutions started in the 1960s at the beginning to deal with the problem of recurrent floods (Tesfaye, 2018). According to Tesfaye (2018:97), the Eastern Nile basin has suffered from "high sedimentation (downstream), high environmental degradation (upstream), negligible

water resource management (both upstream and downstream), climate change (both upstream and downstream), and a lack of basin-wide cooperation (both upstream and downstream)." The challenge in the Nile is attributed to the fragmented nature of water institutions in the basin. The water institutions in the Nile basin are country-specific and under-resourced to deal with the big challenges of the basin, which required, among other things, coordination and the need to be basin-wide to handle the challenge through basin-wide institutions. That is to say, it requires a permanent legal and institutional framework to deal with the problem as those basin-wide institutions are effective in the business of water resource management in an international river context.

Tesfaye (2018) also implied that the demand to forge such basin-wide institutions remained elusive because of the incompatible interests of the upper and lower riparian states. In any governance effort for transboundary rivers, institutions are the glue that holds together any meaningful coordination on the conservation of the water and related resources. Berkes et al. (2003) argued that institutions are crucial for safeguarding and sustaining shared resources in the Nile River from destruction caused by human actions and natural phenomena. Moreover, UNDP (2013) argued that the absence of strong water institutions and agreements at different scales can lead to local, regional, and transboundary conflict. The states that share the Nile are unable to deal with or solve the challenge because of the governance crisis in the basin, which is partly attributed to weak institutions.

There is a general belief that the management of transboundary resources needs to be transformed from a state-centric approach to transboundary water management if such transnational resources are to be effectively managed (Earle and Neal, 2017). Berkes et al. (2003) implied that institutions are the most important human invention to mitigate environmental degradation because of human actions. According to Berkes et al. (2003), institutions have formal and informal dimensions to constrain humans not to causing environmental degradation in their wording of ‘the tragedy of the commons’ on a local, regional, national, or global scale. Moreover, the quality of an institution is very important to protect the natural resources from devastation while using them. The journey to establish all-inclusive institutions that could govern the Nile River from its source to its end has not made much progress in facing the many

challenges that characterize the basin. This journey began with distorted premises and has yet to overcome the obstacles that lie ahead.

The arrangement of institutions at various levels is very important to implement not only the conservation of the water resources and their ecosystem but also to govern the water resources in the basin. In this regard, the water institutions in the Nile basin have remained state-centric. Both the supra- and sub-national institutions are not effective as such in coordinating the effort to govern the water of the Nile from the local to the international level (Patrick et al., 2014a). In this regard, the South Sudanese hydrologist[83] stated that institutions put constraints on water misuse and waste has been long recognized. Despite this realization in the Nile basin, the sub-national institutions, which are important for ensuring efficient utilization of the water for various services, have been very weak. Government agencies dominate sub-national institutions among lower-riparian countries, resulting in a lack of coordination that hinders water conservation in the Nile basin. When they achieved partial success in water saving, there were no or weak regional institutional mechanisms to share the saved water among the riparian states.

Indeed, the supranational institutions would have allowed the pooling of resources to invest in environmental projects with regional impacts in conserving the water resources, thereby contributing to the sustainability of the water resource and its ecosystem in the Eastern Nile basin. Institutional infrastructure is extremely important to at least softer issues of Nile water governance so that it will pave the way for dealing with the actual problem of river water allocation or the allocation of the benefits of the Nile River as envisaged in the NBI (NBI, 2012).

It has been a long time since scholars and other international multilateral institutions realized the fact that the existing institutions are neither ecologically sustainable nor bring social equity and economic efficiency. It is out of this conviction that the institutional arrangements in the basin have to be evolved to deal with the growing challenge in the Eastern Nile basin. Multilateral institutions intervened to set up institutions that have regional character to deal with the threat that is regional in the Eastern Nile basin. The creation of transboundary institutions has been driven by multilateral institutions such as the World Bank and UNDP. The World Bank and

[83] Interview with South Sudanese hydrologist who worked in the Sudanese Ministry of Water Resources and Irrigation for more than two decades now work as a lecturer at Juba University on December 10, 2019.

other donor agencies are the instruments for financing participatory processes and identifying joint projects in the basin. Moreover, they pledged additional resources for the jointly identified projects in the basin (Mason, 2004).

The intervention of the World Bank when it initiated the NBI has been based on the irresponsive nature of river institutions in the basin. They invested in the basin to make a difference so that these institutions in the basin could respond to the new dynamic of climate change, which caused environmental degradation, ever-growing demand for fresh water from the ever-growing population, and economies that put pressure on meager water resources in the Eastern Nile Basin. The effort to coordinate basin-wide cooperation among the riparian states faced challenges because of the varying degrees of interest among the riparian states. These riparian states have no equal interest in Nile water and are thus passively involved in Nile issues. Despite the long-term negotiations to establish a permanent Nile River Basin Commission (NRBC), they have not yet concluded its formation. Leave alone the basin-wide institutions to govern water use and management in the entire basin, the core states of the Eastern Nile basin have been struggling to agree on the regulation and operation of a single project, GERD, at least since the commencement of the project in 2011 (Swain, 2016). According to Swain (2008), for any regional institution that is serious about achieving functional regional cooperation, the starting point should be "to address the issue of contention between Egypt, Sudan, and Ethiopia." In this regard, the scholar Swain (2008) further noted that the much-lauded NBI started its operation "based on a flawed strategy." Furthermore, the NBI has been criticized for giving less attention to environmental issues and rather emphasizing big water development projects (Swain, 2008:211).

The efforts to collaborate among the states along the Nile for more than five decades have been to bring coordination and collaboration over the use of the water and its management. All the cooperation efforts intend to not only resolve the potential conflict over the Nile but also to bring synergy between these states and bring about the wise use of the resource by maintaining a wise use through institutions that promote such coordination and synergy between states (Mason, 2004).

Scientific evidence and data on the ground show the need for collaboration to jointly use and conserve Nile water in the face of growing challenges from climate change and population pressure. However, despite the progress made towards mutual understanding in the recent past through different forums and negotiation processes, the actors in the basin are far from reaching a level of consensus to develop and conserve Nile River water. Lack of recognition of the Nile as a shared resource also prevented collaboration over the use of Nile water and collectively dealt with the existing and potential challenges to the Nile river system. The embedded popular view of considering the Nile as an Egyptian river in Egypt hindered the move towards the idea of equitable utilization of the Nile River. In the case of the Nile River, ideational factors explain the lack of collaboration in the basin (Kalpakian, 2015).

5.3.4. The Influence of regional institutions on riparian state behavior in the Eastern Nile Basin

The power relations of the regional water institutions with their member states are not indicated. Those river basin institutions in other major international river basins that are known to be successful have enjoyed a degree of influence and power over their member states. Paradoxically, in the Eastern Nile basin as well as in the entire Nile basin, regional institutions are not enjoying such authority over member states, making the regional institutions weak vis-à-vis the member states. Thus, the river commissions in the Nile basin lack the authority of supranational authority over member states, unlike those successful and effective basin commissions in other river basins like the South African basin commissions and those river basins in North America and Europe (Schmeier, 2013).

A political science lecturer[84] from Ambo University argued that several factors determine the effectiveness of regional institutions and their capacity to influence the compliance of member states. Among the various factors that affect the impact of the regional institution on the behavior of its member states are the overall relationships between the states, beyond the water issue, and the existence of previous regional integration. Additionally, the balance of power and the policy relevance of the collective action problems to the respective riparian states also play important

[84] Interview with a Political Science and International Relations lecturer at Ambo University on April 2, 2019.

roles. A previous study by Scheimer (2013) also identified similar factors that affect the compliance of member states with the regional institutions. The cooperation of the riparian states in non-water issues facilitates cooperation in the water sector and also the compliance of the member states. Moreover, when the collective action problem has low policy relevance and low politics, the riparian states can readily work together to address the collective action issues. However, if the issues are deemed to have high policy relevance for the riparian states, cooperation becomes less likely, and they may not adhere to the principles, norms, and values of the regional institutions. It is widely reported that the regional institutions in the Eastern Nile basin suffer from a lack of compliance by member states. The distribution of power among the riparian states also matters a lot. There is a general theoretical assumption that if the lower riparian state is a dominant power in the basin, it strives for cooperation and institutionalized governance. However, unlike this widely held assumption in the Nile basin, Egypt places hindrances on institutionalized cooperation and compliance with regional institutional norms.

Experiences in the other international river basins where there is successful institutionalized governance show the active engagement of the basin hegemon in encouraging the remaining basin states towards greater cooperation and compliance of the basin states with the established principles and norms. Moreover, in most cases, they bear the financial burden; they make a significant contribution to the budget to run the governance system and enforce compliance. However, in the Nile basin, Egypt, as the dominant power in the basin, rarely plays a constructive role and has so far promoted unilateral water development while denying other co-riparians the opportunity to develop and use the Nile water resource (Cascao and Nicol, 2016; Corbetta and Long, 2008:3).

The internationalization of environmental issues since the 1970s has had an impact on national environmental institutions and the actions they undertake. The policy-making and governance activity of national institutions has been highly influenced by actors outside the traditional policy-making circle because of the active involvement of external actors like different UN agencies, multilateral banks, epistemic communities, and regional organizations. Their influence has kept growing (Schreurs, and Economy, 1997). In the same fashion, UNDP and the World Bank made their way to the Nile basin to set up a functioning institution that governed the entire river basin in the 1990s, which concluded as the NBI in 1999. However, the disagreement over

how to govern the Nile water resources impedes the compliance of the member states with this regional institution (Abadir, 2011).

Institutionalist scholars believe that the member states' change of behavior because of the institutions to which they are members can be viewed as the success of the institution in obtaining compliance from the member states. This is what the institutionalists perceived as the "outcome" of their effectiveness, addressing the problem for which they established it as having an "impact" (Schmeier, 2013: 24). Young (1994:145) elaborated that change of outcome occurred "when one or more of its members [...] alter their behavior, either by doing things they would not otherwise have done or by terminating or redirecting prior patterns of behavior." However, in the Eastern Nile basin, despite the riparian states agreeing with the guiding principles and norms of regional institutions like ENTRO, the expectations and interests of the states in the basin have been far from converging.

According to institutionalists interested in studying the effectiveness of regional regimes, the compliance of member states alone won't change the collective action problem on the ground (Schmeier, 2013). The collective action problem of conservation demands more commitment and action from all the member states. Unfortunately, in the entire Nile basin, neither compliance nor commitment corroborates the challenge of conservation and coordination of water uses through policy and institutional mechanisms. This entails the pulling back of states like Egypt and Sudan from their previous commitment to make a financial contribution to the well-functioning of such institutions. In addition, the failure of downstream states to finalize the CFA also indicates the divergence of expectations among the member states in the basin, making it challenging to establish an effective regime in the Nile basin (Abadir, 2011). Swain (2008) criticized the Eastern Nile basin states for failing to take concrete measures towards cooperation despite their pledges for cooperation over the management and sharing of the Nile River water. In his words, "Though basin countries promise basin-wide cooperation, they continue to advocate and promote large-scale hydrological projects unilaterally within their territories" (Swain, 2008: 210).

Unfortunately, states in the Eastern Nile basin rarely observe their commitment to regional agreements like NBI, which makes collaboration and cooperation over water use and conservation very difficult. The compliance of the riparian states with the rules of the agreement

is very weak. Despite the existence of the NBI, states in the basin are competing with each other when it comes to water use in the basin, even in the context where the water uses are not contradictory. The best example is the diplomatic wrangling among the Eastern Nile basin states over the GERD issue, despite the existence of norms and principles through which those differences could be handled. The provisions included in the Declaration of Principles (DOP) between Ethiopia and Egypt to sort out their differences over Nile water use in general and the GERD project in particular have so far not been observed. These all vividly show the weakness of water regimes in the Eastern Nile basin because of noncompliance by member states. In instances where the myopic self-interests of the individual states override collective interests in the basin, thus colliding with the existing regime principles in the basin (Tawfik, 2016)

In the Eastern Nile Basin, the regional institutions have to play a coordination role to conserve the Nile water and its ecosystems. The responsibility to conserve the Nile water from the beginning to the end has to be accomplished not only by the individual states but also through the collaboration of the states that benefit from the water resources. It is only through this approach of collaboration among the states that we can avoid the challenge of collective action problems in the basin. Every state that benefits from this river water has a responsibility to protect the river and its ecosystem from degradation through collective action mechanisms. Regional institutions like ENTRO have a responsibility to coordinate these riparian states to act collectively. Moreover, it is supposed to develop protocols that govern the behavior of the states in the region to fight against the free riders.

It has been a long time since scholars like Ashok Swain (2008) realized that regional institutions like NBI were successful on less controversial issues while unwilling or unable to deal with more controversial issues, particularly in the Eastern Nile basin involving countries like Ethiopia, Egypt, and Sudan. The recent conflict over the Blue Nile among these three countries shows the inability of these regional institutions to handle issues related to water use and water regulations. Indeed, it has never tried to deal with sensitive issues like water allocation among the basin states so far. When it comes to even less controversial issues like joint water management in the basin, the success of the regional institutions is very limited. The impacts of the regional institutions in coordinating the states for identified projects are not as visible. Moreover, the approaches of the regional institutions are incoherent and not that effective, particularly in the Eastern Nile basin.

5.3.5. Regionalism and Regional Water Institutions

As indicated in chapter two of this dissertation, the existence of prior regional cooperation in many issue areas other than the water sector has the potential to help cooperate and ensure institutionalized water governance, as is the case in the South African region and Western Europe. Indeed, many scholars of institutionalism implied that "countries that cooperate in general cooperate about water as well" (Wolf et al., 2003:43). These countries that have greater interdependence in other issue areas have similar perceptions and attitudes toward improving the wellbeing of the basins they share. Such a common understanding of the basin countries helps to provide common governance mechanisms. The regional block helps to reinforce the water regulations and policies set by regional water institutions. The presence of SADEC and the EU facilitated the smooth implementation of water laws by riparian states. Unfortunately, in those basins where regionalism is not common or the riparian states are not included in the same regional block, the riparian states are struggling to practice shared governance of the international river.

The lecturer[85] at Wollega University specializing in international relations believes that it is relatively easy to track the successful management of international rivers in areas where regional alliances align with regional water management systems. The correlation between regional alliances and institutions governing cross-border rivers is not yet well established and warrants in-depth exploration. However, in regions with operational regional organizations, the governing bodies of international rivers tend to operate more effectively and safeguard the waterways from various threats. Regional alliances are seen as drivers of a collective economic, social, and political agenda. The push for a unified market among member countries could facilitate compromises and agreements on water-related issues. The advantages of collaboration in non-water sectors surpass conflicts over shared river resources. In Africa, regional alliances strive to enhance economic interconnectedness and collaboration, aiming to alleviate tensions over shared water reserves. Without such economic interconnectedness and collaboration, establishing cooperation on shared water resources proves to be highly challenging.

[85] Interview with International Relations lecturer in Nekmte on April 4, 2019

Unfortunately, in the Eastern Nile basin, the two most important riparian states, Ethiopia and Egypt, hardly share such regional blocks. The only common regional block is the loose and weak regional block of AU and COMMESA, with no significant impact on the ground. In other African regions, there are strong regional blocks like SADC and ECOWAS with impacts on regional water institutions. The absence of regional blocks presents a hurdle to cooperatively governing and developing the environs of the Nile and its water resources. In the Nile basin itself, the presence of the East African Community (EAC) allowed the East African states to cooperate over the use and management of Lake Victoria to some degree (NBI, 2015). In the Eastern Nile basin, the existence of a functioning regional organization would have served as a facilitator for the emergence of effective water institutions that manage the Nile water efficiently. The recent African Union effort to mediate the Eastern Nile basin countries over the GERD issue is one instance that reveals the importance of such regional institutions to override transboundary river issues. Had the regional institution, the AU, been as effective as the EU or other regional blocks, it could have solved transboundary river management on the continent, including that of the Nile basin. Unfortunately, such regional blocks are rare on the continent, probably except in ECOWAs and SADEC regions, which also assisted in the formation of water institutions that effectively govern transboundary rivers in their respective regions.

The competition for limited water resources and the absence of allocation mechanisms for the Nile states undermined the institutionalized governance of the Nile. The core problem that created disagreement in the basin is the challenge of the allocation of water resources among the riparian states. The efforts of regional institutions like NBI to focus on benefit sharing instead of water sharing also fail to make much progress for the institutionalized governance of Nile water and its environment.

5.4. Overall reflection on the regional response thorough Basin Wide Agreements and Water Institutions

The preceding sections indicated the preoccupation of the Nile legal regimes with ensuring Egypt's water security for most of the 20th century. These regimes, established during the colonial and post-colonial eras, largely overlooked the conservation and sustainability of Nile water. While the legal regimes after the 1990s fostered increased cooperation by building a level

of understanding among basin states, they rarely dealt with Nile water conservation. Consequently, the chapter underscored the deficiencies in regional legal and institutional responses to Nile water conservation and sustainable use. The findings of this chapter are not only limited to demonstrating the shortcomings of Nile-related water agreements in ensuring sustainable utilization of international rivers; international water law provisions hardly demonstrate a means to curb when a riparian country abuses a shared resource to waste it by building infrastructure in the middle of deserts. In addition, the findings of this chapter indicated that if regional institutions are weak, it is difficult to apply water management concepts like IWRM, which aims to promote sustainable water use by applying IWRM principles at basin level.

Moreover, this chapter indicated that the Nile governance regime has weaknesses in implementing regime rules like benefit-sharing objectives. In the Eastern Nile basin, member countries have not made enough effort to achieve these objectives as outlined in the NBI. Despite the expectations of regime theorists that regional regimes like the NBI would influence member countries' behavior, this is hardly evident in the Eastern Nile basin. Contrary to regime theory assumptions, countries in the Eastern Nile basin did not align their policies or collaborate to address shared challenges by relinquishing their policy autonomy to supranational bodies. This led this state to stick to unilateral means to overcome water management challenges, including those that are transnational.

The findings in this chapter suggest that regional agreements and institutions in the Eastern Nile basin lack the necessary mechanisms to coordinate water management effectively. Additionally, they do not have the means to hold riparian states accountable for the wasteful use of shared Nile water. The study found no evidence of regional institutions attempting to apply water management principles such as IWRM to use Nile water sustainably at a basin-wide level. This indicates that conservation of the Nile has been given a lower priority by policymakers and experts at NBI and its affiliates as the basin countries continue to dispute over Nile water allocation. This situation could perpetuate inefficient water use practices in the basin and prolong the disagreement over Nile water utilization. Conversely, if a functional and adaptable water governance system were to replace the current ineffective regime, it could enable basin countries to collaborate on Nile water conservation on a broader scale. This, in turn, could lead to greater

water savings and availability for each riparian state's development needs without infringing on the interests of others.

The shortcomings of the regional water management regimes in the Eastern Nile basin not only limited to the issue of water conservation but also watershed protection which a single country can't adequately undertake would have been facilitated by Nile basin institutions. Unfortunately, regional institutions like ENTRO rarely coordinate such regional response to common threats in the basin. Indeed, the impasse to conclude a comprehensive agreement like CFA has logically stalled the progress towards cooperation over the use and management of Nile River water and its ecosystem. The struggle between the upstream and downstream states of the Nile to change the status quo and maintain the status quo has blocked every good progress toward cooperation. The success story of regional agreements like NBI in diffusing conflicts and achieving a level of cooperation among the riparian states in the Eastern Nile basin has been marred by its inability to address unilateralism and fair allocation of either the benefit of the water or the water of the Nile itself. The good stipulations in the CFA regarding water conservation and ecosystems, as stated in Art. 6 of the agreement, never materialized because of the impasse over the CFA agreement.

Despite the downstream states walking out of the Cooperative Framework Agreement (CFA) and suspending their membership in the Nile Basin Initiative (NBI) and Ethiopia beginning a unilateral project on the Blue Nile after hopes of a joint project under the Joint Multipurpose Project (JMP) were dashed, the development of the Grand Ethiopian Renaissance Dam (GERD) has forced the states to cooperate once again. This is because the new realities on the ground dictate cooperation to manage the common Nile water and the reservoirs on the Nile jointly. This calls for a new water management regime with a common Nile water policy, which, in turn, opens up new possibilities for cooperation on non-water issues among the basin states.

Thus, this chapter demonstrated the deficiency of the Nile water agreements and institutions to effectively govern the Nile water for the maximum benefit of the riparian states. Its inability to overcome the deadlock over Nile water allocation or implement the idea of benefit sharing affected common interests like Nile water conservation and its sustainable utilization. This inadequacy of the Nile legal regime forced scholars and policymakers alike to call for alternative legal frameworks to govern Nile River water more sustainably. However, the assessment of the

literature regarding the impacts of the legal regimes on water use has so far not helped water use sustainability and conservation in the basin. To change the status quo in the basin, alternative legal regimes acceptable to all the riparian states should be introduced, or chaos will unfold in the basin.

Chapter 6: The Demand for Transboundary River Water Policy in the Eastern Nile Basin for sustainable Water use and Conservation

Water is in constant motion. It is part of a cycle – one that ignores all borders created by humans. As such, it is a common good, which requires common management, if this management is to be both effective and relevant.
Audrey Azoulay- UNESCO-General Director (2023)

6.1. Introduction

In the Nile basin in general and the Eastern Nile Basin, in particular, the status quo water management regime seems unable to deal with the existing and emerging water management challenges that are transnational (Ali, 2003; Kimenyi and Mbaku, 2015). The demand for transboundary river policy is not unique to the Eastern Nile basin, since the "global water demand is currently said to double every 21 years" due to population growth (Thuo and Ridell, 2015: 222) thus demanding an effective basin-wide governance regime for international river basins. In the Eastern Nile Basin, the Nile water management gets complicated because of the population pressure, water scarcity, unfair allocation of the Nile water, environmental degradation, overutilization, and mismanagement of the Nile River water (Kliot et al., 2001: 230). Moreover, water nationalism is said to complicate efforts of cooperation in a transboundary river basin like the Nile (Allouche, 2005). Studies reveal that unless proper water conservation measures are taken, the water scarcity in the Nile basin could hamper the development prospects of the basin countries (NBI, 2020; Abdel-Kader and Abdel-Rassoul, 2010). For instance, Egypt the country known for adopting extensive water conservation measures in the basin still struggles to address water mismanagement during storage, conveyance, and the application of the river water to irrigation fields. Water wastage is also reported when using the water for domestic and industrial uses. However, some of these conservation challenges like loss of water from storage facilities are difficult to address through unilateral measures.

Thuo and Riddell (2015) contend that the current Nile River water regime is similar to the 2008 financial crisis because the Eastern Nile Basin states continuously favor immediate profits above long-term benefits. If this trend continues, the Nile water economy could collapse. Furthermore, the steady population growth, the impacts of climate change, and environmental degradation in the basin (Swain, 2011) all call for a common regional approach to prevent the looming disaster. New developments like the construction of Great Ethiopian Renaissance Dam (GERD) (Hassan,

2018) with crowdfunding point to the need for the joint regulation of these reservoirs along the Nile River.

The challenge to transboundary water resource management in the Eastern Nile Basin has been characterized by power and economic asymmetry, differences in the level of water infrastructure development and the prevailing mistrust among the upstream and downstream states (Swain, 2011) despite the Nile Basin Initiative (NBI) claim of building trusts among the basin countries as one of its core achievements (NBI, 2020). Notwithstanding all these challenges, the countries in the basin made a good move toward cooperation, particularly since the late 1990s. Besides, the riparian states in the Eastern Nile Basin at least in principle recognized the importance of cooperation and also the need for managing the river at the supranational level. A case in point for this was even though Egypt and Sudan walked away from the Cooperative Framework Agreement (CFA); they proposed the establishment of the Nile River Basin Commission (NRBC) without reaching a comprehensive agreement even if the other Nile states rejected the idea (Swain, 2011). Several authors have attested the long journey made toward cooperation over the management of the Eastern Nile Basin in the recent past (Brunnee and Toope, 2002; Tafesse, 2003; Mason, 2004; Medhane, 2004; Elmam, 2010; and Hilhorst, 2016).

However, the process of cooperation is very slow and the negotiation process that hoped to strike a basin-wide permanent agreement was stalled in the Nile basin. This in turn dashed out the hope for the establishment of the Nile River Basin Commission (NRBC) due to the disagreement on Article 14(b)[86] of CFA which is supposed to provide the policy framework for transboundary water management. Moreover, in the Eastern Nile Basin, the joint projects that aim to address transboundary water management challenges through the ENTRO projects were too meager for the basin that demands a coordinated response of large magnitude to deal with the challenges of the basin. More importantly, the regional responses have not been institutionalized and incorporated into the national policies of member states as the NBI document also concedes these drawbacks of policy harmonization (Kalpakian, 2015; NBI, 2020).

[86] No consensus was reached on the provison of the article which read as “not to significantly affect the water security of any other Nile Basin states”. The Egyptians proposed to replace this provison as “ not to adversely affect the water security and current uses and rights of any Nile Basin State”.

The NBI projects that are identified, prepared, and implemented by ENTRO were too small compared with the transboundary water management major objectives like: “maximum utilization of the common good (utilitarian approach), conflict prevention and maintaining ecological sustainability” (Kim and Glaumann, 2012:3). According to Veilleux et al. (2013:3) “… uncoordinated use of shared freshwater resources could result in further challenges with quality, quantity and access issues”. For the river basins that are highly stressed because of environmental degradation, water scarcity, and pollution; “cross-border coordination mechanisms” (Renner et al., 2021: 256) need to be given a top priority to sustain the river basin since the livelihoods of millions of people rely on the river water. Unfortunately, regional water institutions like ENTRO have remained ineffective in coordinating water use and management among the Eastern Nile Basin states despite the need for joint responses to enhance water conservation and ecological sustainability. In the Eastern Nile basin transboundary water management approach which enhances the welfare of the basin states has also the potential to prevent the occurrence of conflict in the basin (Kim and Glaumann, 2012).

Even if, the countries of the Eastern Nile Basin declare that they incorporated Integrated Water Resources Management (IWRM) principles in their water resource management policies, so far the sates have been shying away from the issue of managing the Nile River water at the basin scale, against the IWRM principle that adopted basin-wide approach to govern river basins (Thuo and Riddell, 2015). In the Eastern Nile Basin, especially among the downstream states, the individual state policies that evolved are unable to address the quantity issue as well as water quality problems. In Ethiopia and South Sudan, the water sector is at its early stage of development, though they are suffering from environmental degradation and loss of water to evaporation respectively (Yacob, 2010; AfDB, 2015).

This chapter aims to demonstrate that the existing fragmented and state-centric policy framework, along with the ineffective regional policy structure in the Eastern Nile Basin, is insufficient to address transboundary water management challenges. It highlights the critical necessity of establishing a functional sub-basin-wide policy framework in the Eastern Nile Basin to promote the conservation and sustainable use of Nile water.

6.2. The shortcomings of Existing Regional Water Management Policy Regime for Water Conservation and Sustainable Utilization in the Eastern Nile Basin

According to Cascao (2012), the NBI marks a great departure from the previous effort of establishing cooperation and the formation of legal regimes in the Eastern Nile basin. The basin states had begun the search for regional cooperation with the introduction of HYDROMET in 1967. Since then, two cooperation efforts were made with the formation of UDUNGU in 1983 and TECONILE in 1993 (Elmam, 2010). The formation of NBI was applauded by scholars as well as development partners as a step forward in the cooperation of all the riparian countries. Since its inception in 1999, it has achieved a great deal, particularly by serving as a platform for engagement among riparian countries. Moreover, its attempt at building confidence among the riparian countries, at least locked the riparian countries within the diplomatic engagement with one another. Despite the appreciation extended to the achievement of the NBI for strengthening cooperation among the riparian countries (Awulachew et al., 2012), the NBI keeps facing hurdles even that amounts to the reversal of its achievements so far as the lower riparian countries have started to distance themselves and withhold their financial contributions temporarily since 2010 as a result of the disagreement on CFA article 14(b). The disagreement escalated and Egypt and Sudan suspended their regional engagement even-though Sudan rejoined the NBI in 2012 as Egypt insist to its historical right claim and refuse to make concessions of its centuries old Nile water use policy (NBI, 2020).

The proclaimed mission of NBI has been stated as “to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”. To this end, the initiative outlines its achievement as follows: “so far, the Initiative has created platforms where countries from the Nile Basin can come together and talk so that they get to know the realities about their neighbors and how they utilize the waters of the Nile” (NBI, 2020:7). More importantly, the NBI has undertaken tangible projects that enhance the collaboration of the Eastern Nile Basin countries through power grids that facilitate power trade and watershed management projects with regional impacts. The NBI also conducted several studies, the notable one being the Nile basin Decision Support System (NB DSS) which helped member countries to apply the tools to their domestic water resources management decisions (NBI, 2020).

There are also projects at the stage of identification, preparation, and also under implementation with a capacity to further enhance the collaboration among the Eastern Nile Basin countries (ENTRO staff, 30 May 2019). The other most cited success of NBI was that it successfully negotiated and implemented projects of the Nile Basin Interim Procedures for Data and Information Sharing and Exchange in 2009 and the Operational Guidelines for Implementation of the Nile Basin Interim Procedures for Data and Information Sharing and Exchange in 2010 (Paisley and Henshaw, 2013). However, after two decades of its operation, the influence of the NBI on member states' water resource policies has remained weak. Even though the member countries' water resource policies recognized the importance of collaboration, the suite of NBI transboundary policy packages were rarely adopted by member states in the Eastern Nile Basin (NBI, 2020). Similarly, previous studies by Bernauer (2002) and Gerlak (2007) show the poor implementation of international agreements by member states.

The existing NBI suite of Nile basin transboundary water management policies are neither properly framed nor prioritized the problems that they intend to address both in terms of its content and implementation strategies (Expert at IWIMI, May 2020). In the Eastern Nile Basin, the severity of existing and emerging water management problems calls for either the effectiveness of NBI's suite of transboundary river policies or the adoption of a new adaptive policy framework that evolves as the problems get complicated (Ibid). According to this IWIM expert, the Nile River water conservation is one of the areas that receive less attention despite the growing risks that the water demand outstrips the supply of water in the basin unless mitigation measures are taken. The 2015 NBI Strategic Water Resources Analysis also corroborates the view expressed by IWIM expert (researcher) as the analysis indicated, that without the intervention and coordination of member states the water shortfall could go as high as 50% of the current Nile River water supply (NBI, 2015: 23). On the other hand, this analysis also indicated the water demand for irrigation could increase by more than 160% from where it was in 2015 calling for basin-wide water conservation intervention. The irrigated area in the basin was estimated to increase from 5.4 million hectares in 2015 to 8.7 million hectares by 2050 (NBI, 2020). The study of Strategic Water Resource Analysis was conducted "…with the aim of developing sustainable options to meet the growing water needs of the Nile riparian countries, and subsequently to mitigate current and future water stress " by the NBI (NBI, 2020: ix). Similarly, Wu et al. (2016) projected the gap between supply and demand to be around 50 BCM

shortly when the present water projects plan of the basin countries are implemented. All these studies indicate the need to prioritize water conservation in the Eastern Nile Basin for the welfare of the basin states.

Moreover, the NBI Strategic Water Resources Analysis estimated the loss of water from the Nile Basin reservoirs to be around 17.2 BCM (NBI, 2020). This estimation of Nile water loss doesn't include the extensive losses of water in the irrigation fields of Egypt and Sudan, the sector which has extensively used the Nile water with very backward irrigation practices where the losses are reportedly very high (Mahgoub, 2014; El-din, 2013). Moreover, this study didn't include the massive evaporation losses from the Sudd marshland in South Sudan.

To tackle the indicated water loss and mismanagement, the NBI and its Subsidiary institutions like ENTRO could have scaled up the good water conservation practices as well as augmented the member states water conservation measures by designing joint multipurpose reservoirs where the evaporation rate is very low like in the Ethiopian highland areas. With water saved because of the conservation measures, it is possible to fairly distribute the physical water as well as the benefits that accrued and in turn lessen the tension over the use of the Nile water among the Eastern Nile Basin States (Ethiopian academia, 2019). Whittington and McClelland (1992) called for the conservation plans in Ethiopia that could include the construction of several reservoirs to capture every drop of rainfall-runoff during the summer in different sites throughout the Nile catchment areas to release a regulated amount of water from every reservoir into the mainstream so that the flow of the river will be regulated. The reservoirs constructed for water conservation could also be used for generating electricity that can be used by member states through the already developed power grid (ENTRO Staff, 2019).

In the Eastern Nile Basin, though no exact estimations were made as to how much joint development of the river could save, in central Asia the joint development of transboundary rivers by the riparian countries could save up to half the total annual flow of the Aral basin. The joint development addresses both water use inefficiency and loss of water to the evaporation problems (Krutov et al., 2015). The NBI though proposed the need to look for strategic options that enhance water conservation in the Nile Basin; it has not yet conducted a study to identify how much it could save through the joint conservation measures (ENTRO Staff, 2019).

In fact, the regime theory stated that the water management regimes remain “paper tigers” if they unable to resolve the problem structure they are created to address by bringing behavioral change on members of the regime (Bernauer, 2002; Young, 1999). This shows the ineffectiveness of the existing Eastern Nile Basin water regime in addressing common challenges of environmental degradation and the need for water conservation.

6.3. The Deficiency of Unilateral Water Management Policy Regimes in the Eastern Nile Basin

The Eastern Nile Basin countries adopted water management policies with the major objectives of providing water for the growing population, economy, and urbanization with the right quantity and quality (Thuo and Riddell, 2015). Egypt as an extensive user of Nile water has been working hard to increase water conservation through designing different water saving strategies and reducing water mismanagement in different sectors of its economy. As a result the country made a significant journey in conserving the Nile water with an inward looking policy. The basin-wide approach to conserve the Nile water as proposed by the British hydraulic engineers during the early 20th century hardly adopted and materialized with the exception of the Jongeli Canal which aborted because of the South Sudanese People Liberation Army (SPLA) attack in 1983.

Although Egypt’s efforts in the hydraulic mission; addressed water supply issues throughout the 20th century, the country’s policymakers noticed the need for a paradigm shift toward demand-side management (NWRP, 2005). However, the development of the policy with an emphasis on demand side management hardly achieved the required level of water saving. In the irrigation sector alone, Tesfaye Tafesse (2020) reported that 48% of water was lost due to poor application of water saving technologies and regulations related to water use charges.

Moreover, the Egyptian state’s measure to conserve water through regulations like adopting a less water consuming cropping pattern and application of water saving technologies could not keep pace with the growing water demand showing the inadequacy of domestic water saving strategy in Egypt. The inadequacy of Egyptian water conservation strategy to meet the growing water demands calls either to adopt a policy shift from a water intensive agricultural sector to sectors which consume less water or suggest a basin wide approach to secure additional water through conserving water in the upstream states to at least mitigate the current challenges in the basin through collaborative mechanisms (Sherif, 2014).

Even though the above data clearly indicated the need for water conservation in Egypt and in the Eastern Nile basin countries, the Egyptian diplomat based in Addis Ababa has a view that his country made significant progress and he thought that "Egypt can be a role model in reusing the water resources and water conservation for the whole world". He further noted that even in the irrigation sector the massive drainage networks collect water for reuse after it undergoes some treatments. Therefore, he concluded that we are well managing the Nile water resources within Egypt; and that Egypt is willing to share its water management expertise with the basin countries (Egyptian Diplomat, May 2020).

Similarly, the Sudanese draft national water resource management policy and the various water-related legislation hardly ensured water conservation in the irrigation fields as the country still practices flood irrigation, and the low budget allocated for the maintenance of irrigation canals consequently resulted in water wastage. On top of that, the country's water resource management policy didn't safeguard the country from siltation problems, and extreme events like floods and drought (Ali, 2003).

Unilateral water management has been the dominant feature of water management practices in the Eastern Nile basin (Thuo and Riddell, 2015). Some of the water resource management policy objectives of these countries cannot be realized without the actual collaboration and coordination efforts. In Ethiopia and South Sudan, the low level of water development demands external funding for boosting the low level of water development in both countries. The efforts of Ethiopia to rehabilitate the degraded lands in the Nile basin over the last four decades made good progress even though the extensive degradation that took place for a long time has necessitated resource mobilization from domestic and external sources. However, it is difficult to access external multilateral resources without an agreement with the downstream states (Allan, 1999). Therefore, Ethiopia needs to make policy adjustments to attract external funding from multilateral sources for the development of the water sector as well as efficient management of its water resources. Similarly, South Sudan demands external support for capacity building and project funds to develop its water resources which demand cooperation with the downstream countries, particularly with North Sudan as the water issue was not discussed and resolved by the 2005 Comprehensive Peace Agreement (CPA) (Salman, 2011b).

The states in the Eastern Nile basin recognized the importance of IWRM as an approach to govern shared water resources as indicated in, respective policy documents (the 1999 Ethiopian Water Management Policy, the 2005 Egypt's NWRP, the 2007 South Sudanese Water Policy, and Draft water policy of Sudan) incorporated IWRM as one important pillar of the policy document. Despite the recognition of IWRM principles as an approach to governing the Nile, no coherent regional policy document that guides Nile River governance or a regime is evolved based on the idea of a distributive model. As a result, the Nile basin remains exposed to the threats of climate change, environmental degradation, and water mismanagement. Moreover, as most states have already started or plan to exploit the Nile water resource without the appropriate water use policy for the entire basin, it is difficult to tap the limited Nile water resources and this can result in a conflict of interest among the Nile water users (Wheeler et al., 2018).

The implementation of IWRM as an approach not only avoids policy fragmentation to govern the Nile water resources; but also promotes cooperation and institutionalized governance. In the major international river basins that adopted a common policy framework to govern the basin resources, degraded river water, and its environment were rehabilitated. In addition, standards that member states expected to meet were set (Norman, 2015).

The incorporation of the IWRM principle in the water resource management policies of the Eastern Nile Basin states (the 1999 Ethiopian water policy, 2005 Egyptian National Water Resource planning, 2001 Sudanese Draft Policy Document and 2007 South Sudan water resource management) hardly brought policy convergence as it promotes "river basin planning" (Kibaroğlu *et al*., 2007:51) among the upstream and downstream states. The water resource management policy regime remains fragmented along the national borders. This shows the adoption of ideas and concepts that were generated at the international level, though embraced by riparian states; they hardly affect state practices unlike the expectation of regime theorists which predict such policy convergence.

According to an expatriate (February; 2021) based in Addis and familiar with the Nile water resources management, the sustainable utilization of the Nile much depend on a setting up of a permanent supranational institution. He further noted that though the countries in the Eastern Nile Basin seem to have different water development priorities and incompatible interests; there

is a potential for policy convergence in the Eastern Nile Basin. The expat expressed the policy convergence point in the following ways:

> The Ethiopian demand for water development including the construction of reservoirs and protection of the reservoirs from silts through watershed protection activities is also helpful for the downstream states in two ways: first, it helps to store the Nile water in Ethiopia where the evaporation rate is relatively low and second, the environmental protection activities and the construction of the reservoirs which Ethiopia could use for different development purposes can hold back and mitigate the siltation problems from which the Sudanese reservoirs have been suffering.[87]

Similarly, Ethiopian academia with a hydraulic engineering background (February; 2021) forwarded an idea that complements the views of the above expat. He stated that "I don't see any viable alternative than institutionalized cooperation among upstream and downstream states. The alternative to cooperation is a denial of opportunities to the future generation to thrive and prosper". He noted that governance arrangement at the supranational level has the potential to overcome the current quagmire "through the conservation of the Nile water from evaporation by building hydraulic infrastructures jointly in low temperature and narrow valley of Ethiopia as well as joint projects that emphasis supply-side enhancement collaboratively where every state benefits from such collective action".

Regime theorists have a view that when a unilateral actions or domestic institutions have difficulty to achieve policy objectives, states resort to international institutions to overcome the challenges or help them "converge their policies" (Martin and Simmons, 1998). The idea is that national water policies have exhibited limitations to deal with water management challenges that are transnational in nature as indicated above. This implies that the existing national water management policies in both the upstream and downstream states need to be reformulated towards a transboundary river policy for the common benefit of all the Eastern Nile basin states as the existing fragmented policy regime is inadequate to deal with water conservation challenges. The findings of the previous works by Ali (2003), Tesfaye and Brouwer (2016) and Salman (2016) corroborates the views expressed by the expat and Ethiopian academia.

[87] Interview with ECA staff who work on water resources management including in the Nile basin on Feburary22, 2021 at Addis Ababa.

6.4. Existing and Emerging Transboundary Water Management Challenges that Demand Sub-Basin Wide Policy Regime in the Eastern Nile Basin

The need for sub-basin wide policy regime is required not only to deal with the existing common challenges in the Eastern Nile Basin. In the sub-basin, there are also emerging common challenges that demand an urgent collective response from the part of the basin countries. The policy regime theory also argues that policy regime helps to deal with new emerging challenges that are transnational or difficult to resolve through unilateral actions (May and Jochim, 2013). According to Stone and Stoker (2015) members of the regime could effectively deal with these challenges by allocating resources that commensurate the goal being pursued. This study identified some of the salient challenges which require such collective response through transboundary policy regime such as climate change impacts, joint regulation of mega reservoirs, environmental degradation and siltation problems and the politicization and securitization of the Nile water use as witnessed in the recent past.

6.4.1. Climate Change

According to Marty (2001) as a result of global climate change, the challenges international river basins face are expected to compound in the coming few decades coupled with the increasing demands for more fresh water and the deterioration of the quality of the water. In the Eastern Nile Basin, the basin countries already started to experience these problems. Therefore, to cope with the challenges Marty (2001: 23) states that "Basin states should coordinate or even better, integrate their respective policies, and they should establish legal regime, which covers the whole of the basin and defines the rights and duties of all actors using the basin resources". On the other hand, Thuo and Riddell (2015) noted the impacts of climate change are expected to worsen, increasing the severity of drought and flash floods in the Eastern Nile basin. According to the IPCC (2014), the African continent will experience more warming with a potential increase in extreme events. Similarly, the OSS (2017) predicted high temperature in North East Africa with a potential to increase the evaporation of the freshwater resources from the Nasser Lake thus increasing the amount of water lost to evaporation.

Despite the growing challenges that posed threats to the sustainable utilization of the Nile River, the Regional policy regime's response to deal with the problem is not satisfactory. The regional institution, ENTRO, established a pre-warning system and has implemented projects that reduce/

mitigate the flood vulnerability of the society in a flood-prone area of Sudan (NBI, 2020). However, the ENTRO still struggles to coordinate the actions of the basin states as well as set up a clear climate change adaptation strategy with the exception of upgrading the various water and meteorological gauging sites in the basin. Obviously, the watershed project that ENTRO has undertaken in the Ethiopian highlands marks the possibility of joint intervention to cope with climate change impacts in the Eastern Nile Basin regardless of its limited magnitude (ENTRO Staff, 2019).

6.4.2. Joint Water Development and Regulation of Mega Reservoirs

In the Nile basin in general and the Eastern Nile basin in particular, scholars warned that the lack of coordinated use of the water led to water mismanagement. In this regard Kimenyi and Mbaku (2015:xi), warned that the inability of the Nile basin countries to reach a consensus on allocation of the Nile water exposed the river to "inefficient and wasteful use of the common pool resources" which further undermined the sustainability of the Nile river. Likewise, the Economist magazine in its August 3rd, 2017 edition warned that the Eastern Nile countries should not only focus on the timing of the GERD reservoir filling but also the operation of the dams along the Nile river during negotiation among the three countries. The magazine reported that "[n]o where in the world are two such large dams on the same river operated without close coordination," citing the studies conducted by MIT researchers (The Economist, 3 August, 2017). In corroboration with the above views, Professor Hamdy Hassan rightly said "[t]he lack of coordination between the Nile Basin countries, especially Ethiopia and Egypt concerning the use of water, will cause great harm to the downstream countries" (Hassan, 2018:48). Even though the recognition of the Eastern Nile basin countries' interdependence through the Nile is a step forward, the basin countries are still lagging behind both in strategic diplomatic engagement and the strengthening of basin institutions. The case in point is that Egypt has abstained itself from NBI engagement since 2010 though that abstention detrimental to Egypt's water interest as realities on the ground are radically changing among the upper Nile states (ENTRO Staff, 2020).

Ethiopian academia (2019) has a similar view with regards to the need to coordinate the dam operation of the thirty (30) water reservoirs that spread along the Nile basin countries holding more than 200 BCM of water. Without the coordination to operate the dams, the climate change effects which are expected to aggravate the two extremes of flood and drought made the

management of water resources extremely difficult in the Eastern Nile Basin. Regulating water reservoirs jointly is crucial for ensuring the safety of large dam structures within the basin. Egypt has raised concerns regarding the safety of the GERD during various negotiation sessions (Kandeel, 2020). However, an independent technical team was established to conduct an investigation and officially confirm that the dam meets all technical standards without posing any risks to its safety (The Ethiopian Reporter (Amharic), 24 Nov 2019).

The UNDP (2006) estimated that collaborative development of transboundary rivers in central Asian countries could potentially save approximately half of the total annual flow of the Aral basin, although no precise calculations were conducted for the Eastern Nile basin. The joint development addresses both water use inefficiency and loss of water due to evaporation problems (Krutov et al., 2015). In North East Africa, where fresh water is the scarcest resource and competition overutilization is growing from time to time, emphasizing only legal and institutional frameworks alone won't resolve the problem in the Eastern Nile basin to govern the water resources of the Nile for sustainable use. It also needs a sound policy that guides action on the ground to address the most important issues in the basin. The sustainability of the Nile water use not only demands balancing the national water demands with the regional demands of other riparians, but it also requires balancing the exploitation of the river water for the current generation as well as for generations to come.

The states in the Eastern Nile basin have limited capacity to exploit the resources of the Nile independently in a sustainable manner by giving due consideration to environmental concerns. However, the desire to jointly exploit the water resource of the Nile is a rare phenomenon, except for a few projects and plans to conserve the water resource by constructing the Jongeli Canal. From an economic perspective, the interests of the Eastern Nile basin states are compatible with each other, thus demanding cooperation to jointly develop the Nile water for development purposes. The following table shows the compatibility of interests in the basin.

Table 6.0.1 Distribution of interest among the countries of the Eastern Nile basin

Sector of interests	Riparian states of the Eastern Nile basin

	Ethiopia	Eritrea	Egypt	Sudan	South Sudan
Agriculture/irrigation	*	*	*	*	*
Water supply			*	*	*
Navigation	*		*	*	*
Hydropwer	*		*	*	*

Source: Compiled by the author

The water use potential of the riparian states for different purposes varies from one country to another. However, instead of developing the Nile water unilaterally, as is a common trend in the basin, efficiency and sustainability can be achieved if the basin states develop the Nile water jointly. For instance, the potential of Ethiopia for hydropower is much higher than that of the rest of the riparian states, facilitating the opportunity to jointly develop hydroelectric plants that can meet the water needs of the basin states through energy trade or other arrangements. The same is true about irrigation potential and water conservation projects for the benefit of all the basin states.

The success of joint projects, whether they are water development, environmental, or conservation projects, depends not only on the desire for cooperation and agreements but also on a clear strategy and sound policy. Nevertheless, the Nile basin suffers from a lack of binding agreements, functional regional institutions, and sound policy. As a result, no significant move has been made in the direction of water use regulations and coordination among the different projects along the course of the river. This fact alone can exacerbate the water scarcity in the basin as well as undermine the capacity for optimal water use in basin, paving the way for interstate conflict and undermine the sustainability of the river.

The experience in other international river basins shows that riparian states can easily cooperate on less sensitive issues where states do not view water as a national security issue, like the protection of basin environments. In the Nile basin, unfortunately, there are rare cases where states cooperate to deal with an environmental challenge in the basin, despite the low-political

nature of such issues. As a result, the environmental problems challenge keeps growing since no coordinated intervention has been made against the problems.

6.4.3. Environmental Degradation and Siltation Problems

The Nile environmental degradation, particularly in the Ethiopian highlands, has worsened despite the successive Ethiopian governments' intervention to protect and rehabilitate the Nile environment. The agreement responds through a regional approach to deal with the problem of land degradation through ENTRO is too late and too small provided the extent of the problem and its negative impacts on the remaining downstream states. For instance, the NBI (2015: 2) reported that if the countries fail to cooperate and jointly deal with the land degradation in Ethiopia alone, the NBI estimated the current cost of the degradation around 670 million USD. This report further indicated that if this trend continued for the coming two decades without a joint intervention from the basin countries, it estimated an economic loss of 4.5 billion USD (NBI, 2015)

The soil degradation has led the removal of the fertile topsoil that has impacted land productivity. This process led to the expansion of agricultural lands to the marginal lands intensifying the removal of the topsoil which resulted in deforestation and therefore the exposure of the degraded land to drought and other climate irregularities with the ramification on river flow regimes. On the other hand, the siltation problem in the Sudan has already affected the storage capacity and therefore the sustainability of dams and irrigation canals. The removal of silts and heightening of the reservoirs has sapped the limited financial resources of the Sudan (Mason, 2004). NBI (2015) reported that Sudan incurred an annual cost of 7.5 million USD to remove silt from the Roserries dam alone. Unless otherwise collective joint measures are taken, the consequences of the degradation in the Ethiopian highlands have a far reaching consequence that might affect the flow regime of the Nile water that arrives in the downstream states (NBI, 2020).

Environmental change has brought a paradigm shift in how to use shared natural resources. The 21st century demands a new approach to using natural resources. Natural resources such as freshwater need some effort on the part of humanity. The degradation of water environments, the alien species' invasion of water bodies, and climatic variability in the era of climate change

necessitate human intervention, at least to stop the degradation process or reverse the trends where they were. Indeed, such efforts command a huge amount of human, financial, and technological resources to achieve the noble objective of achieving water resource sustainability.

Nations are not altruistic entities that commit their meager resources to the conservation and preservation of commonly shared resources for the benefit of others who share the resources. Those principles enshrined in the international and regional legal frameworks should have mechanisms to address these demanding issues through detailed guidelines for collective actions by states. A detailed set of institutional and policy guidelines to cope with the new reality where natural resources are no longer 'natural' but demand some human effort for their sustainability, a complete shift in resource ownership and use, has to be outlined to cope with the new reality.

6.4.4. Politicization and Securitization of the Nile Water Use and Conservation

In the Eastern Nile basin the course of action taken by the riparian states by politicking and securitizing the Nile issue never resolved the allocation of the water resources of the Nile or any of the major collective action problems in the basin. The existing river management regime neither protected the river from the different challenges nor brought efficient utilization, hence demanding a change of governance approach. The extreme dependence of some of the riparian states on the Nile made cooperation over the use and management of the river very complex and tough. Moreover, the concentration of the population and economic activities in the Nile valley forced countries like Egypt and Sudan to politicize, internationalize, and securitize the Nile issue, Egyptian scholars like Hamdy Hassan (2018) concede the internationalization of the Nile water use when he stated that "…the Grand Ethiopian Renaissance Dam is regarded as an Arab Gulf issue and not just a purely Egyptian affair" (Hassan, 2018:43).

Egypt in particular views the Nile as the highest political and national security over which they are unwilling to negotiate and reach compromise thus halting efforts to institutional joint governance of the river water (Kalpakian, 2015). In the basin so far countries like Egypt, which can save water through the adoption of laws and policies and also recycling of the wastewater (Abdel-Kader and Abdel-Rassoul, 2010) have not been willing to use the saved water to equitably share with upstream Nile states. This could create a favorable condition to reach an agreement on the Nile water use and management among basin states. Instead, Egyapt opted for

reclaiming desert lands outside the Nile valley with the saved water than using that for more cooperation with upstream states (Allan, 1999).

From a normative perspective, the regional mechanisms like ENTRO could overcome the challenge of securitization and politicization through the systematic promotion of water supply enhancement, on the one hand, and water conservation among the lower riparian states, on the other, so that the states in the basin could reach agreement on the use and management of the basin. The regional mechanisms can achieve this goal only through a policy framework that enables the states of the basin to coordinate their water management and use in the Eastern Nile basin (Ethiopian academia, 2019). Once a given river basin's collective action problem has got security relevance, nations in the river basin struggle to reach a common understanding and agreement dooming the chance for cooperation and institutionalized governance. However, this policy position won't contribute to the health of the basin and exposes the river to several collective action problems

which can only be solved through common policy frameworks and joint governance mechanisms (IWIMI expert, 2020)

In the international river basins where the river basin collective action problems are not securitized and politicized, there are opportunities for cooperation and resolving or mitigating the identified collective action in the basin. There is also a great chance not only for jointly mitigating the problems but also for institutionalized governance of the river to jointly address similar collective action problems permanently. Such cooperation and joint governance are possible in the basin where the collective action problems have no security relevance for the co-riparian states (Schmeier, 2013:71).

In the Eastern Nile Basin, if the politicization and securitization of the Nile river continue, the lives of the millions of people that relied on the river will soon or later be jeopardized as the existing governance of the River is dominated by politics and security issues with little recognition of the looming danger in the basin because of the climate change, urbanization, population growth, economic growth which demand a new legal, institutional, and sound water policy to ensure the sustainability of the river and meet the new ever-growing demands for the freshwater use. The domination of Nile River management with politics and security so far has

not moved the states in the basin to face the real challenge of the river. As a result of political deadlock over allocation issues, the challenges to the river basin and its ecosystem have been neglected. In the Eastern Nile Basin, both the water and the health of the Nile environment have paramount importance for the sustainability of the Nile and the livelihood of millions of people that rely on the river water resources. The protection of the Nile environment and conservation of its water are very crucial given the number of populations that rely on the Nile water and the threats of droughts and impacts of climate change which could influence the flow regime of the river hence the quantity available to the Nile water users. Despite all sensitivities of collective action problems in the basin, the politicization and securitization of the Nile water will help neither the health of the river and its environment nor resolve the challenge of joint governance that characterizes the basin. Indeed, the policy of internationalizing the Nile water politics and securitization has not brought security and mutual understanding and hence the effectiveness of institutionalized governance of the river. It rather resulted in increasing tension and the expansion of mutual suspicion among the riparian states beyond the water sector.

The Egyptian government brought the Nile case to the Arab League and they declared their support for Egypt. Through the ministry of foreign affairs, Ethiopia expressed her concerns about the decisions of the Arab League regarding the Nile (Addis Standard, 2019). Egypt also strongly demanded the involvement of the United States of America and World Bank first as observers though America tried to impose the terms of the agreement through its treasury officials which Ethiopian authorities decline to accept (Yacob, 2020). These all show the Egyptian effort to politicize the Nile issue which neither parties for the sustainable utilization of the river water.

Egypt has already securitized its access to the Nile water. Successive Egyptian leaders have already declared others' access to the water as a national security matter. Indeed, they threatened to use force in case states like Ethiopia dare to use the fair share of the Nile water for their development. Egypt leader Anwar Sadat after the conclusion of the Camp David agreement with Israel declared that Egypt go to war if her water right is threatened by upper riparian states implying the securitization of the Nile water access (Hassan, 2018).

The desecuritization of the water issues in the Nile basin holds great benefits for all the basin countries. It can promote cooperation and economic interdependence in the basin countries, thus producing more economic potential than the actual benefit that can be reaped by securitizing the

Nile issue (Grandi, 2016). The call for the Nile river governance regime change intensified from scholars as well as development practitioners in the recent past. Indeed, many call/search for alternative transboundary water regime governance in the Nile basin since the existing regimes are neither effective in terms of efficient water utilization of the water resources nor sustainable in protecting the water and its environs from the looming threats to the basin water resources (Kimenyi and Mbaku, 2015; Grandi, 2016).

The securitization and politicization of the Nile River can be toned down if the riparian states search for an alternative source of freshwater by investing in emerging technologies and trying to reduce over-dependence on the Nile as the source of freshwater. The third method is to advance technologies that rigorously encourage water conservation among water users and to advance rules and regulations that do the same. It is thought that the high pricing policy will discourage overuse and waste of water and encourage water conservation. To prevent states from enacting policies that securitize and politicize water, all of the aforementioned actions are extremely important.

6.4.5. Prevention of open conflict (water war)

The presence of a basin-wide policy framework is also vital for preventing the potential for water wars beyond ensuring the efficient utilization of water resources. Promoting the collaboration of the basin to conserve and utilize the water resources reduces the potential for misunderstanding and mistrust among the riparian states. The existence of the policy also helps to achieve the NBI objective of sharing benefits among the riparian states, which might facilitate the potential deadlock over sharing the physical water because of the contradicting claims by the riparian states following certain international law arguments and claims. The scholars of the Oregon State University, which developed the TFDD database, concluded that though the potential of the transboundary rivers as a source of cooperation remains very high, they identified the Nile basin as one of the potential conflict flashpoints (Wolf et al., 2003).

The coordination and collaboration of water use among the riparian states could also promote the growth of regional trade blocks and economic relations. The trade and economic interdependence among the riparian states reinforces the sustainability of peace and the prevention of conflict, allowing them to enjoy the benefits of economic and trade

interdependence, as such arrangements create huge market opportunities for economic actors in the basin.

The presence of integrated policy frameworks would have solved the current tense relations among the riparian states over the filling and operation of GERD. Had a clear policy been in place, mistrust and misunderstanding wouldn’t have arisen over Nile River projects, as projects would contribute to fulfilling the common purpose of addressing poverty and contributing to the whole region's prosperity. However, the absence of such common policy frameworks made the possibility of war over Nile water an existing option for the competing nations over the use of the Nile. Grandi (2016: 252) stressed the importance of a transboundary policy framework for the prevention of war in the following ways: "Policy frameworks for the integrated management of transboundary water resources, which would provide them with coordination mechanisms, efficient technical solutions, and norms for dispute settlements, thus minimizing the risk of conflict”.

The poor state of water use governance as well as the challenges of environmental degradation throughout the basin require a sound regional policy intervention. In the Eastern Nile basin, collaboration projects for the management of the fragile Nile ecosystem have to be guided by transnational policy. In the absence of such a policy framework, initiatives to conserve the water resources of the Nile and its ecosystem, regulation and coordination of water uses, and interventions to protect the environment of the Nile cannot be sustained and will not be able to protect the river from different dangers in the long run.

In previous discussions of the chapters, we have seen that no individual country’s legal, policy, or institutional framework suffices to protect the integrity of the Nile water. Stakeholders that work on the sustainable use of Nile water ought to emphasize developing policy frameworks that govern the Nile as an indivisible unit from the beginning to the end. With fragmented policies, laws, and institutions, no one is in a position capable of protecting the Nile River water from degradation and the influence of climate change.

Mere knowledge of environmental problems cannot immediately lead to finding solutions that can protect the environment. However, the environmental system is highly intertwined with the

social, economic, and political dimensions of human life, thus demanding these contexts when one develops river policy. However, in the context of the transboundary river, other considerations, like cooperation between the riparian states, are required to develop a common policy that can deal with the challenges of the Nile River system. The ecology of the Nile system keeps deteriorating as the states relying on the Nile ecology, though, have directly contributed to the degradation of the ecology of the Nile River and have made little effort to reverse the damage that occurred to the ecology or stop the continuing deterioration of the river ecology in the basin (Ali, 2003).

In principle, environmental policy, which includes water policy plans, aims to make human actions not cause environmental damage or reduce the damage done to natural resources to the best possible level. Indeed, water policy is designed to avoid, solve, or ameliorate water problems. To protect the commonly shared water resources from the tragedy of the commons, states need to adopt what Roberts (2004: 4) calls “a policy of mutual coercion, mutually agreed upon”. In the Eastern Nile basin states, a common water policy has to deal with the problems of the upper and lower riparian states separately as the problems along the Nile River are different. Among the lower riparian states, the common water policy designed by regional institutions needs to focus on ways of reducing water waste when it is used for different purposes. In Ethiopia, the common policy focus has to do with ways to rehabilitate the degraded river ecology and mechanisms of harvesting surface runoff to regulate the flow of the river throughout the year.

The problem of water loss among the lower riparian states in the Eastern Nile basin has to be corrected by introducing a stringent water auditing system if both Sudan and Egypt want to tackle the problem of water loss and determine the possible solution to the problem of water loss and inefficient utilization of the precious resource.

The quest for common water policy by the riparian states emanates from the fact that the future for all who share the Nile lies within genuine cooperation, not the fragmented and incomplete national water policies of the Eastern Nile basin states. Isolating oneself from the multilateral cooperation that would benefit all the members would bring little benefit, as the opposition to cooperation is expensive, uncertain, and disastrous for the Eastern Nile states. Moreover, resistance to cooperation, therefore, for the basin-wide river policy, would undermine the

sustainability of the river. Such a move will reinforce mutual suspicion, mistrust, and the potential for violent conflict over the use of the river. Furthermore, it reverses the achievements of the basin countries in the direction of cooperation, undermining the potential benefit reaped from the river water resources and its ecosystem services (Kimenyi and Mbaku, 2015).

The future for the riparian countries lies in cooperation rather than securitization or politicization of the Nile River for all the countries in the basin. Such securitization and politicization of the Nile basin would help little in terms of conserving the Nile water and its environs for generations to come and resolving the level of mistrust and diplomatic disputes between the countries in the basin. It needs the engagement of the main stakeholders in the formation of basin-wide policy, as such policy brings about the sustainability of water use, economic efficiency, and social stability. The engagement of the stakeholders in the policy dialogue and joint projects at least helps build trust and mutual understanding between the parties to the policy dialogue (Cascao and Nicol, 2016). As the constructivists implied, mutual understanding between the parties to the policy dialogue would enhance the chance of institutional sustainability and acceptance of the institutions as their own. This in turn brings compliance from the part of the participant to basin-wide policy as well as the supranational institutions that overlook such issues.

Aaron Tesfaye (2008:5) implied that the basic challenge in the Eastern Nile Basin is, in his own words, "the arbitrary division of the Nile River Basin" without consulting with the co-riparian countries and agreeing on the coordinated utilization of the river. He further argued that "from the standpoint of economic efficiency, a river basin should be treated as a unit because, unlike geopolitical entities, river systems do not encourage unilateral or separate development. Geography suggests that a river system should be developed as a single, indivisible whole regardless of political divisions". However, in a transboundary river basin, addressing the problem of allocation alone is not enough to address the other water-related problems. A commitment that expands across national borders in a river shared by multiple countries and involves sharing the costs and benefits of managing the river based on established rules can create an effective river basin system that treats the entire basin as a unified entity (Kliot et al., 2001).

When considering the basin-level policy, it's important to address two key aspects. Firstly, promoting conservation among lower-riparian countries can help meet the additional water demand and facilitate the renegotiation of water allocation based on the principle of equitable and reasonable use. Secondly, conservation efforts in the upstream area of the Nile should involve collaborative measures to ensure environmental sustainability and continuous water supply for all riparian countries. In Ethiopia, conservation plans may involve constructing multiple reservoirs across the Nile catchment area to capture rainfall runoff and release regulated water flow into the mainstream, thereby regulating the river's flow (Allan, 1999; Whittington and McClelland, 1992).

There is no rationale for only one riparian country to bear the responsibility of protecting and preserving the ecosystem of the upper catchment areas. As such, this area is the major source of the bulk of the Nile water. Projects that protect the Nile water and its related resources have to be co-designed by all the users of the Nile water and financed by these users of the Nile. Any institutions and nations that are interested in the sustainability of the vital resources of the Nile should commit resources, energy, and technology to the protection and preservation of the environment of the Nile. If no efforts are made towards developing the Nile water resources, the resource, after all, belongs to the developer of the resource. All nations that share riparian rights over the Nile must safeguard and utilize the river's water resources if the river is to remain theirs. The water resource needs protection and intervention to protect it from depletion. The water resource is no longer a God-given resource that flows freely without some human intervention to protect it; thus, the cost of environmental protection has to be equally shared through adopting a common policy and strategy. [88]

When riparian countries undertake conservation measures that involve infrastructure development, they should specify how they could benefit from such joint projects. Some sort of joint protocol on the conservation of the Nile with detailed guidelines has to be evolved. This conservation protocol for the Nile has to be acceptable to all the stakeholders. The Nile River’s well-being cannot be achieved by an individual country’s efforts. Watershed development programs that happen to protect the well-being of the international river should be undertaken

[88] Interview with professor of Political Science and International Relations on June 23, 2020 at Nekmte.

with the collaboration of all the beneficiaries of the river. All societies along the riverbanks must participate and contribute to protecting the water and its surroundings from degradation by allocating resources, as these actions benefit everyone. The upper-riparian countries, which will sacrifice their development, should be recognized and compensated for the cost they incur by refraining from expanding economic activities, which include agriculture. An institutional mechanism has to be put in place to facilitate such arrangements.

In the Eastern Nile basin, there is no logic or legal ground for one to incur costs, and there is no sharing of the benefits of water resources. The post-World War II water policy shows the need for a clear legal framework. The existence of supranational directives also helps states obey the directives of such entities by national governments. All efforts towards establishing a supranational framework for governing the transboundary river without an enforcing mechanism are futile. When such frameworks are established, they need some institutions and legal frameworks that enforce transboundary water policies (van der Zaag, 2009).

The additional water produced through the investment of a single state must be set aside for the nation committed to replenishing and sustaining the continuous flow of river water. This can be calculated from two angles: what would happen to the water resources if a particular country had no intervention projects? The loss if left to the vagaries of nature should be estimated, as should its impact on ecosystem loss and the loss of the amount of river water therein. The second view is what was gained because of the intervention. Water saved by building a water reservoir needs to be calculated and allocated to the country that invested to address water loss. The other important issue has to do with the amount of resources a nation allocates for the conservation of water and its environs. How much did the country invest to achieve the result of environmental restoration in the upper catchment area of the Eastern Nile Basin?

The old and traditional approach to overcome water insecurity and meet the growing demands for water among lower-riparian countries won’t address their thirst for water and the potential to grow. They have been on a long journey, achieving that through a unilateral and egoistic approach that paved the way for upper-riparian states like Ethiopia to use their natural resources, the Nile water, for their development imperatives. The desire to undermine the cooperative use and conservation of the Nile would backfire sooner than later. The desire by the lower-riparian

countries to undermine the implementation of CFA because of Article 14(b) will lead to the same downward spiral. Such moves neither contribute to sustainable water use nor bring harmony between riparian countries over the water use regime.

In the Eastern Nile basin, there is a political deadlock in the direction of forming a cooperative framework, which lays the foundation for a cooperative policy framework that would have led to the regulation of water use and conservation of water and related resources. Domestic economic and political factors have a huge impact on the policy choices of countries (Schreurs and Economy, 1997). Domestic factors significantly influenced the efforts to adopt a transboundary river policy regulating water use in the Eastern Nile basin. In the context of the Eastern Nile basin, the domestic economic and political establishments fear the water use regulation at the regional level for fear of a reduction in profits, and the political establishments fear offending the large business establishments that are well connected to the political class. This is at least true among the lower-riparian countries of the Eastern Nile basin, as the political economy of these countries is associated with the water resources of the country.

In Ethiopia and South Sudan, such domestic economic and political factors have no significant impact on the negotiation process to form basin-wide river water policy in the Eastern Nile basin, as they are less powerful than their peers in the lower riparian states. Therefore, the government in Ethiopia and South Sudan has the free hand to negotiate on environmental issues, including the policy of transboundary river regulation. Despite widespread poverty, Ethiopia has demonstrated a strong commitment to environmental protection, especially after the 1984–1985 famine and drought in the northern region. Since then, successive Ethiopian governments have adopted the environmental protection policy and have tried to implement it. Ethiopia contributed to the conservation of the Nile River ecology despite its financial difficulties; however, countries like Egypt with better financial standing would have done better than Ethiopia in protecting the river from pollution and introducing better mechanisms for efficient utilization of the Nile water resources.

6.5. Overall Reflection on the Need for a Common River Policy

In the Eastern Nile basin, the need for a common policy to overcome the multiple collective action challenges the basin faces has existed for a long time. The British colonialists that

controlled the basin realized the challenge and tried to produce agreements that benefited their interests. However, the agreements with different entities along the river show their desire to benefit lower riparian states through collaborative arrangements. The then-bilateral agreements were also an attempt to establish a common policy ground with regards to Nile river use. However, these early attempts to forge a common policy with regards to Nile use are neither genuine nor based on mutual benefits that take the interests of all the states into account.

The uncertainty of the Nile River because of economic and environmental pressures can only be mitigated through a common policy framework that governs the Nile. This common policy framework in the basin addresses policy fragmentation as well as the adoption of water use policies that complement each other. A sound common policy is in great demand, like the new legal and institutional frameworks, at least to mitigate the threats the basin faces. The quest for the new common water use policy is very crucial at a time when water projects have already proliferated among the upstream states. The common policy helps the states regulate water use to achieve optimal benefits for all the states along the Nile.

International rivers do not recognize national boundaries, thus demanding a basin-wide policy that regulates water use and management. Most of the challenges in the Nile basin are transboundary in nature, thus demanding a coordinated policy response from all the riparian states. The fragmented national policies are inadequate to deal with the challenges that are transboundary in nature. These challenges that demand a coordinated policy response in the basin include the losses of water from the Egyptian and Sudanese reservoirs through evaporation, the threats of drought and desertification, environmental degradation that calls for joint responses in Ethiopia, enhancement of water quantity and quality, protection of water hyacinth from the lakes that serve as the source of the Nile water, exchange of information and data, and coordinated regulations of the water reservoirs on the Nile river to promote smooth regulations of the Nile water flow and also hamper conflicts over the use of the Nile water through coordinated regulations of the water along the Nile river.

Beyond the protection of the basin from the looming threats, a sound common policy also prevents violent conflicts. Instead, such common policy frameworks help to achieve greater cooperation not only in the water sector but also the greater integration of the states along the

basin, which brings more prosperity and development to the water users. The common policy framework for the Nile River has multidimensional significance. The main purpose of such a common policy is to ensure sustainability and avoid disputes that arise among the basin states. It also promotes cooperation and integration in non-water sectors among the basin states. It has the potential to pool resources necessary to conserve the Nile ecosystem from the source to the end. This commonly pooled resource can be allocated to member countries and institutions that work on basin ecosystem conservation to fight drought and climate change impacts.

In the absence of a common policy framework, loose cooperation and agreements like NBI have no means to have a meaningful impact on the ground. For these agreements to be implemented and bring about change on the ground, a common policy framework is a prerequisite with no substitute. The intention and plan of the basin states to further exploit the Nile water cannot be achieved without a common policy framework to regulate and coordinate the water use among the basin states. This fact necessitated transnational regulation and coordination of water projects along the Nile River. This can only be achieved with clear policy frameworks that guide the responsible regional institutions to govern the Nile River. With the proliferation of projects along the Nile River, transnational regulation of the river is in great demand to ensure optimal utilization of the river water and protect the basin from looming threats.

Chapter 7. Conclusion

This dissertation set out to investigate the way Eastern Nile Basin states and regional water management governance regimes responded to the challenges of water conservation and environmental degradation in the basin through legal and policy measures. It attempted to shed light on how the Eastern Nile basin states tried to conserve and protect the Nile water resources through legal and policy regimes unilaterally and the pros and cons of this.

In regions where riparian countries heavily depend on a single river system and physical, political, and economic scarcity are common, water conservation for the protection of the basin's water resources take center stage. The need to conserve Nile water has become the top agenda item to mitigate and meet the ever-growing demand for water in the basin due to population pressure, economic growth, urbanization, and climate change impacts though there is a lack of collective response to transnational or transboundary water governance problems which debilitates the chance to successfully conserve the water and hence the Nile water for sustainable use among all basin countries.

The mismanagement of Nile water affects its quality and availability in the Eastern Nile basin, exacerbated by population pressure, urbanization, economic expansion, and higher living standards. These socio-economic factors, along with the impacts of climate change, pose significant challenges to sustainable water use in the Nile basin. The Nile states' efforts to conserve and protect the Eastern Nile Basin, particularly through devising laws and policies that promote water conservation and overall sustainable water use, is a unilateral effort by each country which could not bring overall success. The environmental aspect of the Nile water is the area that holds the greatest opportunities for the countries to cooperate, as their interest in conserving and protecting the Nile environment is one of the areas where interest converges, which also demands the convergence of their respective policies. Moreover, the Ethiopian state commencement of the GERD and other upstream states plan to commence water projects demands collaboration over the use and management the Nile river water.

This study found that the basin states in the Eastern Nile Basin emphasized water conservation only within their boundaries, with limited success. The colonial-time basin-wide approach to

conserving Nile water was abandoned with an emphasis on having water control structures within one's county, as was the case with the Aswan High Dam. The water governance regime in the post-independent Nile states is more nationalistic than multilateral.

Moreover, due to differences in geographic location, development levels, and economic and technological capacities, the Eastern Nile Basin states have not responded uniformly to water-related problems. Due to shortages caused by pollution and mismanagement, downstream states like Egypt have shifted towards demand management domestically while still pursuing the policy of supply enhancements outside their territory. On the other hand, countries like Ethiopia emphasized more environmental protection from further degradation and the rehabilitation of degraded environments to fend off the impacts of climate change, thus assisting the Nile's 'water making'. In Sudan, the water laws and policies impacting the efficient utilization of water have not evolved, and rather, the policymakers in the country have focused on only hydraulic missions to exhaustively utilize their water quota according to the 1959 full utilization agreement. South Sudan has not yet embarked on the hydraulic mission, and it has mainly focused on the state-building project to recover from the political crisis it has faced since December 2013.

The priorities of water management in the states have also been evolving. In almost all the riparian states, the hydraulic mission is the most important issue where states invest their resources. Water conservation hardly got the attention of water managers and policymakers in almost all the states along the Eastern Nile basin. These states also have different capacities to manage their water resources due to their differences in levels of socioeconomic development. In Egypt, since they developed their water resources, it seems their laws and policies have started to focus on promoting water conservation to further reclaim desert lands outside the Nile Valley. On the other hand, in the remaining Eastern Nile countries, the hydraulic mission is at an early stage for these countries to give primacy to water conservation issues, as these countries still emphasize and invest in water development projects for the progress of their citizens regardless of their laws and policies attempts to balance water development and conservation issues. Therefore, the level of development and the level of water scarcity are other important issues that prompt individual states to invest in water conservation measures.

In the Eastern Nile basin, national governments have developed laws and policies that guide state actions against actual and perceived threats to the Eastern Nile river system. This study revealed the inadequacy and insufficiency of the individual state's response to the challenges of water conservation and sustainable utilization through unilateral action for challenges that are transnational in nature. It provided evidence of the water-related challenges with which the national water policies and laws of the Eastern Nile basin states failed to cope. The water policies and laws of the Nile states lack adaptability and thus resilience in the face of environmental, economic, and social uncertainties to deal with the emerging new challenges the basin faces. The study uncovered the fact that the water policies of individual states in the basin though recognized the Nile as international river it hardly treated the management of the river as international in their respective water policies and laws, which would have enabled them to manage and share the water or the benefits and costs of management and development in the Eastern Nile basin.

The existing fragmented and uncoordinated response to the challenges of the Nile River is nowhere near matching the existing and looming challenges of the Nile basin. A good case for this is the siltation problem in the Sudanese water reservoirs, which is difficult to overcome without coordination with Ethiopia through the construction of water reservoirs in the Ethiopian highlands and investments in Ethiopian environmental protection programs. This implies the need for policy change in order to face the common challenges the basin faces. There are ample cases where all the states in the Eastern Nile need to coordinate their responses to the basin challenges, as those challenges undermine the interests of all the states along the river.

This study, while attempting to figure out the response of the individual state to the sustainability and conservation of the Nile water, found that the Ethiopian state's effort to protect the watershed of the Nile was neither adequate nor recognized by the other riparian states. Without such intervention, the downstream states would not receive the quantity and quality of water they currently receive due to desertification and environmental degradation, which enhance the frequency and intensity of the drought that affects the Ethiopian highlands. In the Eastern Nile basin, the downstream states made no contribution to the fight against desertification, though they enjoyed the Nile's water. This situation created what Mancur (1965) called the "free riders" in the Eastern Nile basin. In the era of climate change, the water that flows through the Nile

banks is no longer naturally gifted, but Ethiopian state agencies, people, and experts participated in the Nile's ‘water making’.

Though the past hydropolitical situation in the Eastern Nile basin allowed Ethiopia to remain indifferent, since the commencement of the GERD, Ethiopia has become no more indifferent to Nile watershed management and has aggressively embarked on watershed management. As this study implied, the Ethiopian effort alone is neither adequate nor affordable for countries like Ethiopia. Additionally, the neighboring states fail to acknowledge the broader impacts of the deterioration of the Ethiopian highlands. This degradation not only leads to siltation issues in their water reservoirs but also diminishes the water flow reaching their borders as a result of drought and desertification. Without intervention to address land degradation and safeguard the environment, the situation may worsen. However, that intervention is very expensive and beyond the capacity of poor countries like Ethiopia to deal with the challenges, so Ethiopia cannot afford the costs of continuing the intervention without the participation of other riparian states.

In this sense, this study brought a new insight to the Nile water management literature and transboundary river water resources management by shedding light on the idea of ‘water making’ first came to the water management literature by Jessica Barnes (2014) while discussing the Nile water politics in Egypt. But the idea also makes more sense if applied at the basin-wide level than the domestic jurisdiction, as the Nile ‘water making’ involves several stakeholders, including state agencies, local administration, and communities mobilized to rehabilitate the Nile environment from the Nile basin countries. The most important idea here is that Nile water is not only a natural gift but also made because of human intervention to ensure its sustainability. Every state that claims a share of the river water should also play its part in ensuring sustainability. The findings of this study go beyond the conventional collective action dilemmas of the free-riding problem in the Eastern Nile basin but also the weakness of Ethiopian diplomacy in communicating the intervention of the country. There are no instances when Ethiopia communicates how its intervention to rehabilitate the Nile environment mitigates desertification threats, maintains Nile quality, and other climate change impacts.

Moreover, this study found that the mere inability to solve water management problems through unilateral action didn’t lead to cooperation to deal with the challenges as suggested by regime

theory. This implies that the inadequacy of unilateral action doesn't translate into the cooperation of the states to solve common problems. Thus, the inadequacy of unilateral policy is not a sufficient condition to lead to collective action, as policy regime theory implies; therefore, consideration beyond rationality matters in the consideration of states to come to cooperation, as this study tries to indicate factors like risk perception and water nationalism.

As a result of the inadequacy of national efforts to address the looming threats and challenges in the Eastern Nile basin, the member states in the basin have tried to establish a regional regime that deals with the threats and challenges. However, the regional regimes remain ineffective because of a lack of compliance from member states, particularly from the basin's hegemonic power, which led to the establishment of alternative arrangements to address the inadequacy and inefficacy of the existing regional arrangements. To this end, the upper riparian countries are not only in a move to adopt a counter-hegemonic approach, but they also desire to establish alternative governance regimes at a regional level that address the problems in the basin that have regional ramifications.

The progress to cooperatively manage and utilize the Nile water has appeared to be stalled with the disagreement over the political track to conclude the CFA which in turn affected the transitional arrangement plan to accomplish jointly planned projects in the basin. Once this trajectory of cooperation in the 1990s and early 2000s stalled, the regional arrangement lacks the momentum to reach the formation of permanent river commission to replace the provisional arrangement with a mandate to institutionalize the Nile River governance. This derailment of the cooperation and loose of hope in the cooperation trajectory forced states to resort unilateral development of the Nile water as Ethiopia decide go alone with GERD project once the hope for joint development faded.

This in turn jeopardize the hope of jointly developing and managing the Nile river water including the joint conservation of the Nile river water and watershed management. This in effect paralyzed the functions of institutions like ENTRO and the accomplishment of NBI's commitment in the Nile Basin in general and Eastern Nile basin in particular. The downstream states like Egypt and Sudan walked away from both NBI and ENTRO and suspended financial contribution.

This study demonstrated that the current agreements are inadequate to deal with the environmental problems and low-level political issues that the basin states could easily agree upon. This study found the negligent impact of the regional regimes on sustainable water use of the Nile River water resources. The water agreements (bilateral agreements between Egypt and Sudan) in the basin have not been designed so far for water conservation and hence sustainability. Political considerations and the need to meet immediate demands shaped the Nile legal regime. They have rarely implied a way to reduce extreme dependence on Nile water and look for alternative sources by encouraging both conservation and technological innovations. The experiences of other international river basins can guide the rights and obligations of states when investing in water-making processes without collaboration. However, the Eastern Nile basin neither has treaties nor customary international law doctrines that guide these rights and obligations. There are hardly any mechanisms to share the costs incurred for the common good of the basin states. Moreover, the benefit-sharing principles embodied in the NBI are inadequate to understand state practices in the basin. Some states invested billions, while others enjoyed the benefits of such investments.

In the Nile basin, there has been a longstanding desire for a unified policy to address the multiple collective action challenges the basin has been facing. The British colonialists who controlled the basin realized the challenge and tried to produce agreements that benefited their interests. However, their agreements with various entities along the river demonstrate their commitment to collaborative arrangements that benefit lower riparian states. The then-bilateral agreements were also an attempt to establish a common policy ground about Nile River use. However, these early attempts to forge a common policy about Nile use are neither genuine nor based on mutual benefits that consider the interests of all the states.

Despite the limited achievements of regional institutions in the Eastern Nile basin, the regional institutional mechanisms more or less failed to mitigate water-related problems in the basin. Moreover, the regional institution failed to achieve the goal of jointly governing the Eastern Nile basin in terms of water use and environmental protection. Thus, the establishment of a regional institution has not significantly impacted the governance of Nile water, including the regulation of river water utilization. In the Eastern Nile basin, the regional regime failed to address the problems because of a lack of financial contribution from member states, which shows a lack of

commitment. In the Eastern Nile basin, this weakness emanates from a lack of political commitment to a regional approach to addressing basin problems and a lack of capacity among the member states, as most of these states are the poorest of the poor in their development category.

International rivers do not recognize national boundaries, which demands a basin-wide policy to regulate water use and management. The Nile basin faces multiple transboundary challenges that require a coordinated policy response from all riparian states. Fragmented national policies must be revised to effectively tackle these challenges. In the basin, several challenges need a coordinated policy response. These include tackling the water losses caused by evaporation from the Egyptian and Sudanese reservoirs, addressing the threats of drought and desertification, and jointly responding to environmental degradation in Ethiopia. Moreover, this study, while trying to show the demand for common policy along international rivers, amply demonstrated why and how national water policies are inadequate to govern international river basins. Such policies not only ensure sustainable utilization but also hold the potential to prevent violent conflicts and accentuate cooperation beyond the water sector.

The intention and plan of the basin states to further exploit the Nile water cannot be achieved without a common policy framework to regulate and coordinate the water use among the basin states. This fact necessitated transnational regulation and coordination of water projects along the Nile River. This can only be achieved with clear policy frameworks that guide the responsible regional institutions to govern the Nile River. With the proliferation of projects along the Nile River, transnational regulation of the river is in great demand to ensure optimal utilization of the river water and protect the basin from looming threats.

Transnational Nile river management is probably the only solution to ensure sustainable water use and prevent conflicts over the use of river water. Such transboundary river management can be realized through the adoption of new legal, institutional, and policy frameworks. Indeed, in the basin, efforts to institute such transnational mechanisms to govern the entire Nile basin have made slow headway despite the mounting challenges the basin faces because of climate change, population growth, and development pressures.

Water conservation is not an end in itself; it serves societal, economic, and social goals. In the context of the Eastern Nile basin, Nile water conservation should serve beyond the national interest; it is expected to serve the basin-wide goal of reaching a compromise to solve tensions over the use and cooperatively govern the Nile water resource to achieve its sustainability. Above all, the study amply demonstrated that the social processes are as important as the technical and physical management aspects of the Nile water to improve the overall management of the Nile and hence to ensure the sustainable use of the river water for generation through demand management as well as protection of the basin environment from human and nature-induced threats.

This study has found that the fear of losing relative benefits has caused a political-legal deadlock, preventing a transition to a more comprehensive water governance regime. This regime would enable the basin states to effectively address common problems in the basin, ensuring the sustainable use and management of the river. Therefore, future research needs to show the benefits and incentives the new regime can offer to the riparian states. Moreover, future research must convincingly explain the costs of maintaining the status quo in the Nile basin to all riparian states. Water conservation in the Nile holds the key to resolving the water challenges and overcoming domestic water shortages; it holds the potential to break through the political deadlocks over water allocation and management in the eastern Nile basin. It can pave the way for further cooperation in the form of adapting a basin-wide policy framework that regulates the use and management of the river basin optimally.

The overall argument of the dissertation is that the existing water resource management policy regimes at national and regional levels are inadequate and that there is a clear void in the policy regime hampering sustainable utilization and management of the shared Nile waters among riparian countries. This calls for new and robust national and regional policy regimes in order to deal with water management challenges that are transboundary in nature.

To ensure the long-term sustainability of the Nile River and resolve the ongoing disagreements regarding its management and utilization, it is essential to focus on effective water management practices. This includes conservation efforts in irrigation fields and drainage canals, as well as reducing evaporation rates from reservoirs. Additionally, investing in increasing water supply

from South Sudanese wetlands and constructing reservoirs in areas with low evaporation rates will be important. Environmental restoration programs in the Ethiopian highlands will also play a crucial role in reducing siltation problems and preventing desertification and drought, which could have negative impacts on the Nile basin's flow regime.

The issue of sustaining Nile water through the above measures demands a common policy framework that guides a coordinated response to deal with the challenges the basin faces. The common policy framework also assists in coordinating water use regimes across the course of the basin. The mega reservoirs that have already been constructed and are planned to be constructed also have to be regulated, not only through data exchange but also through a policy guideline that helps the regulation of the mega facilities to ensure the smooth operation of these facilities so that every state along the Nile benefits from the water of the Nile River.

Sustainability and peace can be secured in the Nile basin when powerful individual states like Egypt make policy changes regarding water use and changes in values regarding access to water. Within its national boundaries, the policy shift has to be concentrated on water saving by prohibiting centuries-old waste practices, and externally, the policy shift should focus on building not only cooperation but also the realization of joint Nile environmental governance. Moreover, negotiation for project-specific issues won’t bring sustainability and institutionalized governance to the Nile basin, but negotiation and agreement about the water use and protection of the basin will bring sustainability, understanding, and a win-win situation for all the states along the course of the river.

So far in the Eastern Nile basin, the principle of cost sharing for the protection and rehabilitation of the basin environment has not enjoyed as much space and recognition as the principle of benefit sharing entertained in the NBI. The Nile basin, particularly the Ethiopian highlands, is vulnerable to the threats of desertification and recurrent droughts. The area is also highly degraded because of poor land management. Thus, if states in the basin are interested in the sustainability of the Nile River water and also want to curb the siltation problem, it demands collaboration to resolve the challenge. Moreover, mechanisms to share the costs of environmental protection and rehabilitation have to be in place to ensure the continuous flow of the Nile River.

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Appendices

Appendix A: Key Informant Interview Guide Questions

S/N	Research objectives	Guide questions developed to answer the research questions	Potential Target Resp
1	Assess the challenges facing the policy and governance responses of the individual states of the Eastern Nile basin in dealing with water conservation, sustainable water use, and environmental protection within their respective jurisdictions.	1. would you briefly explain the status of the Nile water management in your country? 2. Do you think your national water policy and law contribute to Nile water conservation and sustainable use 3. Do you think a unilateral water management approach is adequate to deal with water management challenges, particularly concerning water conservation 4. If these unilateral responses are inadequate why do countries struggle to cooperate to deal with common challenges 5. In your view why have countries in the Eastern Nile basin failed to cooperate over common water management challenges 6. How do you assess state intervention in conserving Nile water and thus its sustainable use 7. Do you think the status quo Nile water management is sustainable? If not what solutions do you suggest? 8. Do you think the basin countries realization of the weakness of unilateral policies led to policy convergence 9. If not, why	Experts at the Mi Water Resources, Affairs Ministry; I from South Sudan, S Egypt; University p with internationa Engineering and Science Background at ENTRO are potential targets interview
2	Investigate the shortcomings of regional agreements and institutions in reversing environmental degradation and bringing about water conservation in the Nile basin countries.	1. Do you think interim agreements like NBI have changed water use regimes in the Eastern Nile Basin countries 2. How do you think the agreements impacted the behavior of member countries in the Eastern Nile Basin? 3. In your view how the difficulty to conclude permanent agreement on the Nile affected basin-wide cooperation over Nile water management 4. How do you compare and contrast the impacts of bilateral agreements during colonial and post colonial period with multilateral agreements since 1990s 5. Do you think regional institutions like ENTRO able to coordinate joint response of the Eastern Nile basin countries to deal with water management challenges like water mismanagement, environmental degradation in the upstream areas 6. what challenges/ problems did you face while trying to coordinate joint response of the Eastern Nile Basin states 7. Do you think projects implemented by ENTRO are suffice to tackle the water management challenges 8. In your view, how do regional institutions may improve their effectiveness 9. Do the presence or absence of regional blocks affect the performane of regional water institutions in bringing cooperation and collaboration in the Eastern Nile Basin	Experts at the Mi Water Resources, Affairs Ministry from South Sudan, S Egypt; University p with internationa Engineering and Science Background at ENTRO are potential targets interview

3.	To examine the need for transforming the existing water policy and governance regimes and replacing them with transboundary water policy and governance regimes for the conservation and sustainability of water use in the Nile basin.	1. Do you think the exising national and regional water management regimes in the Eastern Nile basin are adequate to deal with the existing and emerging water management challenges in the sub-basin 2. Do you believe the status quo Nile River governance regime are capable of bringing Nile water conservations? If not, what are the specific limitations the governance regimes 3. How effective the existing water governance regimes deals with water management challenges in the Eastern Nile Basin 4. In your view, if the basin countries pursue the current Nile water management practices what may happen to the sustainability of the Nile River water 5. What How can basin countries effectively deal with emerging challenges like the regulation of mega projects in the Eastrn Nile? 6. Are individual states effort alone can address environmental degradation problems in the upstream areas? 7. How possibly may the riparian countries support each other to deal with water management challenges like environmental degradation in the upstream area of the Eastern Nile 8. Do you think the intervention of the individual states to safeguard the Nile environment is adequate? 9. In your view if this persists and free riding continue in the basin do you think this may complicate the Nile river ownership between the countries who made intervention to safeguard the river agins degradation, impacts of climate change, and desertification through th process called the water making?	

Appendix B: Target key informant interviewee (KII) code, position, interview date and organization

S/N	KII Code	Position	Date of interview	Organization	Remark
1	KII #01	Communication officer	30 May. 2019	NBI (ENTRO)	
2	KII# 02	Environmental Specialist	30 May 2019		
3	KII#03	Watershed Management Coordinator	30 May 2019		
4	KII#04	Manager of Power Coordination Unit	25 Jan 2020		
5	KII#05	Research Group Leader	5 May 2020	IWIM	
6	KII#06	Principal Researcher	6 May 2020		
7	KII#07	Postdoctoral Fellow	24 March 2020		
8	KII#08	Senior External Affairs officer	20 Feb. 2021	World Bank	
9	KII#09	Land and Natural Resource Mgt Specialist	21 Feb. 2021		
10	KII#10	Environmental Economist (Research Analyst)	21 Feb. 2021		
11	KII#11	Advisor to deputy executive secretary (programme)	22 February 2021	ECA	
12	KII#12	Research expert	22 February 2021		
13	KII#13	Law Associate professor	7 May 2020	Addis Ababa University	
14	KII#14	Law lecturer	7 May 2020		
15	KII#15	IR Associate Prof.	4 February 2021		
16	KII#16	Transboundary water Mgt Ass. Prof.	7 May 2020		
17	KII#17	Histoian from IES	21 July 2020		
18	KII#18	Development Professor	21 July 2020		
19	KII#19	Irrigation Engineer Ass. Professor	1 April 2019 7 Feb 2021 (2nd time)	AmboUniversity	
20	KII#20	Irrigation Engineer lecturer	1 April, 2019		
21	KII#21	Natural Resource Mgt. Lecturer	1 April 2019		
22	KII#22	Nat. Resource Mgt. Lecturer	2 April 2019		
23	KII#23	International Relation Ass. Professor	2 April 2019		
24	KII#24	Law Ass. Professor	2 April 2019		
25	KII#25	IR Lecturer	15 June 2020	Bahirdar University	
26	KII#26	Moral and Civic Education Lecturer	15 June 2020		
27	KII#27	IR Lcturer	14 June 2020		
28	KII#28	Development and Governance Assistant Prof.	14 June 2020		
29	KII#29	Political Science Assistant Profess	16 June 2020		
30	KII#30	Law Assistant Professor	16 June 2020		
31	KII#31	History Assistant prof.	11 June 2020	Debremarkos University	
32	KII#32	History Lecturer	11 June 2020		
33	KII#33	Natural Resources Mgt. Assitant prof.	12 June 2020		

34	KII#34	Natural Resources Assistant Prof.	12 June 2020		
35	KII#35	Political Science Assistant Prof.	23 June 2020	Wollega University	
36	KII#36	IR Lecturer	4 April 2019		
37	KII#37	Environmental History Assistant Prof.	6 April 2019		
38	KII#38	Natural Resource Mgt Assistant Prof.	5 April 2019		
39	KII#39	Environmental Economics Ass. Prof.	5 April 2019		
40	KII#40	Hydrologist Associate Prof.	10 Dec. 2019	Juba University	
41	KII#41	Hydrologist Assistant Prof.	10 Dec.2019		
42	KII#42	Expert (Transboundary Water Desk)	2 February 2021	Ministry of Water Resources	
43	KII#43	Project Mgt. expert	6 June 2020		
44	KII#44	Desk head (hydropolitics and diplomacy desk)	6 June 2020		
45	KII#45	Senior expert (Hydropolitics and diplomacy Desk)	6 June 2020		
46	KII#46	Desk head (Surface Water Desk)	2 February 2021		
47	KII#47	Director of Directorate of Transboundary River	23 March 2020	Ethiopian Ministry of Foreign Affairs	
48	KII#48	Ethiopian Veteran Diplomat	23 March 2020		
49	KII#49	Egyptian Diplomat	5 May 2020	Embassy of Egypt	
50	KII#50	Sudanese Diplomat	13 February 2020	Embassy of Sudan	
51	KII#51	South Sudanese Diplomat	13 Dec. 2019	Embassy of South Sudan	
52	KII#52	Local elder (Retired government official)	2 May 2020	Nekmte town	
53	KII#53	Water management consultant (Working in the MOWR for several years at different capacities)	23 July 2020	Addis Ababa	

Appendix C: Letter of opposition from Ethiopian House of Peoples Representative Speaker

የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ የሕዝብ ተወካዮች ምክር ቤት
አፈ ጉባኤ ጽ/ቤት

The House of People's Representatives Of The Federal Democratic Republic of Ethiopia
Office Of The Speaker

ቁጥር HPR/SP/01/01
Ref.No
ቀን 25/11/2019
Date

Hon. Mishaal bin Fahm Al-Salami,

I wish first and foremost to convey my respectful greetings.

It is with great dismay that I learned of the Resolution by the Arab Parliament issued on the 31st Oct 2019 in Cairo regarding Grand Ethiopian Renaissance Dam and the Trilateral Negotiation between Egypt, Ethiopia and the Sudan.

The House of Peoples' Representatives of the Federal Democratic Republic of Ethiopia has closely examined the "Resolution" of the Arab Parliament issued on October 31, 2019 regarding the Ethiopian Great Renaissance Dam and the Trilateral Negotiation between Ethiopia, Egypt and the Sudan, and would like to rectify and put on record Ethiopia's opposition to such an imbalanced Resolution.

The Nile River is a common resource of all the eleven Basin Countries under International law. However, the entire Nile water resources have all along been allocated between Egypt and the Sudan, based on the 1929 and the 1959 Colonial Treaties. These are Treaties that Ethiopia has completely rejected from the very outset. Since Ethiopia is not party to these Treaties, we are not bound by them under Internationals law.

Likewise, there has never been a Basin-wide Legal and Institutional Framework for cooperation and equitable utilization of the Nile waters among the Basin Countries. It is only in the past two decades that the joint

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ስልክ 24-10-13 ፋክስ 24-10-39 Email:officeofthespeaker@yahoo.com የፖ.ሣ.ቁ አዲስ አበባ