

THE POLITICS OF THE NILE BASIN

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DECLARATION

**I hereby declare that this dissertation is my own
unaided and has not been submitted to any other
University for any other degree.**

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May 2009

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INTRODUCTION

The Nile basin is the largest international river system in the world. This river system is composed of two major tributaries: the White Nile and the Blue Nile which originate from Lake Victoria (Kenya, Rwanda, Tanzania, Uganda) and Lake Tana (Ethiopia) respectively. These two major tributaries converge at Khartoum to form the Main Nile which continues on to Egypt. The Blue Nile is by far the largest tributary in terms of contribution³ to the inflow of the water (86%) and the White Nile share is only 14%.

The Nile waters present both opportunities and challenges to the riparian countries. In view of this, the thesis tries to analyze the historical, geo-political and legal aspects of the Basin. The socio-economic factors that contribute to the Silent dispute among riparian countries will also be examined from both upstream and downstream countries perspectives.

The willingness to forge technical cooperation among riparian states was weak until 1960s. However due to the rising population and development needs in the fields of agriculture, industry and energy in the riparian countries coupled with De-Colonization of some countries in the Basin, that were under British rule, the need has arisen to review of old treaties. In this respect, an attempt will be made to critically look into the pros and cons of these treaties.

The Methodologies of the paper are mainly an extensive literature review including legal documents and critical analysis. Descriptive as well as narrative elaboration of the Nile Basin and its tributaries are also part of the methodology. Moreover, I have conducted interviews with prominent personalities who are authority on the Nile issues.

Among these authoritative personalities, I should firstly mention the extensive discussions I conducted with Dr David Gray, Leader of the Nile Team in World Bank. This discussion played a very important role in shaping my theme and the issues I covered in the Chapters of the paper. Dr. Gray continues to play an active part in facilitating negotiations among the riparian states for a future basin organization and cooperative projects being undertaken by them.

³ Swain, Ashok (1997) Ethiopia, the Sudan and Egypt: The Nile River Dispute, The Journal of Modern Africa Studies, 35.4, pp 675-694

I have also undertaken interviews and field research in the some of the basin states as part of the methodology of the paper. For this purpose, I conducted constructive discussions and interviews with some prominent intellectuals in Ethiopia. The scholars and prominent personalities interviewed include Mr. Kifle Wodajo, Professor Richard Punkrust and Mr. Zewde G/Hiwot with a traditional title of Dejazmach. These personalities were relevant for the research as they could easily identify important historical events and their implications for cooperation on the Nile.

Finally, the methodology of work included field visits to gather information containing legal and historical documents on the Nile at University of Makerere in Uganda, University of Cairo, and University of Addis Ababa. I have also undertaken a research work with a local NGO called Interafrica Group. I was also provided access to some of the relevant documentation at the Ministry of Foreign Affairs. I also used information from other river basin organizations such as the Mekong River Basin and from the experience of waster sharing arrangement between South Africa and Lesotho.

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ABSTRACT

The Nile Basin Countries are abundantly endowed with natural water resources which have been the cause of both conflict and cooperation among the riparian countries. There are ten¹ riparian countries in the Basin with different contributions to the over all flow of the water. It is possible to say that this transboundary river is indestructible natural bind for countries in the Basin whose catchments area² is over 3 million km².

The Nile river, if equitably distributed among the riparian countries, wouldn't have triggered tension in relations between its riparians. On the basis of historical facts on how the river has been utilized and the slow pace to shift from confrontation to cooperation, this study attempts to reveal the hindrances not to share this vast water resource equitably between riparians for ages. It is believed that the unprecedented demands of the upper riparian countries to utilize the water equitably is an indication that it is a right time to come up with an agreement on the utilization of the resource by all riparians.

The expansion of the Sahara Desert towards South, the recurrent drought and the trend of population growth in the region are considered to be the legitimate causes for these countries to demand equitable distribution of this water resource.

In view of this, an attempt will be made to identify the key elements needed to ensure equitable utilization of the water, not only to alleviate the riparians growing economic problems and political conflicts, but also as an instrument of political harmonization and long range integration of the basin.

1 The Riparian countries are: Ethiopia, Eritrea, Uganda, Brundi, Rwanda, Democratic Republic of Congo, Kenya, Tanzania, Sudan and Egypt

2 Transboundary River/Lake Basin Water Development in Africa: Prospects, problem, and achievements, Dec. 2000 P. 19

CHAPTER ONE

A BRIEF SURVEY OF THE NILE BASIN

1. General Overview

In terms of its length, drainage area and number of riparian countries, the Nile River is one of the largest in the world (see Table 1)⁴. With an area of 3.1 million km², the Nile Basin covers about 10% of Africa and 2.3% of the world's land⁵ surface. The Nile River is the longest river in the world. It flows⁶ 6,700 km from its source in the Equatorial lake basin to the Mediterranean Sea, north of Cairo, Egypt. Although⁷ the upstream rainfall is 2000 billion cubic meters yearly, 7% of this immense quantity flows to the down stream countries.

Table 1 - Major International River Basins in Africa

Basin	No. of States	Basin Area 000km ₂	Basin States
Nile	10	3130	Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Rwanda, Burundi, Democratic Republic of Congo, Eritrea
Zaire	9	2850	Democratic Republic of Congo, Central African Republic, Angola, Republic of Congo, Zambia, Tanzania, Cameroon, Burundi, Rwanda
Niger	9	180	Niger, Nigeria, Mali, Guinea, Burkina Faso, Cote d'Ivoire, Benin, Cameroon, Chad
Zambezi	8	1420	Zambia, Angola, Malawi, Zimbabwe, Mozambique, Botswana, Tanzania, Namibia
Volta	6	390	Ghana, Burkina Faso, Cote d'Ivoire, Togo, Benin, Mali
Orange	4	950	South Africa, Namibia, Botswana, Lesotho
Senegal	4	340	Senegal, Mauritania, Mali, Guinea
Limpopo	4	385	South Africa, Botswana, Mozambique, Zimbabwe

4 Source: Tvedt, Terje, The management of Water & Irrigation. The Blue Nile; eds, M. Doornobous et al.

5 Mohamoda, Dahilon Yasin (2003) Nile Basin Cooperation: A Review of the Literature, Current African Issues No. 26, Nordiska Afikaninstitutet.

6 Transboundary River/Lake Basin water Development in Africa: Prospects, Problem and Achievements, Dec. 2000 P.19

7 EL-SADEQ EL-MAHDI, Nile water, The Promise and the Treat, Oct. 2000 p.

The ten riparian states of the Nile Basin are Burundi, Rwanda, Uganda, Tanzania, Democratic Republic of the Congo, Kenya, Ethiopia, Eritrea, Sudan and Egypt. The basin cuts across several climatic zones as well as a number of racial and religious boundaries. A. Moorehead describes the boundaries of the Blue Nile as follows:

*"No one crosses this border with impunity. When the Arab invades Ethiopia his camels die in the mountains and he himself loses heart, in the fearful cold. When the Ethiopian comes down into the desert his mules collapse in the appalling heat, and he is soon driven back to the hills for the lack of water. It is the conflict between two absolutely different forms of life, and even religion seems unable to make a bridge since Christianity falters as soon as it reaches the desert and Islam has never really been powerful in the mountains. Only the river binds these two conflicting worlds together."*⁸

The Nile has fascinated philosophers, geographers, historians, engineers and politicians of all creeds for many centuries. Before man first set eyes on the Nile River four thousand years ago, major civilizations had already been flourished there. The Nile enabled ancient civilizations to flourish in its linear reaches in Egypt. In its upper and middle reaches at Meroe and Axum this stream was believed to be a holy river, revered as the God Hapi.⁹ Greek philosophers were intrigued by the Nile. They believed its origin was not like that of other rivers but it had been created along with the world. The mystery of the Nile lies not only in its source, but in the predictability on the rise and fall of its flood. Tales of Miletos, the chief of the seven wise men of ancient Greece, believed that the northerly Etesian winds with their constant blows held back the Nile before releasing the pent up giant to enter the Mediterranean. Herodotus rejected this theory as Sinica did. It was due to the lack of coincidence between the onset and dying of the wind and the Nile flood. Two centuries after Herodotus, Erotoshenes (276 - 194 BC) described the Nile source much more accurately separating the White and Blue Niles and describing its source as a lake fed by summer rains.

8 Bruce, J., Travels to Discover the Sources of the Nile, Vol.2 (London, 1790) P.525

9 Yamia, A.M.: "The Nile Basin: lessons from the past", in Asit K. Bismans (ed.), International Waters of the Middle East: from Euphrates-tigras to Nile Bombay, 1994 p.156

However, this was not before early Greek geographers such as Hecatos of Miletas who pictured the world surrounded by oceans from which the major rivers such as the Nile, the Euphrates, the Tigris and the Indus were fed. Other theories on the source of the Nile suggested that its locations were in Libya and they connected the Nile to the Niger River in West Africa. Ptolemy, the Roman Astronomer and geographer who resided in Alexandria in the second century AD, prepared a remarkable map of the Nile Basin showing the three lakes (Tana, Victoria and Albert) with the main source of the White Nile in the snow capped mountains of the Ruwenzore Range, which was then mystified as the mountains of the moon. Aeschylus in the year 500 BC talked about Egypt as a country nurtured by the snows.¹⁰

2. Exploration of the Nile

The exploration of the Nile's source is an epic story which has captured the imagination of the world and has continued to attract the attention of many people for centuries. The actual source of the Nile River was not made known until the 19th century, when a German explorer, B. Waldecker, traces the southern most tributary of the Kagera River, which flows into Lake Victoria. The Blue Nile was explored with great difficulties. It was believed that it flowed from sacred springs and only priests from the neighbouring church could take water from it. The sources were first visited by a Portuguese Jesuit, Pedro Paez in the seventeenth century. In 1770, the headwaters were reached by James Bruce who became friendly with the rulers of Ethiopia. The Blue Nile flows a long distance from Lake Tana through a canyon in some places going 1200 meters deep.

As recently as 1905, McMillan's expedition was able to follow only about two fifth of the river. McMillan tried to navigate the river in a steel boat but almost drowned at the very outset. In 1923, the top of the canyon was traveled by an expedition led by R.E Cheesman. The local historians, chroniclers, priests, and ordinary peasants also played a more significant role in the discovery of the source of the Blue Nile. Ancient

¹⁰ Howell, P.P. and Allan, J.A.: The Nile. University of London. 1990 p.15

civilizations spread in the banks of the great Nile Rivers. The Nile Basin sheltered not only the ancient Egyptian civilization (3100 BC), but also (Meroe 656 BC - AD 320). It covered the Cush and (an early iron making center), early Christian and Muslim States in the southern part of Egypt and the northern Sudan; and Kmydams such as Buyanda, established during the 17th century in East Africa. Many smaller social and political units also unified the peoples of the Nile Basin.

3. Geographical & Hydrological Feature of the Nile Basin

The Nile River originates from two physically and hydrologically different sources: The Blue Nile (or Abbay, as it is known in Ethiopia) originates from Lake Tana in the highlands of Ethiopia, and the White Nile from Lake Victoria in the Equatorial Lakes region of eastern and central Africa (see Table 1.1).

3.1 The Blue Nile

Both Lake Tana and Lake Victoria are fed by small streams and rivers, among which the Gilgel Abbay and the Kagera rivers are considered to be the headwaters of the Blue Nile and the White Nile respectively. At Lake Tana, the Blue Nile starts as a small river, but its flow increases as tributaries from the Ethiopian mountains join in its westward path to the Sudanese border. The main tributaries of the Blue Nile in Ethiopia are the Dedessa, Muger, Guder, and Beles rivers, while the Rahad and Dinder rivers originate and pick up their flows in Ethiopia but join the Blue Nile in the Sudan. At the Sudanese border, the Blue Nile has an average annual flow of 47.44 billion cu. m (BCM). The minimum and maximum flows of the Blue Nile recorded since 1911 at the Sudanese border are 20.69 BCM (in 1913), and 69.67 (in 1929).

3.2 The White Nile

The White Nile begins in the Equatorial Lakes region in Uganda, Kenya, Tanzania, Rwanda, Burundi, and the Democratic Republic of Congo. The region consists of two groups of lakes: Victoria, Kyoga, Albert (Lake Albert is also known as Mobutu), and

George, Edward, Albert. The last lake in the chain, from which the river emerges, is Lake Albert. In the Equatorial Lakes area, the White Nile is known as the Victoria Nile, the Kyoga Nile, and the Albert Nile, each bearing the name of its feeder lake, from south to north in the direction of its flow. The Bahr El Jebel, which originates in the southern tip of Sudan then spills into the Sudd wetlands, creating one of the world's greatest expanses of fresh-water swampland.

The Bahr El Jebel winds its way through the Sudd and combines with the Bahr El Ghazal and other small tributaries before leaving the Sudd wetlands region. Just as it flows out of the Sudd, upstream from the town of Malakal, it is joined and strengthened by the Sobat River, which flows westward from the mountains of southwest Ethiopia. From here on, the river is known as the White Nile. The White Nile then joins the Blue Nile at Khartoum, Sudan. The Nile River proper is not just the summation of the White Nile and the Blue Nile. Due to the different hydrological characteristics of these two rivers (in quantity, seasonal variation and distribution of flows, sediment transport, dissolved and suspended material, etc.), the Nile River is largely dominated by the much more voluminous and vibrant flow characteristics of the Blue Nile.

The last big tributary of the Nile River is the Atbara River, which flows northwest from the northern mountains of Ethiopia. The Atbara River joins the Nile some 180 km north of Khartoum. Some experts assume that the Mereb-Gash Rivers to be tributaries of the Atbara, suggesting that they drain into the Atbara by underground flow; therefore, they consider them as part of the Nile system.¹¹ Since average annual rainfall decreases significantly along the northward course of the Nile (from 1,800 mm in the Equatorial Lakes and in the Ethiopian mountains to less than 25 mm in Egypt), there is no more inflow to the Nile downstream from the confluence of the Atbara River and the Nile itself. Although the White Nile is longer than the Blue Nile, its contribution to the mean annual flow of the Nile River is only 14 %.¹² Were it not for the very high evaporation

11 Jovanovic, D.: "The Ethiopian interests in the diversion of Nile river waters." Water International. 1985 p. 82-85.

12 Waterbury, J.: "Hydropolitics of the Nile Valley." Syracuse, New York: Syracuse University Press. 1979 p. 23

and spill-over losses in the Sudd wetlands, the White Nile's contribution would have almost been doubled. The Blue Nile, on the other hand, contributes 59 % of the mean annual flow to Aswan Dam.¹³

The seasonal distributions of the two rivers are different too. The White Nile has more or less regular flows throughout the year (again, mainly because of the natural regulation effect of the Sudd), while the Blue Nile is highly irregular, with about 60% of its annual flow coming during the flood period of July through September. With regard to sediment transport, the White Nile has more suspended material, while the Blue Nile is abundant with fertile silt from the highlands of Ethiopia. Among the main tributaries of the Nile River are the Sobat and the Atbara, which generate considerable flows from the Ethiopian mountains. The Atbara River also drains portions of southwestern Eritrea.

Table 1.1 Summary of the flow contributions of the Nile riparian countries to the Nile River, as measured at Aswan.

Nile Riparian Country	Mean Annual Flow Contribution (as measured at Aswan) Bill. Cubic Meters (BCM)	% of Total
a. Egypt	0	0
b. Sudan	Negligible	0
c. Ethiopia	72.24	86
d. Upper White Nile Riparian Countries	11.76	14
Total	84	100

- a. Egypt has no perennial rivers that drain into the Nile.
- b. Sudan's few rivers flow into the Sudd wetlands.
- c. Eritrea contributes to the Atbara River, but no reliable data is available in quantitative terms.
- d. Due to lack of data, and the complexity of the hydrology of the Sudd and the Equatorial Lakes, the flow contributions of each country are not estimated.

¹³ *ibid* p. 23
15

In the simplest hydrological terms, the cycle of the Nile Basins is the evaporation by solar energy of the water of the South Atlantic, the taking away of moisture across more than 3,000 km of Africa by force of changes of pressure in the atmosphere and the force of the earth's rotation¹⁴. The rainfall on the highlands of Ethiopia and East Africa, and the collection of streams in the Basin all run down to the Mediterranean sea and contribute to the swell of the Nile waters. In addition, the Monsoon Winds, blowing from the Indian Ocean, also account for relief rain over the East African plateau and this contributes to the source of waters of the Nile. The total discharge of this great river is less than the size of its basin would lead one to expect. This is so partly because, although some 1,300 - 2,000 mm¹⁵ of rainfalls on the two main geographic source areas, the lower half of the river crosses desert areas in Sudan and Egypt, leaving an annual flow of no more than 6% of the total amount of rain falling in the basin. Hence, its average annual flow 84 milliards of c.m , it is only a fraction of the flow of some other rivers of comparable size¹⁶.

The swamps and lakes of the middle and upper reaches of the White Nile exercise a considerable regulatory effect on the regime of the river. An important feature of the whole Nile Basin is the prevalence of swampland. Poor drainage, coupled with the climatic conditions in certain areas, have accounted for this state of affairs. Swamps are found throughout a wide range of elevations, from the high altitude peat swamps at Kigezi to the flings swamps along the edge of the lakes¹⁷. In particular, in the vast Sudd region of the Sudan, the river loses a considerable amount of its discharge, though later the amount of water estimated to be equal to that loss restored by the Sobat from Ethiopia.

14 Garretson, A.H.: "The Nile Basin" Oceana, New York. 1967 p.256

15 Ibid

16 The Congo, for instance, has an annual flow of 1,250 milliards of cu.m while that of the Amazon is 2,500 milliards cu.m. See ibid.

17 For example, along both the north and the south shores of Lake Victoria swamps occur at the head of almost every in a much indented shoreline. The major rivers such as Kagera and the Mara, create large swampy areas in their deltas. The Democratic Republic of the Sudan, Ministry of Irrigation and HEE, Control and use of the Nile Waters, Khartoum, Khartoum University Press, 1975 p. 1-2.

The kind of wetlands which are concentrated in the southern Sudan are also found in Uganda and elsewhere. These wetlands are important in the context of Nile hydrology as areas of water evaporation. The Sudd in particular has been studied over many years from hydrological viewpoint because of the proposals for reducing the losses by the construction of the Janglei Canal. Less attention has been paid to the Bahr El Ghazal tributaries and the mouhar marshes where significant amounts of water are also evaporated. The White Nile sub-system has a much more regular flow throughout the year than the Blue Nile - Atbara sub-system with its seasonal surges of flood waters alternating with trickles or even total stoppages. This stability is due to the great deep lakes of Victoria and Albert which dominate the headwaters of the White Nile providing a relatively steady discharge little affected by seasonal variations. This turns these source lakes into reliable natural storage basins for downstream countries, as long as the upper-basin countries make no critical demands on the quantities of the waters stored.

This is not to deny the existence of some seasonal variation in the flow of the river throughout the year. In fact, the White Nile discharge at Khartoum shows more variation, which, however, is much less dramatic than that of the Blue Nile. The White Nile at Khartoum provides only 40 % of the river discharge: but at the low flow it accounts for four-fifths of the total delta discharge.

Table 2 - Annual Discharge of the Nile

No. of year deviation	Period in billion m ³	Mean in billion m ³	Std.
30	1870-99	110.0	17.1
60	1900-59	84.5	13.5
90	1870-1959	92.6	19.8

Source: H. Hurst, R. Black, Y. Samaika, *Nile Basin* (Cairo: Ministry of Irrigation, 1965), X:81. The table as presented above was taken from Yusuf Shibi, *The Aswan*

High Dam (Beirut: Arab Institute for Research and Publishing, 1971), p. 22. The entire historic record, approximate though it may be, reflects a marked secular decline in lake and river discharge over a period of 7,000 years.

The entire drainage basin constitutes one of the largest fresh-water basins in the world. After Lake Superior, Lake Victoria is the world's largest fresh-water lake and, as we observed earlier, the Nile is the second longest river in the world after the Mississippi. These facts show that the Nile Basin is a large-size freshwater system.

CHAPTER TWO

RIPARIAN COUNTRIES OF THE NILE AND FUTURE

CHALLENGES

In the previous chapter the general, geographical and hydrological characteristics as well as the economic importance of the Nile Basin were briefly discussed, and certain sensitive points were highlighted. In this chapter the complex issues of the Nile will be analyzed in each state: upstream and downstream. The provisional, human, and potential need of water for development will be assessed. At the outset, it is important to describe further the Nile Basin and its importance to the Region.

The importance of the Nile Basin is highlighted with regard to: the various subsystems; the economy of the Nile Basin; development of the Nile Basin; political dynamics, policies and strategies; the economic importance for agriculture and hydro-electrical power; rapid population growth and environmental degradation; deforestation and soil erosion impact.

The Nile Basin includes one third of Ethiopia, a substantial portion of Sudan, almost the entire cultivated and settled areas of Egypt, the whole of Uganda, parts of Kenya,

Tanzania, Burundi, Rwanda, the Democratic Republic of Congo and Eritrea. The Nile Water system consists of numerous tributaries and a few head water lakes. The main tributaries are clustered in four subsystems: the White Nile, the Abbay (Blue Nile), Tekeze (Atbara) and Baro-Akobo (Sobat) Subsystems.

1. The various subsystems of the Nile Basin

1.1 The White Nile Subsystem

The furthest source of the White Nile is the Luvironza River which discharges into Lake Victoria at the Uganda-Tanzania frontier. The Nzoria River drains Mount Elgon and enters Lake Victoria. The Kagera River traverses the borders of Rwanda and Uganda and then discharges itself into the White Nile. Lake Victoria, one of the largest fresh water lakes in the world, forms the main source of the White Nile. Lake Albert, which lies on the floor of the Rift Valley and the other two Rift Valley Lakes, i.e. the George and the Edward, are additional sources of the White Nile in the Great Lakes Region. Further north, the Bahr El Ghazal and its tributaries drain the northern part of Congo-Nile divide and then joins the White Nile in the southern Sudanese plains.

1.2 The Abbay¹⁸ (Blue Nile) Subsystem

The Blue Nile originates in the Ethiopian northwestern plateau. Its furthest source is the River Gish Abbay in the Choqie Mountains some 60 km south of Bahir Dar City. The Blue Nile has numerous tributaries include the following rivers: the Dabus, Dedessa, Fincha, Guder, Muger, Jamma, Wolaka, Ashilo, Birr, Beles, Dinder and Rahad. Its catchment area is smaller than that of the White Nile, whereas its water contribution to the main Nile is four times than that of the White Nile. Due to seasonal rainfall on the Ethiopian plateau, the flow of the Blue Nile varies considerably. The rainy season on the Ethiopian plateau extends from June to September. The maximum

¹⁸ "Abbay" - The name of the river Nile in Ethiopia. Abbay means in geaz the 'big'. Geaz is one of the oldest Semitic languages in Ethiopia.

flow of the Blue Nile in August, for instance is as high as 60 times of its low discharge¹⁹, which usually occurs in February.

The physical nature of the basin and the seasonal concentration of the water runoff has resulted in the high degree of soil erosion every year, further resulting in land degradation in the upper basin. According to a recent report, Ethiopia's annual loss of top soil is 405 million cubic meters from the Blue Nile basin alone²⁰. The Abbay (Blue Nile) traverses 1450 km from its source until it joins the White Nile.

1.3 The Tekeze (Atbara) Subsystem

The Tekeze (Atbara) Subsystem, whose upper streams rise in northern Ethiopia, and southern Eritrea, perennially replenishes the main Nile in northern Sudan. The Rivers Tekeze, Angareb and Guang are the main headwaters of Atbara. The Mereb and Tekeze Rivers at different sections, mark the Ethiopia-Eritrea border. This subsystem contributes 13 % of the total annual flow of the Nile Waters. The climatic pattern and the physical environment of the Tekeze (Atbara) subsystem is similar to that of The Abbay (Blue Nile). Hence, it is prone to a high degree of soil erosion and land degradation. Ethiopia thus annually loses 120 mcm (million cubic metres) topsoil through the water runoff.²¹

1.4 The Baro-Akobo (Sobat) Subsystem

The Baro, Akobo, Alwiro, Gilo and Pivor Rivers drain the western plains of Ethiopia and join the Sobat River in Sudan. The Baro, Pivor and Alwiro Rivers make up a 380 km frontier line between Ethiopia and Sudan. It is estimated that the amount of water

19 T.Tvedt.: "The management of water and irrigation: The Blue Nile." in Doornbos, M.(ed) Beyond conflict in the Horn of Africa James Curry Ltd., London 1992 p.82

20 Ethiopian Valleys Development Studies Authority. "Ethio-Sudanese Relations with Respect to Water Resources". Monograph in Amharic, Addis Ababa. 1991 p. 2. See also C.R. Joy.: Island in the desert: the challenge of The Nile Coward McCann Inc, New York. 1967 p. 87

21 Ethiopian Valleys Development Authority.: Op cit p.

carried by this subsystem to the Nile, is 14 % of the river's total annual flow.²² Compared to other river systems that flow toward west, the Baro has wider banks and a less irregular course. It is the only navigable river across the Sudanese-Ethiopian border. Previously, there was a river transport using a steamboat between Gambella and southern Sudan, but has now discontinued. It is in this basin that Ethiopia and Sudan have numerous ethnic groups with a common language, culture and economic activities.

The principal economy of the Nile Basin is agriculture, accompanied by pastoralism and agro-pastoralism. The countries of the Nile's upper basin, include Ethiopia, Kenya, Uganda, Tanzania, Rwanda, Burundi, Democratic Republic of Congo and Eritrea. These countries depend mainly on rainwater for agricultural cultivation. Their utilization of the Nile headwaters within their respective territorial jurisdictions, both for irrigation and hydro-electric power, is almost negligible.

The two lower riparians: Sudan and, especially Egypt, are totally dependent on the Nile water for their irrigation and hydro-electric power generation. In the Nile Basin the upper riparians are 'suppliers', while the lower riparians are 'the utilizers'. This state of affairs has continued for a millennium, and was regulated solely by the dynamics of the natural environment. All the countries of the Nile Basin share common problems, such as population growth and limited resources. These problems have not been adequately addressed and the countries rely upon Foreign Aid for development. The use and the growing demand for water from the Nile system is a stark reality. (See Annexure A)

22 G. Tassew.: A Note: Development along the Sudan frontier, Natural Water Resources Development Commission. Addis Ababa. 1965 p. 3

2. General descriptions of the Nile Riparian Countries

2.1 Upper Riparian Countries of the Nile Basin

(Upper Riparian Countries of the Horn)

A. Ethiopia

Brief Geographical Description

Ethiopia is Africa's tenth largest country and lies in the north-eastern Horn of Africa and shares its borders with Somali and Djibouti in the east, Kenya in the south, Sudan in the west and Eritrea in the north. Ethiopia lies between latitude 3' and 18'N and longitudes 33' and 48'E with an area of 1.1 million km². Ethiopia occupies the most extensive highland mass in Africa, rising from below sea level in the Danakil depression to about 4,6000 m in the northern highlands. Ethiopia is the major contributor and key headwater country from where 86 % of the waters rise, and start their long journey to downstream countries as indicated earlier. The rivers that drain the western highlands of Ethiopia contribute to the bulk flow of the Nile as measured in the Aswan Dam. Out of the 84,00 billion cubic meters (billion cu.m) of water that is carried by the Nile River, 72,00 billion cu.m of the total flow is contributed by the three major rivers, the Atbara, the Blue Nile and the Sobat (Ako-Bo-Baro). The contribution of the Blue Nile is immense, as Charles Joy commented 30 years ago:

"most important rushing down from the roof of the world in Ethiopia, come tumultuous rivers, chief among them is the Blue Nile which keeps the great river from dying up before it reaches the sea."²³

Together with the huge volume of water, a very substantial amount of sediment is also washed down from the highlands and carried towards the Mediterranean, annually

²³ C.R. Joy.: Islands in the Desert: The challenge of The Nile. Coward McCann New York. 1967 p.87

replenishing the irrigable lands of Egypt and Sudan. This natural flow is hindered by the huge Aswan high dam and the other lesser dams in the Sudan. It was estimated that 1.285 billion tons of topsoil was washed down from the Ethiopian Nile Basin every year. Ethiopia however, is one of the lesser beneficiaries of the Nile water resources. During the colonial era, Ethiopia was heavily engaged in the anti-colonial struggle to preserve territorial integrity and national independence of the country. Hence, Ethiopia resisted the colonial powers which entailed a lot of sacrifices. Thus Ethiopia preserved her independence, but remained underdeveloped.

There were however, some attempts to develop the Abbay (Blue Nile) basin which is about one-quarter of the country's territory. In 1927 King Tefare Mekonen sent a special envoy of Ethiopia, Dr. Workneh Martin, to the United States Government. The objective was to strengthen diplomatic relations and most importantly, to obtain engineers for the Lake Tana Development project in Ethiopia. The Ethiopian Government's offer to the American counterparts had to reasons: To entice the Americans in business partnership in the coveted area of the Abby (Blue Nile) and secondly, to use the American influence to ease the British pressure on Ethiopia not to utilize the Nile River. As a result of this effort, the J.G White Engineering Corporation was designated by the US Government to deal with the Lake Tana project and send engineering personnel to Ethiopia in 1929. The physical survey for the project commenced in 1930 and estimated the total cost as follows:²⁴

- Lake outlet works - \$4,350,000;
- A highway from Addis Ababa to Lake Tana - \$3,370,000;
- Engineering and construction fee of 15 % - \$1,158,000 and
- The total amounting to \$8,878,000

24 White Engineering Corporation New York. Report on Lake Tana outlet control works and Ethiopian highway from Addis Ababa to Lake Tana. New York. 1934 p.2

The project however failed to be materialized for two reasons: The Americans withdrew because of British opposition to the project, and the impending Italian invasion of Ethiopia was imminent.

On the other hand in 1935 the technical representatives of the British administration in Sudan and the Egyptian Government agreed between them on a dam construction project on Lake Tana to accumulate some 2.7 billion cu.m over a year. This project failed, which naturally the Ethiopian Government would not accept, because it was planned by her strategic adversaries and for the benefit of other countries.²⁵

Climatic Factors

The highlands of Ethiopia have a generally temperate climate, occupying about 50% of the total area; accommodating nearly 90 % of human population, 75 % of the national livestock and 95 % of the cultivated land. The Inter-tropical Convergence Zone, the north-east trade wind and the south-east monsoon are the main factors influencing the climate in Ethiopia. Because of Ethiopia's proximity to the equator, seasonal temperature variations are relatively small. The daily temperature during the dry season in the highlands is about 21 °C, but frost may occur above 2,300 m in the lowlands. The daily temperature may exceed 30 °C, depending on location.

Politics of the Nile Basin - Ethiopia's relations with Egypt

When the revolution gained momentum in Egypt after 1952, and after the revolutionary leader of that nation successfully re-incorporated the Suez Canal back to Egypt in 1956, the question of water security figured itself among the top priorities in Egyptian development strategy. With some negotiated and limited agreement with the newly independent Sudan, Egypt went ahead with the design and the actual construction of the Aswan high dam with the obtained and promised assistance from the former USSR during the late 1950's. Ethiopia, the closest neighbour, was not consulted. Ethiopia

25 Garretson.: Op cit p. 271

went ahead dealing with the United States Engineering firm, Balton Hennessey & Partners to conduct a comprehensive study of the Abbay (Blue Nile) Basin survey which was conducted from 1957 - 1962. The survey included studies consisting of stream flow, soils, hydro-electric power potential, land use, marketing, communications, dams and irrigation potentials.²⁶ During this period, Egypt and Sudan were engaged in intensive negotiations to apportion the entire Nile waters just between their own two countries. These negotiations led the two countries to conclude and institute the 1959 agreement. This agreement by its nature is a bilateral, rather than an inclusive water sharing agreement.

In the 1959 Egypt and Sudan's continuous and exclusive negotiations deliberately ignored Ethiopia as well as the interests of the other upstream riparians. Then the Ethiopian Government declared that it would not sit idle and made it clear that it would develop its own water resources within its territorial jurisdiction. In a statement by the Emperor Haile Selasse on 2 November 1957 it was stated:

"We have already explained that plans are under construction to utilize our rivers as an essential step in the development of agriculture and industry, it is of paramount importance to Ethiopia, a problem of the first order that the waters of the Nile be made to serve the life and needs of our (beloved) people now living and those who will follow us in centuries to come. However, generally, Ethiopia may be prepared to share this tremendous (God-given) wealth of hers with friendly nations neighbouring upon her, for the life and welfare of their people, it is Ethiopian's sacred duty to develop the great watershed which she possesses in the interests of her own rapidly expanding population and economy. To fulfill this task, we have arranged for the problem to be studied in all its aspects by experts in the field. Ethiopia has time and again set this forth as her position regarding the utilization of the Nile Waters."²⁷

26 W.A. Klerru.: The Nile Waters questions: Political aspect of utilization of the Nile Waters. Unpublished PH.D dissertation. University of California. 1962 P. 6

27 Ethiopian Observer. Vol. II, Number 2, January 1958 P. 93

This statement implied that Ethiopia had already commissioned the United States Engineering firm in the Abbay (Nile Basin). As already mentioned, the project was completed in 1964 without tangible economic or political consequences for the more powerful downstream riparians. The free flow of the Nile has always been a national security issue for Egypt, Therefore, its leaders sometimes spoke openly to deter upstream countries, particularly Ethiopia, not to unilaterally use the Nile. For example the late President Sadat warns:

"any action that would endanger the waters of the Blue Nile will be forced with a firm reaction on the part of Egypt, even if that action should lead to war."

In this respect, an acute observer of the Egyptian scene recently wrote:

"Egypt is a country that has not abandoned its expansionist ambitions. It regards its southern neighbours as its sphere of influence. Its strategy is essentially negative: to prevent the emergence of any force that could challenge hegemony, and to thwart any economic development along the banks of the Nile that could either divert the flow of the water, or decrease its volume. The arithmetic of the waters of the Blue Nile River is, therefore, a zero-sum game, which Egypt is determined to win. It must have a hegemonic relationship with the countries of the Nile Basin and the Horn of Africa. When for instance, Ethiopia is weak and internally divided, Egypt can rest. But when Ethiopia is prosperous and self-confident, playing a leading role in the region, Egypt is worried."

Direct conflicts have not taken place between Ethiopia and Egypt since the early 19th century, but psychological warfare and mutual suspicion have always shrouded Ethiopian-Egyptian relations. In the history of the two countries, it has been observed that the Egyptians aim to keep Ethiopia under constant pressure, so that the latter would not threaten the continued discharge of the Nile waters. The hard environmental reality is that nature has accorded Ethiopia the potential command of the most essential headwaters of the Nile, while life in Egypt and lower Sudan can only sustain a portion of these water resources. Under the current political conditions, since the eruption of

the Ethiopian-Eritrean conflict two years ago, the role of Egypt remains in the background with the motivation of supporting and backing Eritrea in its conflict with Ethiopia. In addition to this, despite the OAU intervention in particular, Ethiopia's role to bring peace in Somalia has been challenged by Egypt, with the view to establish a puppet state in order to match Ethiopia. These Egyptian policies reflect on Egypt's permanent interest in the Nile and the Blue Nile in particular.

Agricultural Development (Irrigation)

Regarding the irrigation of the Ethiopian Nile Basin 1,600,000 hectares of land including 115,000 hectares around Tekeze (Atbara), Angerab and Guang Rivers, 1,000,000 hectares around Baro (Sobat) River and 400,000 hectares of land around Abbay (Blue Nile) were planned for agriculture under irrigation. The total irrigable land identified in the whole basin was 433,754 hectares, requiring 6.3 BCM of water for development. Of the sites that were identified for reservoirs, 20 dams would have a combined storage volume of over 100 billion cu.m. The Valleys of Rivers Rahad, Dinder and Beles are suitable for irrigated agriculture. The tributaries of the Abbay such as the Dedesa, Dabus, Gudar, Bashilo, Jama and Muger have extensive valleys which can be harnessed for irrigated agriculture famines and repeated droughts. Ethiopia should and must utilize her water valleys, especially for food production.

Moreover, most of the rivers in the Ethiopian Nile Basin are remarkably suitable for hydro-electric power production. It is possible to say that the cheapest and most abundant source of power for Ethiopia is hydro-electric power. The rivers of Ethiopia have the potential of producing 56,000 million KWH of hydro-electric power.²⁸ For a poor country like Ethiopia, whose economy is weak and its foreign exchange bogged down by ever mounting oil prices, it is essential to develop hydro-power in order to satisfy the future need for energy. In

²⁸ Central Statistical Office, Statistical Abstract, 1977

a genuine attempt to tackle the problem of food and energy, Ethiopia has no option but to use her Nile water effectively for consumptive and non-consumptive purposes.

- Highland Ethiopia is over populated. The individual land holding is less than half a hectare. Further fragmentation of agricultural land is expected with the population growth at a rate of not less than 3 %.
- Abundant rainfall is concentrated in a 2 - 3 month period, and the torrential rains do more harm than good for cultivation. Even if there is availability of land in some areas, the heavy rains wash away the top soil and cause soil degradation.
- The existing highland areas are already degraded because of over utilization across centuries. Even a massive rehabilitation drive would not be sufficient to make it useful for sound agricultural activity. Besides, Some sixty percent of the country is already classified as arid with an annual average rainfall of below 700 mm. The Ethiopian portion of the Nile Basin contains the major part of the agricultural production area with very little rain. Between 50 to 60 % of the cereal production in the country produced in the Basin needs rainfed conditions. The predominant activity is agriculture, and occupies about 90 % of the population.

Ethiopia's options to future agriculture based development (which is the backbone of the country's economy) will inevitably be in the arid and semi-arid lowland zones. This presupposes an extensive application of irrigation technology. In other words, dependence on the Nile waters is not just the fate of lower riparian countries, Ethiopia and other upstream countries will soon have the same fate. This is in addition to the claims by other riparian states that they need to utilize the Nile waters more. Population increase, aridity, drought and degradation have only made all the riparian countries more dependent on the scarce water resources of the Nile.

Water Resource Potential

The four major dam sites on the Abbay River, downwards from Lake Tana, are known as: Karadobi, Mabil, Mendaia and the 'border project'. The four dams have the capacity to store over 51 BCM of water and generate over 25 billion KWH, about three times the actual production of the Aswan high dam. Of the 33 identified projects; it was only after 33 years, that one small hydro-power dam at Fincha, with a storage capacity of 0.6 billion cu.m of water and power generating capacity of 110 MW has been constructed and put in operation. The water resources that are available to the three valleys are estimated to be 57.8 BCM per year. The demand for water to irrigate arable land of 1.2 million hectare in the basins, is estimated at 19.0 billion cu.m. This is almost half of the total water earmarked for the Baro-Akobo basin mainly because of big losses by evaporation in the Abbay (Blue Nile). The estimated available water is 53.3 billion cu.m and the total requirement to irrigate, 0.84 million hectares. However only 8.4 billion cu.m or 15 % of the total volume is available in the basin.

Hydro-electric Power Potential

Despite Egypt's uncompromising on Nile policy, Ethiopia has continued to plan agricultural projects and hydro-electric power production on the Blue Nile and its tributaries since 1970. In a national Expo prepared in 1978, the following projects were displayed to the public:²⁹ The present hydro-power at the Tis Abbay³⁰ which produced only 22,365 KWH would be strengthened by building a dam. When the construction dam was completed, it would also provide electricity in the Gojam Region to the towns of Bahir Dar, Dangla, Injebara and the surrounding areas. In the Gondar Region it would provide power to the towns of

29 National Expo - 1978

30 Tis Abbay - the name given to the waterfalls

Worrota, Dabra Tabor, Addis Zemen, Gorgora, Chawit, Kaldiha, Azazo, Gondar. The hydro-electric power from the Fincha Station (on one of the headwaters of Abbay) would be distributed to the following towns: Fincha, Ghedo, Teipi, Bako, Sirle, Lekempt Ghimbi, Najjo, Gore, Arjo, Beddele, Aggaro, Yebo, Lemmu Ghenet, Seka, Bonga, Jimma, Sarbo, Addis Alem, Tulubollo, Wolkite, Indibir, Hossaina and to the surrounding areas.

Population Growth and Water Demand

In 1994 the population of the three sub-basins was estimated 23 million or 40 % of the total population of Ethiopia. Current projection indicates that the population could be reached 25 million. The Population density ranges from over 200 people per km² in the highland, to less than 50 people per km² in the lowland plain areas. This density pattern is closely related to the suitability of the area to rain-fed crop production, and with high density is recorded in areas with high potential for rain-fed production. About 90 % of the population lives in rural areas which have a low level of agricultural production. The ratio of inactive people to active (productive) people reaches up to 160 %. And this indicates the high level of economic inactivity and social support needed from the economically active people.

The inadequate agricultural production has a crippling effect on the availability and supply of food and other life necessities. In Ethiopia, two nationwide population census have been carried out at 10 year interval (1984 and 1994.)³¹ Prior to the 1984 census, sample surveys were conducted between 1964 and 1984. The population growth rate estimated from the sample surveys, was 3 % per annum. The pattern of population growth between 1984 and 1994 (in specific administrative regions within the basin) has indicated that the growth rate was in the range of 2.09 % to 5.59 % per annum.

31 CSA (1995) The 1994 Population and Housing Census of Ethiopia, Office of Population and Housing Census Commission, Addis Ababa.

Environmental Challenges

Environmental degradation is severe and accelerating in the Nile Basin as a whole. It is manifested in a wide range of problems resulting from demographic growth and the intensification of economic activities. Deforestation and soil erosion are the major problems in the Ethiopia highlands. The widespread deforestation and soil degradation have affected the agricultural production. More than 80 % of Ethiopia's populations still live in the highlands, which constitutes just over 40 % of the land mass, and is the habitat of 60 % of the total livestock of the country. It also accounts for 90% of the rain-fed agricultural land. In the beginning of the 1990s, only 90,000 hectares of irrigated land was reportedly being cultivated, which was less than 5% of the land that could be used for irrigation agriculture what might be feasible in the future. The position of Ethiopia was made clear in the paper prepared by the country's technical experts for the first Nile 2002 Conference, held in Asman, 1993:

"The agriculture of Ethiopia has been at the mercy of rainfall despite the commonly- held belief that 'Ethiopia is the water tower of Africa'. Testimony to these are the series of recurrent droughts, famine and massive deaths. Equally present realities have brought home the unavoidable hard fact that Ethiopia cannot afford to remain a chronically drought-stricken country with an agrarian system of a traditional type fettered in a paradox of population growth and rising expectation and demands of its peoples. It then follows that whatever expansion and intensification is carried out under rain-fed agriculture, food self-sufficiency cannot be achieved unless augmented by irrigation. Hence, there is the felt need to develop its irrigated agricultural potentials.³²

It was stated in 1996 that food sufficiency in Ethiopia will be the main goal, and that Ethiopia had no other choice but to increase its agricultural production by seeking and obtaining a fair share of the waters of the Nile. Ethiopia is projected

32 Ethiopian technical experts paper presented to the first Nile 2002 Conference held in Aswan, 1993 pp. 69-70

to have more people to feed by 2025 than Egypt.³³ The current government in Ethiopia seems to be committed to develop all resources within its borders. Although financial constraints and technological difficulties have stalled the implementation of major projects for a long time, the government is expected to expand its agricultural and irrigation capacities, as there is relative political and economic stability.³⁴ Ethiopia's new image has increased the confidence of policy makers that fair distribution Nile waters can be agreed up on through peaceful negotiations. There are no legal or institutional obligations, which detract Ethiopian policy makers (as well as planners and engineers) from fulfilling this duty in the best interest of their people. The once rich and diverse ecosystem of the Blue Nile source has been severely affected as a result of both natural phenomenon and human activities. The clearing of papyrus³⁵ from the Lake Tana shore area while in search of firewood and housing construction material, the water level has significantly declined and caused environmental degradation and also affecting the aquatic system of Lake Tana.

B. Eritrea

Brief Geographical Description

Eritrea is a relatively small Red Sea state, situated in north-eastern Africa along the Red Sea coast and has a total area of about 121,144 km². The country shares its borders with the Red Sea on the North and East, Ethiopia on the South-East, Djibouti on the south and Sudan in the north and north-west. The cultivatable land is about 1.6 million hectares which is 13 % of the total area. The Cultivated and is 439,000 hectares, i.e. 26 % of the cultivatable area and 4 % of the total area.³⁶

33 United Nations Development Programme, Human Development Report. Oxford. 1994

34 Sudan Focus: 'Stirring up Red Sea and Nile Controversy'. London. 1996 P. 3,9,10

35 Papyrus: paper made in ancient Egypt from a plant that is similar to grass, or the plant itself.

36 R.M. Maxon.: East Africa, Washington. 1993 p. 8

Climatic Factor

The climate ranges from hot arid, adjacent to the Red Sea, to temperate sub-humid in isolated micro-catchments within the eastern escarpment of the highlands. Some areas of the country are more than 3,000 m in elevation, and the average annual temperature ranges from 21 °C in the highlands to 25 °C in the lowlands. The total annual rainfall ranges from less than 200 mm at the northern border with Sudan, to more than 700 mm in a restricted area on the southern border with Ethiopia.

Water Resource Potential

Eritrea has three main drainage systems:

- The Mereb-Gash and Tekeze Setit River systems, draining into the Nile;
- The eastern escarpment and the Barko-Anseba River systems, draining into the Red Sea, and
- The river systems of a narrow strip of land along the south-eastern border with Ethiopia, draining into the closed Denkel Badin.

Although no measurement of run-off available a rough estimate puts internally produced water resources around 2.8 km³ per year most of which are located in the western part of the country. The most important river course is the Tekeze River, on the border with Sudan. The Tekeze (Atbara) subsystem, whose upper streams rise in northern Ethiopia and southern Eritrea, perennially replenishes at the main Nile in northern Sudan. The rivers Tekeze, Angarab and Guang are the main headwaters of Atbara. The Mereb and Tekeze Rivers at different sections, mark the Ethio-Eritrean border. This most important river course has 90 % of its catchment area situated in Ethiopia. In general, Eritrea controls some of the relatively small upstream tributaries.

In 1993, 109 small dams were built mainly for irrigation with a total storage capacity of 24 million m³. A storage reservoir of 8 million m³ was built in the 1960's on the Gash River to irrigate the Alighider Estate, but needs regular de-silting. Several major dams that were built long ago are now completely silted up, eg. the Foro Dam, which had a storage capacity of 4 million m³ just after its construction in the 1920's. In the 1960's a new dam was built at Foro on the River Haddas, with a capacity of 23 million m³, but by 1988 this reservoir was also completely silted up. The main sources of domestic water in rural areas are tub wells and shallow wells. The present status of the rural water supply is unknown. The population in rural areas, subsist mainly on agriculture and livestock raising.

The plateau region and in the north and west where rainfall is sufficient, agriculture is the primary means of livelihood. In the drier coastal plain and the arid regions of the north and west, livestock raising predominates. Eritrea's agriculture and economy suffered a massive damage as a result of the following key factors:

- Lack of rains, to grow crops.
- Scarce alternative resources.
- The Eritrean leadership declaring war which has forced productive peasants to abandon there land and join the military.

Since independence the country has been in a state of war with all its neighbors. This aggressive behavior has generally affected the country's economy. The cost of this conflict has been high.

Population Growth

The total population was estimated to be 3.4 million in 1994, with an annual growth rate higher than 3%. The density is 28 persons per km² but 65 %³⁷ of the population lives in the four highland provinces, although they account only for 16 % of the total land area.

³⁷ Eritrea was previously a northern province of Ethiopia, Ethiopian rule was terminated in May 1991. In Eritrea formal independence was declared as a result of an Eritrean Referendum held in April 1993

C. Kenya

Brief Geographical Description

Kenya covers an area of 592,000 square kilometers and bordered with Ethiopia in the North. It has a water surface area of 11,230 square kilometres and is divided into five drainage basins, including the Lake Victoria Basin Kenya has diverse morphology which comprises of the highlands rising to Mount Kenya at a height of 5200 m, dissected by the Rift Valley with lowlands around the Lake Victoria Basin. In the north the residue of the highlands join the Indian Ocean coastline. The highland areas comprise of volcanic rock with fertile soil and a temperate climate with good reliable rainfall. The lowland areas (with the exception of the Lake Victoria Basin and the coastal belt) cover large sparsely populated areas with low rainfall, poor soil and a fragile ecosystem. Over 80 % of the country is arid and semi-arid.

Climatic Factors

Kenya has an annual rainfall of 621 mm, which varies from below 250 mm in arid areas in the north and east to over 2,000 mm in the highlands and mountain ranges. The annual rainfall generally follows the seasonal pattern. The seasonal variations are considerable to the east of the Rift Valley. In the Northern and Eastern parts of the dry lowlands area, there are two distinct rainy seasons which run from March to May and October to December.

Water Resource Potential

Hydrologically, Kenya is divided into five drainage systems, determined by the great Rift Valley which runs north-south. The rivers drain the eastern flanks of the highlands and flow into the Indian Ocean. Those drain the western flanks flow into Lake Victoria. The five drainage Basins are the following:

No.	Drainage Area	Catchment Area (km ²)	% of total
1	Lake Victoria	49000	8
2	Rift Valley	130000	23
3	River and Coast	70000	12
4	Tana River	132000	22
5	Emaso Nyro North	205000	35
	Total	592000	100

Source: Food & Agricultural Organization (FAO), 1987

Relative to its land mass and population, Kenya has limited water resources, i.e. the perennial rivers concentrated in the western central and coastal areas. Lake Victoria is situated on the eastern African plateau at an elevation of 900 meters, surrounded by relatively low-lying land 1,100 meters above sea-level (adjacent shores). The total area of the lake is approximately 68,800 km², of which the Kenyan shore is accounted ten percent. Lake Victoria's³⁸ drainage basin in Kenya covers the whole area of west of the Rift Valley. The basin receives a good amount of rainfall which is well distributed over the area. In this area the rainfall is consistent from the watershed of the catchment to the outflow of the river system. Lake Victoria is the second largest lake in the world with a surface area of 69,500 km². Only 6 % of the lake lies in Kenya. The lake is a sanctuary to hundreds of bird species, a source of water for human consumption and used for agriculture and industry.

Agricultural Development (Irrigation)

In Kenya, as early as the 1950's, a small area of the Kano plain was developed for rice production. By 1957, some 4000 acres were cultivated by irrigation. In 1959, the colonial government of Kenya appointed Sir Alexander Gibb to study the feasibility of the Kenyan plain for development. According to the reports of the Gibb

³⁸ Country paper of the Republic of Kenya presented at the 5th Nile Conference in Addis Ababa, 1997

Commission, irrigable land in the Kano plains was estimated at 29,892 acres, of which 15,060 acres were suitable for growing sugarcane, 14,832 acres for rice production.³⁹ Due to the historical circumstances, though the project was important for the Kenyan economy, the materialization of the project was postponed. Out of Kenya's total irrigation potential of estimated 160,000 hectares of high potential land (approximately 10 % is situated around Lake Victoria).⁴⁰ See table 4.

Table 4 - Irrigable areas of Kenya and potential water requirements

Kenya's rivers and lakes basin	Total area (km ²)	Irrigable Area (km ²)				Potential Water Requirement			
		UB	US	LB	LS	UB	US	LB	LS
Lake Victoria	48542	1188	9272	2357	10176	1222	8906	2306	9795
Lake Ambaseli	3947	97	936	163	1088	126	1220	214	1420
Lake Marghrita	4133	214	1007	428	1146	331	1554	661	1767
Lake Natron	16912	1288	3154	1441	3369	1574	3839	1728	4098
Lotagipi Swamp	18994	74	2330	1098	2746	103	3247	1530	3828
Omo River	83627	4059	12569	5868	14470	5761	17378	8200	19991
Lake Bor	183245	7091	26076	9572	40907	9799	36343	13217	57868
U. Juba	28664	578	3716	2132	4225	821	5402	3109	6152
Galana	38907	150	8046	249	9632	178	10122	282	12152
Pangani	1463	30	262	41	377	36	317	49	383
Ras Chixmbone	35213	29	5054	43	7481	41	6722	59	10089
Lake Tana	96345	1267	19974	2713	24063	1649	26098	3413	31556
Umba	286	2	39	6	41	2	36	5	38
Kai	22392	1	5668	55	6600	1	6685	55	7809
TOTAL	582669	16070	98046	26166	126260	21642	127871	34828	166945

SOURCE: Food and Agriculture Organization (FAO):" *Irrigation and Water Resources Potential for Africa*".

39 W.A. Klerru.: The Nile Waters questions: Political aspects of utilization of the Nile Waters. Unpublished PH.D dissertation. UCLA. 1962 p. 6

40 The Republic of Kenya: Development Plan. 1970 - 1974 pp. 228 - 229

Note:

UB - Best soil for upland crops

US - Best and suitable soil for upland crops

LB - Best soil for lowland crops

LS - Best and suitable soils for lowland crops

Hydro-electric Power Potential

Kenya: City Electricity data base:

Production	By Source	Consumption	Export/ Import
3.81 billion KWH	Fossil Fuel: 10.5 %	3,985 billion KWH	0 KWH
175 million KWH			
	Hydro: 81.63 %		
	Nuclear: 0 %		
	Other: 7.87 %		

Source: The World Fact Book, Kenya, 1999.

Population Growth

The total population of Kenya is 27 million (1994) and it is estimated that it increases by 3.4 % annually. The rural population is estimated 80 %. Kenya is demanding more water to meet the needs of the rapidly increasing population. Agricultural and industrial developments are also likely to outstrip the available supply of water, making future water supply options more limited and expensive to make use of.

Environmental Challenges

Generally speaking, Kenya has adequate water resources to meet its current demands. Though, it faces a number of challenges in rationalizing consumption. Temporal and spatial distribution of water sometimes causes acute shortages in major urban areas, e.g. in Nairobi and Mombassa, as well as in rural communities. This happens due to a variety of factors: variations in climatic conditions, droughts, increasing demand, distribution system breakdown and mismanagement are the major ones. Future demands of the rapidly increasing population (at present 26 million) which is accompanied by agricultural and industrial developments are also likely to cause scarcity on the available supply. For example, at present, the water supply deficiency in some towns like Mombassa is about 60 %, while the demand is growing at a rate of about 5 % per annum.⁴¹ The increase in population together with the growing demand for water could have impact on the eco-system. So, this unbalance necessitates better planning and sound management of all the water resources in Kenya.

The Omo-Turkana Basin, whose upper stream river is known as "Omo", rises from the southern and south-western highlands of Ethiopia, and finally flows into Lake Turkana. The biggest portion of Lake Turkana lies in Kenyan territory. This Basin is potentially rich, but it is the least developed of all water basins in the sub-region. The Ethiopian portion of Lake Turkana is continuously diminishing and retreating southwards from the Ethiopian frontier into Kenyan territory. It is further anticipated that Lake Turkana will eventually retreat entirely from Ethiopia, and be contained within Kenya. The lower Omo-Turkana Basin is sparsely populated and characterised by pastoralism and a nomadic lifestyle in both countries between the two Ethiopia and Kenya. The water issue has not yet figured in their neighbourly relations. Should either one, or both of the countries turn their attention to the effective exploitation of the basin, an interstate basin issue will be on the political agenda.

⁴¹ Country report prepared by the Ministry of Land Reclamation, Regional and Water Development, Nairobi, Kenya. 1997.

If Kenya and Ethiopia explore their respective development potential, it is possible for them as to harness their resource for the benefit of their peoples. Thus, it is now time for the two countries to work on an institutional framework that serves their mutual interest. This would prevent future conflict and lead to cooperation and joint endeavours for development.

2.2 The Equatorial Upper Riparian Countries of the Nile Basin

The upper Equatorial Nile Basin covers Tanzania, Burundi, Rwanda, Democratic Republic of Congo, Kenya and substantial parts of Uganda. The countries in this sub-region are characterized by civil wars and instability, eg. the so-called 'Congo Crisis' which currently affects those countries. The equatorial upper riparian countries contribute 14 % to the total annual volume of the Nile.

D. Tanzania

Brief Geographical Description

Tanzania is an east African country lying on the South Eastern great African plateau. It covers an area of 945,000 km² and has a common border with six countries. It is bordered with the Indian Ocean in the east, Lake Victoria in the north, Lake Tanganyika in the west and Lake Nyasa in the south. Its altitude ranges between 1,000 meters and 2,000 meters. Although the country is close to the equator, It is not very hot country.

Climatic Factors

More than half of the country receives an average of 800 mm rain annually. The rainy seasons extended from December to April. The rainfall varies from 500 to 1000 mm and the highest rainfall receivers are the north west and north east of Lake Victoria Basin and the southern highlands.⁴²

⁴² Ministry of Water of the Republic of Tanzania. Country Report submitted in 1997.

Water Resource Potential

About 50 % of the freshwater runoff in Tanzania from the major river systems (the Rufisi, Pangani, Mami, Ruvu, Mburemkuru, Matandu and Ruvuma) and flow to the Indian Ocean. The Rufisi River contributes 50% of the total surface water. The remaining 50 % is divided into surface water draining northwards into Lake Victoria, westwards into Lake Tanganyika, southwards into Lake Myasa and then into the Zambezi River, and finally into a number of internal drainage basins which have no outlet to the sea. The main internal drainage basins are the Lake Rukuma and Bubu Complex, Lake Eyasi and Lake Manyara. The Lake Nyasa, Lake Victoria and the Lake Tanganyika basins drain into the international water bodies. (See the table as indicated)

Table 5 - Main annual runoff in million cubic meters at gauging sites.

Rivers	Annual Runoff
Rifise	22250
Pangani	627
Malagarasi	5060
Ruku	1370
Wami	3280
Ruhuhu	5680
Kiwira	1900
Kagera	7064
Mara	1971
Kilombero	14970
TOTAL	64172

Source: Country paper of the Republic of Tanzania presented at the Nile 2002 Conference in Addis Ababa, 1997.

The Tanzanian portion of Lake Victoria and its associated basin has a significant importance to the social and economic life of the population living within and around the basin. It provides fresh water for domestic consumption, agricultural, industrial use. It also serves for transportation, recreation. The major socio-economic activities on the lake and its catchments area include: agriculture, fishing, marine transportation, recreation as well as supplying water supplies for domestic and industrial use in the urban areas situated on the shoreline. Agriculture and fishing remain the dominant socio-economic activities of most of the population. Mining is also an important economic activity in some pockets around the lake in Tanzania.

Agricultural Development (Irrigation)

In Tanzania most of the lake region is fertile. However, agricultural production is limited by insufficient water for irrigation. The potential irrigable land in the lake basin is estimated to be over 300,900 hectares. Crops like cotton, rice, maize, coffee and several varieties of legumes are cultivated, but the full potential is not yet utilized due to limited irrigation. Water is also necessary for afforestation. In Tanzania, before the start of the First World War, a plan was devised by the Germans to develop a large scale cotton farm covering 2 million acres in Sukumaland. Water for the irrigation was to be obtained from Lake Victoria by means of tunnels or a canal.⁴³

Germany was defeated in the First World War and Tanzania became a British Colony under the rubric of the League of Nations mandate and UN trusteeship. The Sukumaland project plan indefinitely suspended as Britain was more committed to her downstream colonies: Sudan and Egypt. Britain was in favour of Egypt, so that the latter received undiminished flow of the Nile waters. When the Suez Canal crisis was in its peak (1956), some of the British Colonial officials intended developing the

43 W.A. Klerru.: Op cit p. 6

Sukumaland project. This was, however, not intended for Tanzania's economic development, but was a political manoeuvre to punish Egypt.

Lake Victoria is used by equatorial upper riparian countries for navigation. Tanzania's export products are transported on Lake Victoria to the town of Mwanza and Kisumu; and later by rail to the outlets for export. The length of navigable water of Lake Victoria equals to 830 miles.⁴⁴ Tonnage loaded on by the lakes' water in 1960 was 245,262 tonnes⁴⁵ and the number of passengers in the same year was 364,438.⁴⁶

In order to achieve accelerated social and economic development around the Lake Victoria and in the Nile Basin countries, large multi-objective water projects are needed. The Lakes Victoria, Edward, George, Albert and Kroygo are all fishing waters. In 1955 the Economic Intelligence Unit estimated the fish production in that year 23,350 tons. In terms of value, it was estimated that this would be equal to US \$25,000.⁴⁷ In 1972 Tanzania, Burundi and Rwanda entered in to an agreement to cooperate in the development of the Kagera River. The steps taken by these three countries would be instrumental in encouraging the riparian states to develop a basin cooperative regime supported by legal and institutional mechanisms.

Hydro-electric Power Potential

Tanzania, and other countries sharing Lake Victoria, do not have adequate electric power to run economic and social activities. There are ample opportunities to construct large power stations to meet the existing demand. It is with an adequate

44 Economic Intelligence Unit. London. 1975. p. 55

45 His Majesty's Government in the UK of Great Britain and Northern Ireland to the Trusteeship Council of the United Nations on the administration of Tanganyika for the year 1960, Colonial No. 394, Her Majesty's Stationary Office. London. 1961. p. 71

46 Ibid p. 72

47 Ibid p. 71

supply of electricity that the country will be able to improve the living standard of the people.

Population Growth and Water Demand

In recent years, the population around the lake and within the basin has grown rapidly at an average rate of 3 %. Currently the population of Tanzania is 27.2 million.⁴⁸ The increasing population pressure and socio-economic activities in the basin have resulted in changes in the land use, water quality, bio-diversity, wetlands and fisheries. The fish stocks are decreasing and bio-diversity has declined. The lake is seriously affected by agriculture, industrial and urbanization activities. It seems though a prospect for rational and sustained utilization of the lake is underway. In this respect, the Lake Victoria Environmental Management Project is the showcase and expected to contribute in alleviating poverty and protecting the environment.

Environmental Challenges

The environmental crisis in Tanzania, particularly in Lake Victoria is very alarming. Increased population around the Lake has continued to exert demands for water and which in turn is causing gradual deterioration on the lake. These activities have resulted in increased pollution and, consequently, changes in the ecosystem. Bio-diversity has declined, fish stocks have been decreasing, Algae flourish and there is increased evaporation and sediment. The water hyacinth is gradually invading the lake and is interfering with the light penetration, the dissolved oxygen, fish breeding sites, landing beaches, recreation, lake transport, ecology, etc.

The lake deterioration has been primarily due to discharges of municipal sewerage, industrial effluent, agricultural fertilizers, and other agro-chemicals and pollutants from the urban areas. The lake basin problems are further accelerated by land use

⁴⁸ Human Development Report. Published for the United Nations Development Programme. Oxford University Press. 1995

practices, which have a negative impact on the water quality and wetlands. In Tanzania the main problem is the discharge of municipal and industrial waste, eg. from mining activities. With regard to mining activities, the issue of opening the Geta Gold Project (which is jointly owned by Ashanti Goldfields Limited of Ghana and AngloGold Limited of South Africa) has raised a disputable concern.⁴⁹ The mining projects, which are found 20km away from Lake Victoria spoil the fresh water surfaces' bio-diversity.

E. Uganda

Brief Geographical Description

Uganda lies in the heart of Africa along the equator and shares borders with Sudan in the north, Kenya in the east, Tanzania and Rwanda in the south and the Democratic Republic of Congo in the west. Uganda covers an area of 241,038 km² and has an average altitude of 1,200 meters above sea level. The highest point on Mount Riwenzari peaks at 5,590 meters, while the lowest is 620 meters at the Albert Nile. Uganda is geographically better placed in the Nile Basin, because Uganda is known as a source of the White Nile and is the only country lying almost entirely within the Nile Basin. Uganda is in special situation because it controls the outlet of Lake Victoria at the Owen Falls hydro-power and therefore has a key position in the utilization and regulation of the Lakes water.

Climatic Factors

The Country's climate is equatorial, tempered by cooling breezes from the mountains. The temperature varies between 60 - 85F. The rainfall in Uganda varies from the place to another; with the highest rain is Lake Victoria area (20 cm). There are two rain seasons in the country May and in October. The rainfall pattern has

⁴⁹ Africa News Online - Tanzania ascertains environmental safety in Lake Victoria. p. 1-2.

recently changed. As mentioned at the beginning of this chapter, the White Nile flows from Uganda into Sudan, and it is joined with the Blue Nile at the town of Malakal. The largest proportion of the White Nile basin lies in the Sudan, which covers 63 % of the area, whereas only 6 % lies within Uganda.

Agricultural Development (Irrigation)

Uganda's main economic activity is agriculture. It is the driving force of the economy and based on crops, livestock, fisheries and forestry. Agriculture contributes 66 % of Uganda's GDP and 99 %¹ of the export revenue. In Uganda the Victoria Region has a big potential for economic development. Apart from agricultural potential, hydro-electric power generation is also promising. The Owen Fall Hydro- electric Power Study started in 1946 and the construction was completed in 1954. The station produces 700 million KWH annually. If the total flow of Victoria were to be available for power production, the annual output would be 921 million KWH. The Uganda Electricity Board derives over 99 % of its power output, for domestic consumption, from the Owen Falls Hydro-electric Power Station which is situated at Jinga on the River Nile.

¹ Facts about Uganda, 1991.

Water Resource Potential

Table 6 - Irrigable areas and potential water requirements in Uganda

Lakes and Rivers	Total area (km ₂)	Irrigable area (km ₂)				Potential water requirement (mm ₂)			
		UB	US	LB	LS	UB	US	LB	LS
Lake Albert	45522	593	40801	2118	5138	543	4404	1958	4716
Lake Victoria	154199	1645	31175	8527	33222	1588	30684	8154	32639
Sobat	3881	15	1212	121	1259	16	1295	131	1345
White Nile	27956	289	6991	2498	7203	268	691	2316	6898
Lotagipi Swamp	2074	0	61	0	63	0	78	0	80
Mugasera	26	0	1	0	3	0	1	0	3
Arumin	4	0	0	0	0	0	0	0	0
Omo	2365	26	567	62	607	30	651	71	698
Oubangui	5	0	0	0	0	0	0	0	0
TOTAL	236031	2568	44809	13327	47495	2446	43806	12630	46379

Source: Food and Agricultural Organization (FAO). "Irrigation and Water Resources Potential for Africa".

Note:UB = Best soils for upland crops

US = Best and suitable soils for upland crops

LB = Best soils for lowland crops

LS = Best and suitable soils for lowland crops

As seen, the potential irrigation water demand of Uganda appears to be limited. The lack of food security is caused by the absence of large scale irrigation in Uganda. Although there are many opportunities for irrigation, very few have been developed in the country. The farmers in Uganda need much less water than their counterparts in Egypt to produce food crops.

Hydro-electric Power Potential

Uganda possesses considerable hydro-electric potential which has been considered in a series of planning and project studies. The table below lists proposed hydro-electric projects in Uganda.

Table 7 - Hydro-electric Projects in Uganda

Project	River or Lakes	Head (m)	Installed Capacity	Remarks
Owen Falls	Lake Victoria	17.8 - 21.0	60.0 MW	Extension
Bojagali	Victoria Nile	18.5	180.0 MW	
Ayago South	Kyoga Nile	73.5	240.0 MW	
Ayago North	Kyoga Nile	43.5	300.0 MW	
Murchison	Kyoga Nile	88.0	480.0 MW	
Kamdini	Kyoga Nile	NA	NA	North Karuma
Kagera (Kigagati)	Kagera	NA	700.0 KW	
Ruizi and Niazikumba		NA	500 - 1000 KW	
Muzizi, Mapanga		-		
Ruimi Rivers		NA	10.000 KW	
TOTALS		NA	1.271.7 MW = 1.27 GW	

Source: Sub Saharan Africa hydrological assessment: Final Report, Uganda World Bank (UNDP, 1989, 2-3).

Having all these hydro-electric projects, Uganda is currently facing power shortages. The power shortage is one of the obstacles to the country's economic growth. Demand is growing so fast that electricity is rationed almost daily, retarding industry and sometimes even crippling it. The international power giant AES, recently won a contract to dam the Ugandan portion of the White Nile, but the construction plan has raised a number of concerns and differences between the government of Uganda and the tourist industry. The real concern regarding the construction of this proposed dam has to do with the Bujagali Falls, the natural spot that has been drawing tourists to view the world's largest breathtaking rapids. Once the dam is built, the run will become a little more than a placid lake. The tourist industry fears that the proposed construction of such a dam will destroy the spectacular set of rapids which is one of the country's top tourist attractions. This controversy over the planned dam remains unresolved.

Population Growth and Water Demand

Presently the Ugandan population is 18.4 million.² In the near future it is expected that the number will have tripled, and by the year 2025 it reaches 55.2 million. As the population grows, the demand for fresh water will also increase. The global climate changes also affect the country's water supply and the demands will be more pressing and huge..

Environmental Challenges

Environmental changes, particularly pollution and environmental degradation at Lake Victoria also affect Uganda. There is a wide range of atmospheric, terrestrial and aquatic environmental pressures on the country, which will have a accumulative effect on agricultural production and thus a decline in the general economic growth. The lake aquatic environment is under constant threat due to a complex of projects and industrial developments on the lake shore and along the Victoria Nile, such as: tanneries, breweries, textile plants, distillers, sugar industries, etc. Under the Uganda water supply and sanitation sector action plan, a programme of rehabilitation and extension of existing systems as well as development of new schemes is planned. Although most of these schemes are based on the use of the Nile River and its tributaries, the total demand does not exceed 0.07 billion cu.m per year. This amount is minimal, compared to the Aswan production.

² Ibid p. 2134

F. Democratic Republic of Congo

Brief Geographical Description

The Democratic Republic of Congo (DRC) is situated in west-central Africa, and bordered with nine countries, namely: the Congo Republic, the Central African Republic, the Sudan, Uganda, Rwanda, Burundi, Tanzania, Zambia, Angola and the Atlantic Ocean. The principal rivers are the Ubangi and Bomu in the north and the Congo in the west which flows into the Atlantic. The entire length of Lake Tanganyika lies along the eastern border of Tanzania and Burundi. Most of the country lies within the vast hollow of the Congo River Basin. The basin has the shape of an amphitheatre, being open to the north and north-western plateaus and mountains. The edges of the basin are breached in the west by the passage of the Congo River to the Atlantic Ocean; they are broken and raised in the east by an upheaval of the Great Rift Valley (where the Lakes Mweru, Tanganyika, Kiru, Edward, and Albert are found) and by overflow from volcanoes in the Virunga Mountains.

The highest peak in this area is the Mitumba Range, on the DRC's eastern border. The Ubangi River, the main northern tributary of the Congo River, rises from the northwestern slopes of this range. In the southwest of the Democratic Congo the mountain chains are collectively designated on the Angola plateau. Here we locate the source of the Kasai, the main southern affluent of the Congo River. Both the Congo River Basin and the mountain regions are traversed by numerous rivers, and the valleys are covered with dense vegetation. Virtually impenetrable equatorial forests cover the eastern and north-eastern portions of the country.³

⁵² The World Fact Book. 1992 p.379

Climatic Factors

The DRC's climate ranges from tropical rainforest in the Congo River Basin, to tropical wet and dry areas in the southern uplands and to tropical highlands in the eastern areas above 2,000 meters. In general, the temperatures and humidity are quite high, but with much variation - many places on both sides of the equator have two wet and two dry seasons. The average annual temperature is 25⁰C and the average annual rainfall is between 1,000 mm and 2,2000 mm, with the highest rainfall measured in the heart of the Congo River Basin and the highlands of west Bukuru.

The average annual rainfall is about 1520 mm (about 60 inches) in the north and 1270 mm (about 50 inches) in the south. Frequent and heavy rainfall occurs from April to November north of the equator and from October to May, south of the equator. In the central part of the country, rainfall is relatively evenly distributed throughout the year.

Water Resource Potential

The DRC is endowed with several rivers and lakes. Among them the River Congo is the largest, and most of the country lies within the vast hollow of this river basin. The largest rivers known as the Ituri, Great Congo, Pygmy and Stanley Forest, extend east from the confluence of the Arumumi and Congo Rivers close to Lake Albert, covering some 65,000 km². In this area of the Ugandan border, is Ruwenzori Range, containing the Democratic Congo's highest point, Mougherita Peak (5109m/16,762 feet).⁴ Most of the Congo is served by the Congo River system, It has facilitated both trade and outlet. Its network of waterways is dense and evenly distributed throughout the country, with three exceptions:

⁵³ Europa World Yearbook. London. 1993 p.3258

- North-eastern Mayobe in the Bas-Zaïre Region in the west, which is drained by a small coastal river called the Shilongo;
- A strip of land on the eastern border adjoining Lakes Albert and Edward, which is part of the Nile River Basin, and
- A small part of the extreme south-eastern Democratic Congo, which lies in the Zambezi River Basin and drains into the Indian Ocean.

Most of Congo's lakes are also part of the Congo River Basin. In the west are Lac Mai-Naombe and Lac Tumba, both being remnants of a huge internal lake that once occupied the entire basin prior to the breach of the basin's edge by the Congo River, and the subsequent drainage of the interior. In the south-east, Lake Mweru straddles the border with Zambia on the eastern frontier. Lac Kiru, Central Africa's highest lake and key tourist attraction, and Lake Tanganyika, just south of Lac Kiru, both feed into the Lualaba River. The latter name is often given to the upper extension of the Congo River. The waters of the eastern frontiers' northern largest lakes, the Edward and Albert lakes, drain north into the Nile Basin.

The Congo River provides the country with an extensive network of navigable waterways on the continent. Ten kilometers wide at mid-point of its length, its flow is usually regular, because it is fed by rivers and streams from both sides of the equator. The alternating rainy and dry seasons on each side of the equator guarantees a regular supply of water for the main channel. At the point where navigation is blocked by rapids and waterfalls, the sudden descent of the river creates a hydro-electric potential.

Agricultural Development (Irrigation)

Although the DRC is endowed with huge natural resources such as extensive land for agriculture, mineral and untapped energy potential, It remains on of the worlds' poorest nations. With GDP decline by about 6 % yearly in the early 1990's, the

DRC's economy has shown considerable deterioration. With hyperinflation nearly 40 % a month, the government deficit has risen by more than four times.⁵ The internal conflict, and political unrest in the country are the main contributors for the weakened economy.

Approximately 75 % of the working population is engaged in agriculture, which accounts for nearly one-third of the GDP. Large areas of the Congo River Basin are fertile and well suited for crops, but only about 3 % of the total land area is under cultivation. The wide range of climatic areas permits diversified agricultural production, and timber resources are extensive.

Hydro-electric Power Potential

The DRC has massive hydro-electric potential because of its large rivers. A major hydro-electric project at Inga, on the lower Congo River started operating in 1972 and has an annual capacity of nearly 40 million kilowatts. Most of the generating plants have been built close to the mines to run mining operations. In the early 1990's the DRC had an electricity-generating capacity of 2.6 million kilowatts. The current annual power output is 6 billion kilowatt-hours, which is produced from hydro-electric.

Population Growth and Water Demand

The DRC's population was estimated at 39.1 million in 1992, making the country the most popular among sub-sahara Africa. The projection for 1995 was 43, 814, 000, yielding an overall population density of about 19 persons per square kilometer (about 48 per square mile). The population is mainly concentrated in the eastern highlands and along the lower Congo River. About 29 % of the population live in the urban areas. With an annual population growth rate of 3.2% among the highest in

⁵⁴ Ibid p. 957

Africa, the Democratic Congo is estimated to double its population in 22 years.⁶ In the Democratic Congo Nile sub-basin, the ever increasing population was estimated at 5 million in 1995.

Environmental Challenges

The Democratic Congo portion of the sub-Nile Basin is also facing a variety of environmental problems which are threatening the natural diversities of the country. The country is currently experiencing water quality deterioration, deforestation and soil degradation, mainly because of human activities. Due to these problems, the country's agriculture 90 % of the population depends on it for their livelihood has been deteriorating. The country's vast forests are also increasingly at risk. The major threat is the multi-national companies 37 % of the total exploitable area of the country's rainforest has already been designated as timber concessions. The most intense logging to date has been in the Bas-Congo Region in the hinterlands of the capital Kinshasha.

Logging itself disrupts the forest ecology, and worse, logging roads are carved out in the forest. The forests have become means of survival for poor farmers who clear and burn more forest fields.⁷ In 1993 one analyst reported that there was virtually no rainforest left in the region of the Democratic Congo Nile catchment. The concern is for the environment, soil conservation and the population growth. These major issues need to be addressed in the country through cooperation in the basin.

55 Encyclopaedia of the Third World (4th ed), (ed. George Thomas Kurian). New York. 1992 p. 2134

56 Country paper of the DRC presented at the Nile 2002 Conference, Addis Ababa, 1997

G. Rwanda

Brief Geographical Description

Rwanda is located in east-central Africa, bordered on the north by Uganda, on the east by Tanzania, on the south by Burundi, and on the west by the Democratic Republic of Congo. Rwanda's land is typically hilly, though there are also swamps and mountainous regions. The country can be divided into six topographical regions: from east to west there is the narrow Rift Valley, which slopes sharply to Lake Kivu; the Volcanic Virunga Mountains, whose highest peak, the snowcapped Mount Karusimoi (14,870 feet), the steep north-south rise of the Democratic Congo-Nile divide whose width averages 25 miles the ridge of the Democratic Congo-Nile divide, with an average elevation of 2,750 (9,000 feet) meters; the central plateaus, east of the mountains which are covered by rolling hills; and the savannas and swamps of the eastern and south-eastern border areas, which cover one-tenth of the nation's land area and include the vast Kagera National Park. Most of Rwanda is at least 900 meters (3,000 feet) above sea level, the central plains have an average elevation of 1,932 meters (4,400 feet).⁸

South-eastern Rwanda has a desert-like terrain. Much of Rwanda's boundary follows rivers - these include (from east to west): the Kagera, Alkanyaru and Luhua Rivers. In the eastern area the border traverses the Rugmero and Lyohoha Lakes. The southern boundary also traverses many swamps. In other regions, and especially in the west, Rwanda's borders cross ridges and valleys. The west-central section crosses the Nile-Congo divide at an elevation of 8,700 feet. Rwanda has 28 lakes, all of significant size. Six of them lie within its territory i.e. Ruhando, Muhazi, Mugasera, Jhema, Rwanye and Burera. Three others, the Bugmero, Lyohoha and Kivu Lakes are shared with neighbouring countries. Lake Kivu drains into Lake Tanganyika and later joins the Ruzizi River. The central uplands are drained by the

⁵⁷ Encyclopaedia of the Third World. 1993 p.570

Nyabarongo River and its main tributaries, the Lukarara, Mwogo, Biruruma, Mukungwa, Base, Nyabugogo and Akanyaru Rivers. Rwanda's eastern border is formed by the Akagera River on its way to Lake Victoria.

Climatic Factors

Rwanda has three main seasons: a short dry season in January, the major rain season from February to May, and another dry season from May to late September. The average yearly rainfall is 790 mm (31 inches)⁹ and is the heaviest in the western and north-western mountain regions. Wide temperature variations occur because of the difference in elevation.

Water Resource Potential

Water resources were further depleted as watersheds and wetland areas were lost. These problems were compounded, especially in the southern regions of the country by severe droughts in the 1980's and early 1990's. The impact of water scarcity on agriculture was harshest in all regions, in other areas too water shortages became critical for personal, domestic and industrial needs.

Agricultural Development (Irrigation)

Agriculture is the predominant economic activity in Rwanda. 90 % of Rwanda's population is engaged in agriculture (mainly subsistence) as estimated in 1993. In the country arable land constitutes 35%, permanent crops 13%, permanent pastures 18%, forests and woodland 22 %, others consists of 12 %. The total irrigated land in the country was estimated (40 km²) to be 40 km² in 1993.¹⁰ According to a recent report compiled by the Food & Agriculture Organization (FAO), the recent harvest of

⁵⁸ FAO/GIEWS - Food Crops and Shortages, No. 2, April 2000

⁵⁹ Ibid p. 570

seasonal crops was good despite severe crop losses due to the dry weather in the eastern and southern parts of the country. The average food production is estimated at 2.8 million tones, an increase of 20 % the previous year.

Hydro-electric Power Potential

Rwanda and Uganda concluded a power export deal in 1999, in which Uganda export five megawatts of power to Rwanda at 30/33 KV and bought two megawatts from Rwanda at 30 KV.

Population Growth and Water Demand

From 1985 to 1990 the population growth rate was estimated at 3.3 %.¹¹ Of the Rwandese population, 94 % live in the rural areas. In 1998 the population of Rwanda was estimated at 7,956,172. The population density is 302 persons per square kilometer (782 per square mile), making Rwanda one of the most densely populated countries in Africa.¹² The per hectare density was 3.2 people in 1993. If the lakes, natural parks and forest resources are excluded from the equation the figure increases to 422 people per square kilometer.

Rwanda's humid climatical situation and population density within an agricultural based economy, causes water scarcity problems. With the development of the international Kagera River Basin tributary to Lake Victoria, conflicting user interests surfaced, particularly in Rwanda, where the materialization of the Kinshasa Hydro-power Scheme would impact on the Kagera National Park's lakes and wetlands. Both the Kagera and the rivers stemming from the Kenyan catchment, have the potential to carry urban, industrial and agricultural pollutants into the lake.

⁶⁰ Environmental Scarcity and Violent Conflict: The case of Rwanda. Occasional Paper. 1995.

⁶¹ Burundi and Rwanda, which sit on the water divide of the African continent drain partly into Lake Victoria through the Kagera River, but does not own any shore on Lake Victoria.

Environmental Challenges

The country faces deforestation as a result of uncontrolled cutting of trees for fuel. The overgrazing, soil exhaustion, soil erosion and widespread poaching are all major environmental problems, which need to be addressed urgently. Rwanda attaches great importance to the Nile for its equitable, rational use and its protection for the benefit of all riparian countries on an equal basis.

H. Burundi

Brief Geographical Description

Burundi is an east African country lying in the middle of the African continent and has a surface of 27,834 km². It has a common border with Tanzania in the south and east; in the north with Rwanda; and on the west with the Democratic Republic of Congo. Burundi is exactly situated in the great African Plateau formed by the Nile and Congo River Basins. The western slopes descend abruptly into the Great East African Rift Valley toward the Ruzizi plain and Lake Tanganyika. The eastern slopes rise toward the central uplands. Three natural regions are thus formed:¹³

- The Rift Valley called the Imbo, along the western border. The Rift Valley is a narrow plain that runs along the Rusizi River and the shores of Lake Tanganyika, ending in the foothills of the western Congo-Nile divide. The entire Rift Valley lies below 3,500 feet in elevation.
- The eastern zone known as The Kamaso. The Kamaso is formed by the central and eastern plateaus, with an average elevation of 6,000 feet, and by savannas along the eastern border, where the average elevation is 3,400 feet.

⁶² Encyclopedia of the Third World. 1993 p. 273

- The central mountain region. The central mountain region is formed by a series of ridges running north to south that is generally less than 16 kilometers wide and 8,000 feet high. The eastern slope of this range in south central Burundi gives rise to the headwater of the Rwanda River, one of the sources of the Nile.

Climatic Factors

Burundi has a moderate tropical climate with average temperatures between 23^o and 24^oC. The country has two seasons: the dry season from June to September and the rainy season from February to May. The rainfall is irregular, with the heaviest concentration of rain in the northwest. Rainfall on the plateaus averages 119.4 cm, declining in the lower regions to 76.2 cm per year. Violent rainstorms are frequent at the higher elevations. The lack of rain periodically causes drought.

Water Resource Potential

Burundi's rivers flow into the basins of two major rivers, the Congo and the Nile. The most important river flowing into the Congo Basin is the Rusizi, which has its source in Lake Kiru and forms the border between the Democratic Congo and Burundi. Among its many tributaries are the Lua, which forms part of the border with Rwanda, the Nyamagana, the Kaburantwa, and the Mpanda. Other rivers flowing into Lake Tanganyika include the Ndahanwa, the Dima, the Mulembwe and the Neyngwe. The Ruvubu and Kagera Rivers are the south-eastern sources of the Nile. The Kagera forms the border between Burundi and Rwanda and is part of the Kanyaru. The Ruvubu separates Burundi from Tanzania.

Agricultural Development (Irrigation)

Burundi's south-eastern region is serviced by the Muragarazi, which forms the border with Tanzania. Burundi has a total water area which covers 2,180 km². The water from the Malagarasi and Ruzizi Rivers is used for irrigation in the eastern and extreme western lowlands. In general, 90 % of the Burundi population depends on agriculture. The country's arable land and land used for permanent crops account for 43 % of the total land area. Another 12 % of land is covered by forest.¹⁴

Population Growth

The country's total population is 5,943,057 as estimated in 1996.¹⁵ There is an average growth rate of 3.1 % per year. This figure, when considering the country's size, Burundi is overpopulated. With the fast population increase, the country faces energy and water scarcity as well as other environmental problems. The country has two small coal-fired generating plants and two small hydro-electric dams, which in 1998 produced 127 million kilowatt-hours of electricity. A portion of the country's electricity is now supplied by hydro-electric facilities in Bakau, the Democratic Republic of Congo. For most Burundians however, wood and other traditional fuels remain the primary source of energy, which is the main factor for deforestation and environmental degradation.

Environmental Challenges

Burundi is affected by a variety of environmental problems, such as soil erosion due to overfarming, overgrazing, and deforestation. The habitat loss is a threat to the wildlife population. This situation is aggravated and intensified by the population

⁶³ Facts about Burundi. 1993 p. 273

⁶⁴ Ibid p. 274

pressure and recurrent political instability. The ethnic tension in the country has to some degree contributed to food scarcity, poverty, and limited access to resources and land pressures.

2.3 Lower Riparian Countries of the Nile Basin

It was mentioned earlier in the previous topic that the upper riparian countries such as Ethiopia, contributes 86 % to the total volume of the Nile waters, while the remaining 14 % comes, through the White Nile subsystem from other equatorial upper riparian countries: Kenya, Tanzania, Uganda, Democratic Republic of Cogo, Rwanda and Burundi. However, the two downstream riparians, namely Egypt and Sudan, are the recipients of the water resources.

The two lower riparians are almost entirely dependent on the water that comes down from outside their borders. The paradox is that the upper riparians contribute all the water utilized by the two lower riparians, with no reciprocity in terms of money or otherwise the shortage of water and environmental degradation caused by the years of severe drought created great suffering for the people of the upper riparian states. This section focuses on the two favoured downstream countries.

I. Egypt

Brief Geographical Description

Egypt lies in the north-eastern corner of the African continent with a total area of about 1 million km². It is bordered in the north by the Mediterranean Sea, in the east by Israel and the Red Sea, on the south by Sudan and in the west by Libya.

Climatic Factors

The main annual rainfall is estimated at 18 mm. It ranges from 0 mm in the desert to 200 mm in the northern coastal region. In many districts heavy rainfall may occur, only once in a two or three year period. During the summer, temperatures are extremely high, reaching 38⁰C to 43⁰C with extremes of 49⁰C in the southern and western deserts. The Mediterranean coast has cooler conditions with 32⁰C as a maximum.

Water Resource Potential

The Nile water is the main source of water for Egypt. Egypt alone has been using the Nile waters many times more than all the riparians in the basin combined. Geographically, the entire Egypt is arid and the country is totally dependent on the Nile waters.¹⁶ The situation in Egypt is '*Aut Nilus aut Nihil*' ('No Nile, no life in Egypt). This description was attributed to Heredotus (a Greek Philosopher) that 'Egypt is the Gift of the Nile'.¹⁷ The country's geographical link with and dependence on the upstream riparians from where the life-giving water descends is so great and important as the Nile is the sole source of life in Egypt. The greatest source of the Nile is its upstream riparians, especially in Ethiopia where more than 86 % of the waters of the Nile come from. The main annual rainfall, including the six inch winter rainfall along the Mediterranean strip, is less than an inch. Not only are the waters of Ethiopian origin most vital to the lower riparians, particularly Egypt, but also the fertile soil that is carried down with the annual floods from the Ethiopian highlands in the form of silt.

65 For a detailed description, see Alfred Namrath: Egypt the land between sun and Nile, Kummer and Frey. Berne. 1920 p.32

66 A.H. Garretson.: The law of international drainage basin. Ocean A Publication Inc., New York. 1969 p. 256. See also W.A. Hence.: The geography of Modern Africa. Colombia Picture Press, New York. 1967 p. 119

As a matter of fact, Ethiopia's loss of alluvial soil is enormous according to the FAO reports. The Blue Nile Basin annually loses one centimeter depth of soil on average. According to the assumption that the Ethiopian highlands constitute approximately 40 % of the total area: and the annual loss of soil is estimated to amount to 960 million tons.¹⁸ During the 19th and 20th century the Egyptian Government hoped to control the Nile waters in such a way that the floods would remain within the banks, thus securing the availability of water throughout the year for permanent irrigation and for expanding land under irrigation. Egypt's plan to construct the Great Century Dam in upper Egypt was unacceptable to Sudan, because of the following reasons:

- Sudan wanted the assurance of a good portion of the water for storage.
- To obtain good compensation for the loss of land under the dam.
- To obtain compensation for the resettlement and rehabilitation of the people who would be forced to abandon the area as a result of inundation of the proposed dam.

After a lengthy dispute which lasted for years, finally they came to a compromising agreement. Inter alia, the Sudan's share of the water to rise to one-third. Hence, Sudan would get 18.5 billion cu.m. Egypt further agreed to pay \$15,000,000 for the resettlement and rehabilitation of the evacuees from Wady Halfa, the area which would be inundated.¹⁹ When the agreement of 1959 was signed, the work on the construction of the Great Aswan Dam went ahead in 1960.

Agricultural Development (Irrigation)

The first and largest man-made lake on earth with a reservoir of 591 kilometers long, was constructed. The high dam would replace the old Aswan Dam and has a capacity to release 1500 tons of water every second, for irrigation during times of drought.²⁰ It

⁶⁷ Mesfin Wolde Mariam. An introductory geography of Ethiopia. Berhanena Selam, Addis Ababa. 1972 p. 77-78

⁶⁸ V. Weingarten.: The Nile: Life line of Egypt. Britain. Frederick Muller. 1960 p.90

⁶⁹ W.A. Hence.: Op cit p.90

was further estimated that the new dam would extend cultivated land by 1.3 million acres and application of permanent irrigation on 70,000 acres using the basin system.²¹ More importantly it was envisaged to protect Egypt secure from floods. The improved drainage of the land would provide a considerable amount of hydro-electric power and also improve navigation below the dam. While designing such a big structure, Egypt did not bother to consult other riparians. Among the ten riparians, only Sudan was able to extract the earlier mentioned concession from Egyptians. It was an Egyptian grant of rights, rather than Sudan's assertion of their rights. The upper basin riparians interests were simply ignored.

The newly inaugurated Sinai and Kaharga Dkhla water division projects were constructed without consultation or prior agreement of the upstream countries. The El Salam Project requires 4.45 billion cu.m in Sinai, that is out of valley of Kharya and Dkhla began in 1981 and the canal inaugurated in November 1996. Two canals link the Nile and Lake Nasser to the new artificial lake with a reservoir of 6000 km², impounding which would contain 120 billion cu.m. It was also planned that 200,000 hectares of land would be under irrigation. Whilst implementing such a huge project with the supposedly common water resources of the Nile, Egypt neither consulted upstream riparians, nor secured any agreement from them. This was an unilateral action by Egypt, (the lower riparian) and has set a precedent for upstream riparians for their own unilateral option on the Nile waters. Egypt, in the future has no choice but to cooperate with regard to the Nile Basin.

Population Growth and Water Demand

Egypt's total population is about 62.9 million (1995), of which 55 % is rural, with an annual demographic growth estimated at 2.1 %. The average population density is 63 inhabitants per square kilometer, but ranges from 2 inhabitants per square kilometer

⁷⁰ All irrigation is full or partial control irrigation. Over 95 % of the area is irrigated from the Nile water.

over 96 % of the total area to 1,429 inhabitants per square kilometer in the Nile Valley and Delta. This area, where the population density is amongst the highest in the world, represents only 4 % of the total area.

Environmental Challenges

The country faces environmental problems such as pollution, as a result of using chemical fertilizers, which has increased fourfold in the last two decades, partly due to the Aswan high dams reduction of silt flow downstream. The use of herbicides to control submerged weeds in canals and the water hyacinths in drains (which if uncleared, can choke irrigation systems) has caused serious environmental hazards.

J. Sudan

Brief Geographical Description

Sudan is situated in the eastern corner of Africa, and is the largest African country with a total area of about 2.5 million km². In the northeast it is bordered with the Red Sea and it shares common borders with nine countries: Eritrea and Ethiopia in the east; Kenya, Uganda and the Democratic Republic of Congo in the south; the Central African Republic, Chad and Libya in the west, and Egypt in the north. Sudan consists of a flat internal plain, lying at about 325 meters above sea level. It is intersected by the Nile River and its tributaries and by a number of mountains. In the south is the Sudd Region, the great wetland which is a maze of channels, lakes and swamps. The most remarkable feature of the Sudd area is its flatness: for 400 km²² from south to north, the slope is a mere 0.01 % and much of it is still flatter. The soil found in the area is generally clayish and poor in nutrients. The northern part of the country is covered by a sandy desert with mobile and fixed sand dunes in the north-

⁷¹ G.M. Craig (ed): The agriculture of Sudan, Oxford University Press. 1991

western part (which is considered to be an extension of the eastern outskirts of the great desert).

Climatic Factors

The climate of the Sudan varies from continental in the northern parts, savannah in the centre, to equatorial in its most southern parts. Rainfall varies from 20 mm per year in the north to some 1600 mm per year in the far south. The average annual rainfall is 436 mm.

Water Resource Potential

Sudan is the second country to make big use of the Nile waters. The main part of the Nile is formed by the confluence of the Blue Nile and the White Nile in the capital Khartoum before flowing into Egypt. Agriculture is the main economic sector of the country and most of the agricultural development projects are located along the Nile and its branches. Modern agricultural schemes commenced in the Sudan as early as the 1920's. The Gezira Scheme, the first of its kind in the continent, started in the 1920's. The gigantic Sennar Dam on the Blue Nile was built in 1925. The Gezira Agricultural Scheme was supplied with water from this dam. Initially a quarter of a million acres was put under irrigation.

In 1937 another dam was constructed at Jebel Aulia on the White Nile, some 40 kilometers south of Khartoum. As part of the 1959 Nile Waters agreement, Egypt accepted that Sudan could build a dam at Raseires on the Blue Nile.²³ The central section of this structure rises 60m above the river bed. The storage capacity is 3 TM³ M and it could be raised by 12 m to increase its capacity to 7.6 TM³ M. The dam which was completed in 1967 was equipped with 250,000 W generators and

⁷² The Democratic Republic of the Sudan: The Gezira Scheme, past and present. January 1970

another five could be installed if needed. Some of the water is used for the managil extension of the Gezira Project.

The Kenana Scheme on the left bank of the Blue Nile was planned as a future development. Khasim El-Girba Dam Project on the Atbara River, with a capacity of irrigating 100,000 hectares, was completed in 1964. According to the official statement of the Sudanese Government in 1970, the Gezira Scheme alone constituted 12 % of the total area cultivated in the Sudan. The scheme produced 75% of the country's main products, "long staple cotton", 12 % of the country's production of Durra, 15 % of groundnuts, 50 % of wheat. Moreover, the statement affirmed that the Gezira Scheme constituted the largest scheme under one management in the world.

Agricultural Development (Irrigation)

The scheme which covers 2.3 million acres between the Blue Nile and White Nile produced about 250,000 tons of cotton in 1976/77 and 350,000 tons in 1977/78.²⁴In the Rahad Valley, a project costing US \$34.6 million was designed in 1977, for an irrigation of 820,000 acres, and was financed by the World Bank, Kuwait and the USA.²⁵ Based on the proposal of the Sudanese Government in December 1973 and upon the endorsement of Arab countries with the budget of US \$6,000 million Arab holding companies were to be formed for the implementation of a joint master plan for agricultural development in Sudan.²⁶ According to the details of the plan of the Kuwait-based "Arab fund for Economic and Social Development (AFESD)", the plan aimed to provide the Arab countries in ten years time with 35-40 percent of

⁷³ The Europe Yearbook: 1979 pp. 12-18 & 1975 p. 7310

⁷⁴ Ibid p. 7310

⁷⁵ African Diary, February 12 - 18, 1975

their food needs.²⁷ The capital was to be shared among Saudi Arabia, Kuwait, Qatar, The United Arab Emirates, Egypt, Sudan, Iraq and possibly Syria.²⁸ This was a grand design to make Sudan the basket of the Middle East with the Nile waters and Arab funding.

In Sudan, the steamer navigation on the Nile covers more distance than in any other riparian country in the basin. This land water transport provides the cheapest communication between northern and southern provinces. The joint Egyptian-Sudanese project of digging in the 280 km Janglei Canal between Malakal and Janglei served a multi-purpose, i.e.:

- To decrease the loss of water in the Sudan by evaporation;
- To increase the water flow to lower Sudan and Egypt, and
- To draw the surface water into the bank of the canal and thus cultivable land would be reclaimed in the upper Sudan. Furthermore the canal was to facilitate a navigable short distance between Malakal and Janglei.

The Janglei Project has been disrupted since 1983 due to the civil war in Sudan. Other development activities in the Nile Basin of Sudan included a 500,00 acres farm project by Tenaco at dinder beside the Blue Nile²⁹, 35,000 acres of land by a Sudanese-Egyptian company, and the Nile to be harnessed jointly for more hydro-electric power production. Other joint development plans were envisaged, including a 1,000,000 acre farm was to be developed in eight years time by the joint Sudanese-Egyptian company.³⁰

⁷⁶ Ibid p. 13

⁷⁷ Ibid p. 15

⁷⁸ Middle East Economic Digest, Weekly News Analysis and Forecast, Vol. 23, No.1, January 5, 1979.

⁷⁹ Ibid Volume 26, No.2, 1979

Population Growth and Water Demand

The population of Sudan is about 28 million as estimated in 1995, of which 75 % are found in the rural areas. The average population density is about 11 inhabitants, but there are substantial regional variations and half of the population occupies 15 % of the land. The annual demographic growth rate averaged 2.8 % between 1985-1993.³¹

Environmental Challenges

The environmental degradation risk is rapidly increasing in Sudan, especially due to the civil war and conflict in the region, and the construction of the Janglei Canal³². These factors have disrupted and caused enormous human and environmental problems in the area, where millions of migratory birds spend the winter. The canal would have a devastating effect on the regions' ecosystem and micro-climate, thereby accelerating desertification. If developed, the project would have to be revised substantially, taking into consideration the conditions of the local population and the environmental aspects.

In this chapter, a comparative analysis was made of each individual state with regard to its geographical advantage, climatical conditions, available water potential for developmental needs, population dynamics and environmental problems. The hydro-political methodology was used by grouping the riparian countries into lower and upper regions, according to their geographical location. In the 21st century the Nile Basin will encounter complex problems. The facts contained in this chapter

⁸⁰ World Bank: Sudan Reversing the economic decline. Country Economic Memorandum.

⁸¹ P. Howell, M. Lock & S. Cobb (eds.): The Janglei Canal: impact and opportunity, Cambridge University Press. 1988

illuminate the concern. As the population growth increases in the Nile Basin, the need for water will increase. The danger of drought, (to which the upper riparian countries of the Horn of Africa are prone) is a virtual threat. Deforestation, environmental degradation, desertification, and pollution in the basin all have serious consequences for the future as it was clearly demonstrated in this chapter.

Among the lower riparian countries, Egypt, without making any contribution, still has the lion's share of the Nile water. This type of uneven distribution can no longer continue. The Egyptian Hegemony, through its foreign policy aims to have full control of the Nile instead of negotiating a rational and equitable share of the Nile water. The reason is simple. The other riparian countries of the Nile all have a rapidly growing population and also have plans for the development of their water resources. The challenge facing the riparian countries of the Nile Basin requires the development of mechanisms for a joint solution comprising of legal, economic and ecological issues with the objective to forge cooperation amongst the riparians, most of whom have done very little in the past to benefit from the blessings of this immense natural resource.

CHAPTER III

1. Historical overview of the legal regime in the Nile Basin

The Nile's vast natural resources attracted European colonial powers after the fall of the Ottoman Empire in the 18th century. Egypt wanted to control the source of the Nile, and might have done so if Emperor Yohannes IV of Ethiopia had not successfully defended his country at Gundet and Gura in 1875 and 1876,

respectively.³³ After the European colonial powers penetrated into the continent and created their zones of influence, Britain's control over Egypt lasted until 1937, and over the Sudan from 1899 until 1956.³⁴ Italy entered the Horn of Africa via Eritrea, and France and Belgium became colonial neighbours in Equatoria. Ethiopia was the only country to remain independent despite numerous attempts by the Italians to colonise it.

Most of the agreements concluded during and after the colonial era took cognisance of Egyptian concerns regarding the waters of the Nile. The Nile has been a major aspect of the relations between Ethiopia and Egypt. Egypt has totally depended on the Nile for its early civilization. The geographical location of Ethiopia as the main origin of the Nile signed between former colonial powers with a view to protecting their influence in the subsequent insecurity of the Egyptian renders the relations of the two countries full of tension and the mistrust.

2. The Doctrine of Colonialism in the Nile Basin

The presence of British colonizers in Egypt and the Sudan during the 19th and early 20th centuries basically dictated the state of affairs. British colonialism in north-east Africa wanted to secure its interest in the Nile to ensure the production and export of cotton for its industries in England. To this effect, the British concluded various agreements with those states of the Nile under their control to secure the unfettered flow of water to Egypt.

82 Houle, A.: "The Roots of Organized Internal Armed Conflicts In Ethiopia, 1960-1991." In Trevdt, T. (ed) Conflict in the Horn of Africa: Human and Ecological Consequences of Warfare; Uppsala. 1993. Research programme on Environmental Policy & Society, Department of Social & Economic Geography, pp 27-45

83 McCaffrey, S.C.: "Water politics and international law." in Gleick, P.H. (ed) Water in Crisis: a Guide to the World's Freshwater Resources New York. 1993 p. 94.

"Great Britain created patterns of water utilization which favoured a single state (Egypt) at the expense of the interests of the whole basin".³⁵ As the British never had any control over Ethiopia, they tried different strategies to achieve their objective is to bring Ethiopia under their sphere of influence. Italy, harbouring colonial designs on Ethiopia came handy in this ploy. In the late 19th and the early 20th centuries, Great Britain was the colonial administrator of the Sudan and had strong similar interests in Egypt. From 1884 onwards, the British "Informal Protectorate" controlled the utilization of the Nile waters; favouring Egypt and to a lesser degree the Sudan. The implementation of the "informal protectorate" over the whole of the Nile Basin was facilitated by the fact that all upper riparian states, excluding Ethiopia and the Congo, were by then under British colonial rule. The main purpose of this scheme was to promote the interest of Egypt. The British engineers implemented models that gave an overwhelming dominance to Egypt over the utilization of the Nile.

3. Nile Treaties and Agreements

3.1 Nile Treaties and Agreements during the Colonial Period

It is important to note that when the legal regime in the Nile was in force during the colonial period, the British made a series of dramatic concessions to Egypt at the expense of other colonial possessions. Sudan, however, was not motivated by good-neighbourliness and the principle of *Sic utere tuo ut alium non lovedas*. It was solely motivated by the desire to protect the security of the communications of the British Empire in Egypt and by the hope of having a more friendly Egyptian government to deal with in regard to other matters of more immediate interest to great Britain.

⁸⁴ Kliot, N.: Water Resources and Conflict in the Middle East, Routledge, London & New York, 1994. p.51.

These considerations formed the basis for the controversial recognition by the British of the natural and historical rights of Egypt in the waters of the Nile. The legal regime which evolved within the context of the "informal protectorate" of the British over the Nile River Basin resulted in a number of treaties concluded by the British with the upper riparian states. With the end of British colonial rule in the area, Egypt pursued the same objective and claimed the whole of the Nile waters for its exclusive benefit through various schemes. Egypt tried to implement the same policy that Great Britain applied to the Nile Basin; but unlike Egypt Britain was in control of the upper riparian countries.³⁶ Despite this, however, Egypt has skilfully manoeuvred in the region to ensure virtual monopoly over the Nile waters.

Most of these treaties were not essentially agreements over the waters of the Nile; they were rather predominantly border treaties, either among colonial powers or between colonial powers and Egypt or Ethiopia. Due to the lack of reliable reference material that clarifies this point, a significant portion of the information on the early treaties was derived from W. Tilahun's 1979 "Egypt's Imperial Aspirations over Lake Tana and the Blue Nile". As the title implies, this book is permeated with biases and rhetoric, but the authenticity of the historical facts contained in the book were critically verified. Other independent sources were also researched.

In general, this chapter highlights documented treaties and agreements concerning the Nile River in the last 100 years in a chronological order to provide an overview of the international aspects, both past and present, of this great river.

⁸⁵ Bullock, J. & Darwish, A.: Water Wars, Coming Conflicts in the Middle East Victor Gallancy, London, p. 105.

3.1.1 The Anglo-Italian Protocol of 1891

This protocol was signed on April 15th, 1891. The treaty was intended to define the colonial territorial claims of Great Britain and Italy and the demarcation of their respective spheres of influence in Eastern Africa. In Article III of this protocol, the issues concerning the Nile River were addressed:

"The Italian Government engages not to construct on the Atbara, in view of irrigation, any work which might sensibly modify its flow into the Nile".³⁷

Ethiopia, a riparian country of the Atbara river, was not a co-signatory of this protocol. Secondly, Article III of this protocol mainly sought to protect the Egyptian interests in the Nile waters. The Article also stipulated:

"The Government of Italy vows not to undertake construct on the Atbara any irrigation or dams other works which might easily modify its flow into The Nile".³⁸

3.1.2 The 1902 Treaty between Great Britain and Ethiopia

One of the earliest agreements regarding the waters of the Blue Nile was the treaty between Great Britain and Emperor Menelik of Ethiopia, which was signed on May 15th, 1902, in Addis Ababa. This agreement basically regulated the frontiers between Ethiopia and the Sudan. It also contained a peculiar Article III on the use of the waters of the Nile which stated:

⁸⁶ Tilahun, W.: Egypt's Imperial aspirations over Lake Tana and the Blue Nile, United Printers Ltd., Addis Ababa, 1979, p. 75

⁸⁷ Waterbury, J. . Op cit, p. 2.

"His Majesty the Emperor Menelik II, King of Kings of Ethiopia, engages himself towards the Government of His Britannic Majesty not to construct or allow to be constructed any work on the Blue Nile, Lake Tana, or the Sobat, which would arrest the flow of their waters except in agreement with His Britannic Majesty's Government and the Government of Sudan".³⁹

Under this agreement, Emperor Menelik entered into an obligation "not to construct or allow to be constructed" structures that would arrest the flow of the waters of the Nile. The assurance was given that no unilateral and complete "stoppage" of the Nile would occur before a mutually acceptable agreement was reached. According to the Amharic⁴⁰ version, as long as Menelik did not "stop" the flow of the waters, except in agreement with the Government of Sudan, Egypt could not claim any rights from this agreement. This was one of the most controversial treaties regarding the River Nile issue.

According to Caponera, the 1902 agreement was never ratified by Ethiopia⁴¹. It is also maintained that the British could not claim any rights from the treaty as they had subsequently refused to recognize the sovereignty of Ethiopia.

Contrary to Egypt's and Sudan's continuing recognition of the 1902 Anglo-Ethiopian Treaty, Ethiopia has made it clear, time and again, that the treaty is obsolete and does not prevent it from using its share of the waters of the Nile. Ethiopia's position or arguments (with regard to the 1902 treaty) were based on the following points:

- The treaty was signed with a colonial power that no longer existed;

³⁸ Article III, 1902 Agreement.

³⁹ Amharic is a semetic language widely spoken in Ethiopia.

⁴⁰ Waterbury, J.: "Legal and Institutional Arrangement for Managing Water Resources in the Nile Basin", Vol.3, No.2, 1989, p. 94

- Unlike the English version, the Amharic version of the treaty obligated Ethiopia only to Great Britain, not to Sudan, and
- Even if the treaty was assumed to be currently applicable, it only obligated Ethiopia "not to arrest", that is, not to fully stop the flow of the tributaries of the Nile (specifying that no dam should be built across the Blue Nile, Lake Tana, or Sobat, that might impede the flow of the Nile.

3.1.3 The 1906 Tripartite Treaty

On December 13th, 1906, the agreement between Great Britain, France and Italy was signed in London. This agreement was signed without consulting Ethiopia. In Article IV of this agreement, the three colonial powers agreed to act together and to safeguard the interests of Great Britain and Egypt in the Nile Basin, more particularly as regards the regulation of the waters of that river and its tributaries (due consideration being paid to local interests) without prejudice to Italian interests.⁴² Emperor Menelik II of Ethiopia immediately notified the contracting parties that he rejected the agreement. The Emperor stated:

"But let it be understood that this arrangement in no way limits what we consider our sovereign rights."⁴³

In effect, the Emperor's rejection of this agreement was a revision, if not a total recall, of the May 15th, 1902 treaty between Ethiopia and Great Britain. This so-called tripartite treaty was considered by Ethiopia to be a sinister colonial ploy directed against the sovereignty of Ethiopia.

91 Okidi, C.O.: "History of the Nile & Lake Victoria Basins through Treaties", In Howell, P.P. & Allan, J.A. (eds), The Nile: resources evaluation, resource management and hydropolicies & legal issues London School of Oriental and African Studies & The Royal Geographical Society, 1990, pp. 193-224.

92 Tilahun, W.: Egypt's Imperial Aspirations over Lake Tana and the Blue Nile, United Printers Ltd., Addis Ababa, 1979, p. 75.

3.1.4 The 1925 Anglo-Italian Exchange of Notes

In November 1919, recognizing Great Britain's interest in Lake Tana, Italy made concessions to Great Britain, and offered assistance to help it obtain (from Ethiopia), a concession to construct a barrage (dam) on Lake Tana. The 1925 Anglo-Italian conspiracy against Ethiopians concocted as a result of Britain's continued efforts to pursue its interests in controlling the headwaters of the Blue Nile. When Britain realized that it could not succeed in obtaining a concession directly from Ethiopia, it pursued its objectives indirectly through Italy. As a result of the Anglo-Italian discussions, Great Britain accepted Italy's offer and subsequent Anglo-Italian negotiations produced an agreement in the form of an Exchange of Notes. These notes included statements that bound the Italian Government to:

"Recognize the prior hydraulic rights of Egypt and the Sudan ... not to construct on the headwaters of the Blue Nile and the White Nile (the Sobat) and their tributaries and affluents any work which might sensibly modify their flow into the main rivers."⁹³

This Anglo-Italian agreement was an attack on its sovereignty, and on June 15th, 1926, the Ethiopian Government dispatched notes to the British and Italian Governments. The note dispatched to the British Government contained an additional paragraph, which read in part:

"The negotiations would have been concluded with us. We would never have suspected that the British Government would come to an agreement with another government regarding our lake."⁹⁴

At Ethiopia's request, both the British and the Italian Governments explained their actions to the League of Nations, but denied challenging Ethiopia's sovereignty over

93 Ibid 91

94 Ibid 94

Lake Tana.⁹⁵ The British and Italian ploy was effectively challenged and the agreement never materialized.

3.1.5 The 1929 Nile Water Agreement

On May 7th, 1929, an exchange of notes took place between the Egyptian Prime-Minister, Mohammed Mahmoud Pasha, and the British High Commissioner, Lord Lloyd, who was acting on behalf of Sudan. This exchange became known as the 1929 Nile Water Agreement. By virtue of this agreement, Egypt recognized the Sudan's right to water adequate enough for its own development, as long as Egypt's "natural and historic rights" were protected. According to this agreement:⁹⁶

- Egypt's share was 48 billion cu.m. (BCM), whereas that of Sudan was 4 BCM;
- The entire seasonal flow of the Nile River, vital for winter crops, was reserved for Egypt;
- Egypt assumed the right to monitor upstream flows;
- Egypt assumed the right to undertake projects without the consent of upstream states, and
- Egypt assumed the right to veto any construction projects that would affect its interests adversely.

The imbalance of this treaty is evident, as it favours Egypt over the remaining riparian states. Thus, this agreement was made mainly to secure the Nile water for Egypt by limiting the rights of Sudan and by rejecting those of the remaining riparians. Ethiopia in particular did not recognize the validity of the agreement, nor did it ever accept Egypt's claim to acquired or historic rights. Moreover, as the

95 Ibid 94

96 O'Cannel, D.P.: State Successions in Municipal Law & International Law ,Cambridge University Press, Cambridge, Vol. II, 1967, p. 247,

agreement was signed between Egypt and Britain, it could not have a binding effect on Ethiopia. According to the principle of treaty making, an agreement made between two parties cannot have a binding effect on a third party without its consent. Other riparian countries have also questioned the validity of the 1929 agreement and had eventually repudiated it after attaining independence. After independence, Sudan criticized the agreement as having been motivated by Great Britain to maintain good relations with Egypt at the expense of Sudan's interest.

It formally repudiated the agreement in 1959 on the argument, inter alia, that "economic and technical development since 1929 had rendered these provisions obsolescent".⁹⁷ Among the riparian states, Uganda, Tanzania and Kenya did not consider themselves bound by the 1929 treaty. The 1929 agreement became a base for the next agreement, called the 1959 Nile Water Agreement. This was a bilateral agreement and opened a door for Egypt and the Sudan to acquire rights to the resources of the Nile and for the full utilization of its waters.

3.1.6 The 1932 Anglo-Egyptian Agreement for the Construction of the Jebel Awliya Dams

This agreement was concluded in 1932 between Egypt and Britain for the benefit of farmers. The agreement allowed Egypt to regulate the flows of the White Nile, primarily to supply enough water for its winter crops by constructing a regulation dam at Jebel Awliya (upstream of Khartoum). The agreement was a direct derivative of the 1929 Nile Water Agreement. In 1952 a supplementary document was signed between the two parties to increase the capacity of the Jebel Awliya reservoir by raising the height of the dam. Raising the height of the Sennar dam and the construction of another dam (both in Sudan) were also included in this supplementary agreement. In this agreement, the parties undertook to revise arrangements for the operations of the dam whenever other dams or installations

⁹⁷ Ibid., p. 247.

became operative. This would coordinate the operation of control in the basin pursuant to a general recognition of the unity of the Nile Valley.

3.1.7 The Anglo-Belgian Treaty of 1934

On November 22nd, 1934, an agreement⁹⁸ was signed in London between Great Britain and Belgium. This treaty addressed the distribution of the waters of the Kagera river in the colonies of Tanganyika and Ruanda-Ulundi (now Rwanda and Burundi). The treaty stipulated that water withdrawn from the Kagera basin in one territory ought to be restored back before entering another territory. This treaty had two unique features:⁹⁹

- It allowed restricted use by the upstream riparian territory, but it is not clear what percentage of water abstracted was expected to be restored, or whether consumptive water use was allowed at all, and
- Unlike the majority of Nile treaties, it had no direct objective to protect the interests of Egypt or the Sudan.

The 1934 Anglo-Belgian treaty, in general was relatively accommodating towards Belgium's interest to utilize the Kagera river and its tributaries. With all the water potential of the Congo river at its disposal, Belgium had no or little need for the Semiliki and Isango rivers. Rwanda-Burundi, however, had no alternative water resources other than those of the Kagera basin.

3.1.8 The 1949 Owen Falls Agreement

After months of intense negotiations, Egypt and Great Britain exchanged notes on May 30th and May 31st, 1949, in which they agreed to cooperate in the construction of the Owen Falls Dam on Lake Victoria, and to initiate other water projects in the

98 Text in the United Nations Legislation texts and treaty provisions concerning the utilization of international rivers for other purposes than navigation, New York, 1963, p. 27.

99 Ntambirweki, J.: "Colonial treaties and the legal regime of the Nile Valley: Re-thinking the legal framework into the 21st century", paper presented at the 4th Nile 2002 Conference, Kampala, Uganda, 1996.

Nile, in Equatorial. The construction of the Owen Falls dam had the following purposes:

- To generate hydro-electric power in British Uganda, and
- To use Lake Victoria as a storage reservoir for the benefit of Egypt.

The agreement provided provisions for Egypt's financial contribution for the construction of the dam and the commitments Egypt had to make to compensate the Uganda Electricity Board for the loss of hydro-electric power incurred as a result.

- The Uganda Electricity Board assumes the overall responsibility of the construction of the dam;

As an extension of the Owen Falls Agreement, Egypt and Great Britain also agreed in February 1950, to cooperate in hydrological and meteorological surveys to be undertaken inside Ugandan. As a result of this agreement, the Owen Falls Dam was completed in 1954.

3.1.9 The 1959 Nile Waters Agreement between Egypt and Sudan

The 1959 agreement was concluded between Egypt and Sudan to the total exclusion of other Nile riparian states. It was not Sudan's concern, but mainly Egypt's that gave an impetus to the 1959 bilateral agreement. This agreement gave a chance for full control and utilization of the annual Nile flow. In 1950 Egypt planned the Aswan High Dam Project to store the entire annual flow of the Nile waters. Before implementing this project, Egypt realized it was important to seek a guarantee from the Sudan and obtain international recognition for the financing and technology of the dam. "By 1955 all that stood in the way of beginning construction of the Aswan High Dam were the problems of hard currency funding and the need to reach an agreement with the Sudan in allocating the Nile waters."¹⁰⁰

100 Waterbury, J.: Hydropolitics of the Nile Valley, Syracuse University Press, New York, 1979. p. 102 .
81

In addition, Sudan argued that its population was about 12 million-half that of Egypt. Sudan also rejected the education of Aswan storage losses when calculating the allocation. Accordingly, Sudan claimed 15 BCM for itself, limiting Egypt's net share (after deducting the 10 BCM for evaporation losses) to 59 BCM. Sudan further claimed that irrigating 5.5 million acres (about 2.22 million ha) of land would require 44 BCM of Nile river waters (equivalent to 35 BCM, as measured at Aswan).¹⁰¹ The debate over the claims delayed the agreement, but whether or not Sudan agreed, the construction of the Aswan High Dam was seen as a development priority for Egypt. One way or another, the Sudan had to come to commit itself to the agreement. Finally, on November 8th, 1959, the agreement for the full utilization of the Nile Waters was signed between Egypt and the Sudan. Both countries are not contributors of the Nile; but only users. This agreement was signed without inviting other riparian states to join the debate and parts of the agreement. The 1959 agreement contained the following most important points:

- The acquired rights of Egypt and Sudan are 48 BCM and 7 BCM, respectively.
- The controversy regarding the quantity of the average annual Nile flow was settled and agreed to be about 84 BCM measured at the Aswan High Dam in Egypt.
- The agreement granted Egypt the right to construct the Aswan High Dam. This dam could store the entire annual Nile River flow.
- The agreement also granted to the Sudan the right to construct the Rossaries Dam on the Blue Nile, and to develop other means of irrigation and hydro-electric power stations until it fully utilized its Nile share.
- The average annual storage losses due to evaporation and other factors were estimated to be about 10 BCM. This quantity would be deducted from the yield of the Nile river before allocation.

101 *Ibid*, p. 103.
82

- Sudan, in agreement with Egypt, would construct projects that would increase the yield of the Nile river by preventing losses in the swamps of the White Nile river. The cost and any increase in net yields from these projects would be divided equally between them. If claims came from the remaining riparian states over the Nile water resource, both Sudan and Egypt would respond together.
- If the claims persisted and the Nile waters had to be shared with another riparian state, Egypt and Sudan would jointly consider these claims and reach a unified position. If their position included allocating a portion of the Nile waters to one or more riparian states, that allocated portion would be deducted from Sudan and Egypt's shares.
- A permanent joint technical commission was to be established to ensure the technical cooperation between the two countries.¹⁰²

When the agreement was signed, most of the upper White Nile riparian countries were under British or Belgian colonial rule with the exception of Ethiopia. The two colonial powers spoke for their colonies whenever a Nile-related issue was raised. Regarding the 1959 Nile Water agreement, Great Britain sent notes in August 1959 to Egypt, Sudan, Belgium and Ethiopia, in which it reserved rights for its last African colonies. The following statement was made by the British regarding this issue:¹⁰³

"Their position must be safeguarded, and His Majesty's government have informed the government of Egypt and the Sudan that they formally reserve the right to negotiate for a fair share of the waters of the Nile for these territories at the appropriate time. ... in the face of these formal reservations, there is no reason why

102 Collins, R.O.: The Waters of the Nile: Hydropolitics and the Janglei Canal, 1900-1988 Oxford, 1990, pp. 400-413.

103 Tilahun, W.: Op cit. p. 44.

any increase in irrigation purporting to appropriate water to which these territories have a legitimate claim should be protected under international law as established users."

Great Britain's opposition to the 1959 agreement was reinforced by its call in the same year, for "an international conference to assure the rights of all riparian states, and to set up an international Nile waters authority, of which the United Kingdom would be a member."¹⁰⁴ As the agreement did not include other riparians, Ethiopia in particular, (both during the negotiations and at the conclusion of this agreement) had rejected its validity, while the 1929 agreement clearly stipulated the long-standing position of Egypt on the principle of "acquired rights" or "priority of appropriation" of the Nile waters; the 1959 agreement made a clear departure from its predecessor by abandoning the use of the term 'acquired rights'. "Only in the 1959 agreement did Egypt distance itself from the long held position of absolute territorial integrity and accepted the principle of more equitable allocations of water."¹⁰⁵

The 1959 agreement had implicitly accepted the evolving principle of equitable utilization by recognising the right of the Sudan to 18.5 BCM of water.¹⁰⁶ In practice, however, Egypt's use of the Nile waters still reflected its adherence more to absolute territorial integrity than to equitable utilization.

The 1959 agreement is regarded by many as the most important to date, despite the fact that it did not include the other riparian states. In essence, this agreement was the last Nile Waters agreement before the end of colonialism in that part of Africa.

104 Waterbury, J.: *Op cit*, p. 72.

105 Kliot, N.: *Water resources and Conflict in the Middle East*, Routledge, London & New York, 1994, p. 51.

106 *Ibid.*, p. 51

3.2 Post-Colonial Era Agreements

The 1960s were characterized by the emergence of newly independent states and the beginning of a new era in the continent. Among riparian countries of the Nile (all being former British colonies), Tanzania became independent in 1960, Uganda in 1962, Kenya in 1963 and the Congo (DRC) in 1960. The other two former Belgian colonies: Burundi and Rwanda also got their independence in 1962. These countries inherited unfair and unbalanced agreements and treaties which were concluded on their behalf by colonial powers and other third parties. In this respect, no Ethiopian Government recognized the various treaties including the 1959 one. This non-recognition of the colonially inspired treaties was also shared by other upstream riparian states, particularly Tanzania, where Julius Nyerere (the first president of Tanzania) repeatedly dismissed the treaties as nil and void and non-binding. Ethiopia has always been consistent in its position regarding the utilization of the waters of the Nile for irrigation and hydro-power generation.

This section highlights and examines some of the few agreements signed after the demise of colonialism and presents some important international cooperative efforts in post-colonial Nile Basin.

3.2.1 The Janglei Canal Project Agreement of 1974

The Egyptian Government formulated a century storage scheme in 1940 for the development of the Nile, which was calculated based on the future needs of Egypt and the Sudan.¹⁰⁷ This project was realised within the framework of the permanent joint technical committee established under the Nile Water Agreement of 1959. This century storage scheme (CSS) was a plan to build an over year flow regulation structures throughout the Nile River Valley. Lake Victoria was to be used as a major over-year storage reservoir, with Lake George and Lake Tana supplementing it. Lakes Kyoga and Albert would operate in tandem with Lakes Victoria and George to

¹⁰⁷ Hurst, Black & Simaika, *The Future Conservation of The Nile*, Cairo, 1946, Vol. VII.

regulate the discharge into the Victoria Nile and the Bahr Jebel. The main purpose of the century storage scheme was to transport the regulated flow of the upper White Nile River through the great swamps of the Sudd, as Waterbury explained:

"Half the total discharge of the Bahr El Jebel, or some 14 BCM, are herein lost through evaporation each year. Over-year storage at Victoria would go for nought if the additional stored water could not be delivered through the swamps. Total losses due to evaporation in the swamps, and comprising the spill-over of all the main White Nile tributaries (Bahr El Ghazal and The Sobat) is on the average 40 BCM per year. The problem therefore was to cut a channel through or a diversionary canal around the swamp ... excavating a canal, known as the Jonglei, to take off north of Juba at Ber and to skirt the swamp to the east for some 280 km, delivering its discharge to the Nile at Malakal. The Egyptian sought approval for this scheme as early as 1938."¹⁰⁸

This was how the Janglei Canal came in to operation. The proposed canal would have a capacity of 55 million cu.m (MCM) per day and would make an additional 7 BCM of water available in downstream countries during the low flow months (December to July). The canal plan was circulated and revised throughout the 1940s and 50s, without any practical steps being taken. One of the tasks of the permanent Joint Technical Commission (formed by the 1959 agreement), was to proceed with the planning of the construction of the Janglei Canal; but it was not until 1974 that Egypt and Sudan agreed to share the cost of building the canal. The contract was awarded to a French consortium. The canal's channel would be 52 m. wide and 4 m. deep. When completed, it would be 362 km long, twice the length of the Suez Canal. In 1978, construction work began despite opposition from various quarters, e.g. environmental, political, local and international groups. In 1982, construction ceased due to the civil war in Southern Sudan, and the fate of the Janglei Canal remains uncertain.

108 Waterbury, J.: Hydropolitics of the Nile Valley, Syracuse University Press, New York.,1979, p. 89-90.

3.2.2 The 1993 Ethio-Egyptian Framework Agreement

The framework for general cooperation between Ethiopia and Egypt was signed on July 1st, 1993, in Cairo. The agreement was neither a binding nor has it settled all the disputes between the two countries; though it has symbolic value. The significance of signing the document is that it represented the first attempt by the two sides that they should tackle the very serious challenge of them. In the agreement, five of the eight articles directly addressed the Nile river issues.

They were:-

Article 4: The two parties agree that the issue of the use of the Nile waters shall be worked out in detail through discussions by experts from both sides, on the basis of the rules and principles of international law.

Article 5: Each party shall refrain from engaging in any activity related to the Nile Waters that may cause "appreciable harm" to the interests of the other party.

Article 6: The two parties agree on the necessity of the conservation and protection of the Nile waters. In this regard they undertake to consult and cooperate in projects that are mutually advantageous, such as projects that would enhance the volume of flow and reduce the loss of Nile waters through comprehensive and integrated development schemes.

Article 7: The two parties will create an appropriate mechanism for periodic consultations on matters of mutual concern, including the Nile waters, in a manner that would enable them to work together for peace and stability in the region.

Article 8: The two parties shall endeavour towards a framework effective cooperation among countries of the Nile Basin for the promotion of common interest in the development of the basin.¹⁰⁹

Egypt tried to use the word "appreciable harm" as a blocking mechanism to prevent Ethiopia from implementing various projects on the Blue Nile (or on other

¹⁰⁹ The Ethio-Egypt Framework of Cooperation, Cairo, 1993.

tributaries). They insisted on not doing anything to the Nile that would do "appreciable harm" to the other side. Egypt considered the Nile as its private property, and continued with new projects, e.g. the Tochka Canal. The canal was designed to irrigate 500,000 acres without consultation with other riparian states. In general the 1993 agreement opened a new chapter in Ethio-Egyptian relations and created a better understanding vis- á -vis the Nile. This was the beginning of an era of reduced tension in the Nile Basin. Ethiopian Prime Minister Meles Zenawi said in an interview with Pan-Arab-Al-Hayat:

*"What we need is to basically treat the Nile Basin as a single region and a shared natural resource. If we deal with the issue of the Nile on that basis, then we can discuss and agree a framework that allows the countries along the Nile to find the best ways of exploiting its water to the maximum."*¹¹⁰

On several occasions Ethiopia attempted to induce Egypt to cooperate in sharing the water resources of the Nile equitably. So far Egypt has pursued the motto of "acquired rights" on the utilization of Nile waters. The 1993 agreement could be considered as a sign of positive trend which opened the way for dialogue and partnership,. In other words, it gives rise to cautious optimism amongst Egypt, Ethiopia and others.

3.2.3 The Ethio-Sudanese Agreement regarding the Nile

Throughout history Ethio-Sudanese relations have never been cordial or stable. There were many years of mutual distrust and cold diplomatic relations. On December 23rd, 1991, Ethiopia and Sudan issued a joint peace and friendship declaration in Khartoum. In this declaration, Ethiopia and Sudan agreed that they "believe in a firm, equitable entitlement to the uses of the Nile waters without

¹¹⁰ Pan-Arab-Al-Hayat interview with Ethiopian Prime Minister Meles Zenawi, May 1998.

causing appreciable harm to one another".¹¹¹ In the declaration, both sides agreed to work together to establish a Nile Basin Organisation. A similar agreement was signed in December 1992 between Ethiopia and the Sudan as a result technical advisory committees were formed. Bilateral meetings and contact between the respective national committees were held regularly.

3.2.4 The Lake Victoria Agreement of 1994

Problems associated with pollution, water quality, entrophication, the introduction of alien species and the consequent loss of indigenous species were some of the items on the agenda that required joint action. Practical measures were taken and two separate agreements were signed in 1994 (independent of the tecconile initiative) by Kenya, Tanzania and Uganda regarding Lake Victoria. On June 30th 1994, these countries adopted "The convention for the establishment of the Lake Victoria Fisheries Organization (LVFO)". After its establishment, LVFO, was supposed to coordinate the fisheries policies and legislation among member countries. It was also to enhance the conservation of Lake Victoria and its basin. The other document, known as the agreement on the "preparation of a tripartite environmental management programme (UNEP), was signed by the three countries on August 5th, 1994. It was envisaged that this agreement would launch a programme for the cooperation (by the signatories) in the management and conservation of the resources of Lake Victoria. The successful implementation of these agreements to save Lake Victoria may initiate similar collaborative actions in other sub-basins of the Nile. UNEP's recent recommendation to embark on a diagnostic study of the Nile Basin was another step forward in this direction.

111 Waterbury, J.: "Waters of the Nile" Ethioscope Vol.1, No.1, 1994.

4. Basic Principles Applicable to the use of International Water Resources

4.1 Basic Principles on International Rivers

International codification efforts to develop rules applicable to international rivers are of recent origin. The earliest attempts were made by the International Law Association (ILA), a non-governmental organisation. During its 52nd conference held in Helsinki in August 1966, the ILA adopted rules which set guideline principles on the use of international water resources. Although the Helsinki rules do not have a binding effect, they have contributed significantly to subsequent codification efforts, particularly by the International Law Commission. The basic principle laid down in the Helsinki Rules on the transboundary waters was that they have to be shared equitably and reasonably among the riparian countries. In order to determine an "equitable and reasonable sharing", certain factors, though not exhaustive, were listed in the same set of rules.

The Helsinki Rules, as they were first adopted by the ILA in 1966, explicitly recognised the principle of "equitable utilization". However, they did not contain any clause imposing a duty on the riparian states not to cause "appreciable harm". This duty was included twenty years later in the ILA's 62nd session, held in Seoul, 1986. This could explain why the Helsinki Rules mainly favoured the principle of "equitable utilization" over the "no harm" rule. A major effort towards the codification and progressive development of the rules of international law (governing the non-navigational uses of international watercourses) was made by the International Law Commission in 1971 upon the recommendation of the United Nations General Assembly. After 25 years of intense research, the Commission finalised its studies in Geneva in the summer of 1994. These studies addressed the

non-navigational uses of international watercourses. The findings and recommendations were submitted to the 51st session of the General Assembly. Recently a substantial part of draft articles were approved, with the exception of a few articles requiring further examination.

The most important component of the Helsinki Rules is equitable distribution. Equity does not mean distribution by equal shares, however, by "fair shares", which are determined by the following factors:

- The topography of the basin, in particular the size of the river's drainage area in each riparian state;
- The climatic conditions affecting the basin in general;
- The precedents for past utilization of the waters of the basin, up to present-day uses;
- The economic and social needs of each basin state;
- Population factor;
- The comparative cost of alternative means of satisfying the economic and social needs of each basin state;
- The availability of other water resources to each basin state, and
- The avoidance of undue waste and unnecessary damage to other riparian states.

Compared to the 1966 Helsinki Rules, the 1994 draft articles of the International Law Commission are more elaborate and comprehensive. Unlike the Helsinki Rules, they include a provision for environmental issues. Since they are relatively new, the draft articles are quoted directly in part II, "General Principles"¹¹²

Article 5 expressed the entitlements of a watercourse state, within its territory, to an equitable and reasonable use of an international watercourse. "This right is an

¹¹² The Law of the Non-navigational Uses of International Watercourses, UNGA, A/CN.4/L 493, 12 July 1994
91

attribute of sovereignty and is enjoyed by every state whose territory is traversed or bordered by an international watercourse".¹¹³

Article 6 provided the factors which should be taken into account in order to determine an equitable, reasonable and optimal utilization. Such factors, though not exhaustive, comprise various elements e.g.: the population, climate, alternative water supplies, hydrology, technology in use, development stage and economic needs of the region. The source of a state's rights of equitable utilization depends on the factors and circumstances of each individual case, and especially on weighing all relevant factors. In the application of Article 5 (or paragraph 1) of this article, the watercourse states concerned should, when the need arises, enter into consultation in a spirit of cooperation. Another important article in the draft is the obligation of states to exercise diligence in their utilization of an international watercourse in such a way as not to cause significant harm to other watercourse states.¹¹⁴ The new draft has made considerable change in the concept of degree of harm from "appreciable harm" in the previous draft to "significant harm". This change is very important in that it raised the level of accountability of an upper riparian state, which may cause damage to a lower riparian state from "appreciable harm" to "significant harm". Through such a change, it has been recognized that the damage caused to the lower riparian state should be "significant".

Concerning the two principles, the draft clearly showed its preference for "equitable use" to "significant harm". Some have even argued on making "equitable" the sole criterion for use by deleting "significant harm". The final draft, however, although giving priority to "equitable use", has tried to maintain a delicate balance between the two concepts. If a certain use of water of an international watercourse by an

113 The Law of the Non-navigational Uses of International Watercourses, UNGA, A/Cn. 4/L 493, 12 July 1994. p. 28.

114 Article 7 (1) of the International Law Commission's Draft Framework Convention.

upper riparian state causes significant harm on the lower riparian state, there is an obligation on such states to enter into consultation on the question whether the planned use was equitable, on ad hoc adjustments to the project and, where appropriate, on the question of compensation.¹¹⁵ The problem in the Nile Basin, is the reluctance to recognise the basic principles of international law which have gained universal acceptance, and which have been applied by almost all other international river systems in the apportionment of water rights.

As far as the Nile is concerned, there is no single legal statement or agreement which acknowledges that all the co-riparian states have rights to its water resources or that these rights are limited in any way and are guided by the principle of trust and equitable water sharing.¹¹⁶ The draft law of non-navigational uses of international watercourse prescribed a general obligation on co-riparian states to participate in negotiations and consultations. More than ever before, there is an urgent need for redistribution of the Nile waters of today as the existing utilization is grossly unjust and ignores the legitimate rights of other riparian states. The status quo should not be allowed to continue, as it does not promote cooperation among the Nile states for the optimal utilization of their untapped resources. There is an imperative need for negotiation on the utilization of the Nile to avoid a potential crisis arising from separate actions instituted by every riparian state.

4.2 "Equitable utilization" versus "Historical rights" in legal terms

As in many parts of the world, the end of the Cold War Era brought relief to the Nile Basin region. The danger of confrontation seems less acute and the current level of cooperation is indeed remarkable. Due to this and other factors, Egypt can no longer maintain the status quo and monopoly over the Nile waters. However, despite the

115 Article 7 (2) of the International Law Commission Draft Framework Convention.

116 Klot, N.: Water Resources and Conflict in the Middle East Routledge, London & New York, 1994. p. 51.

shift from confrontation to cooperation in the relations among some riparian states of the basin others still persist in their firm position by denying the legitimate right of other riparians to an equitable use of an international watercourse. This creates an obstacle for any meaningful negotiation on the waters of the Nile. The demands of Egypt concerning the Nile are not only limited to satisfying their interests. Egypt will not be satisfied just to ensure its water needs, but would like to have full control of the Nile waters within its territory, which leaves no room for negotiation with upper riparian states.

The role of the international community (and in particular the World Bank and the International Monetary Fund (IMF)), is encouraging and supports the process of negotiation on the use of the Nile waters. Some hard and fast rules should be set for the financing of projects that affect international watercourses. The international community should be urged to make a positive contribution to facilitate negotiation and to promote the positive application of the basic principles of international law in the distribution of water resources among riparian states of the Nile. They should encourage negotiation and refrain from giving unreserved support to states which may block any effort for a water-sharing arrangement between the watercourse states of the Nile.

The basic understanding reached between Ethiopia and Sudan on application of the principle of "equitable utilization" and duty not to cause "appreciable harm" is encouraging. Also Ethiopia and Egypt have agreed to abide by the principles of International Law. This constitutes a framework for cooperation by which the three countries negotiate on the equitable utilization of the waters of the Nile. The negotiations of the three countries on the eastern Nile sub-basin level has progressed well.

CHAPTER IV

THE NILE BASIN COUNTRIES: FROM CONFRONTATION TO COOPERATION - A NEW TREND/PERSPECTIVE

This chapter will examine the existing obstacles impeding the development of the Nile Basin. Development issues concerning the Nile Basin will be followed by a discussion of the recent measures taken to forge cooperation between the Nile riparian countries. Some plausible solutions will also be suggested which seem to be accepted by all countries along the basin.

1. Factors hindering cooperation in the Nile Basin

There are several factors which hindered genuine cooperation in the past. The main factors can be summarised as follows: Firstly, the continuous reluctance of the downstream states, especially Egypt, to engage in an open negotiation process on the equitable distribution of the waters. Egypt was particularly reluctant to involve major upstream states (such as Ethiopia) in its water management regimes despite Ethiopia's substantial contribution to the in-flow of the waters. Secondly, the divergence of views among the riparians on how to use the water taking into account their contributions and demands. Egypt, for example, argued that the absence of sufficient data and information was an obstacle to any negotiation on the sharing of the waters of the Nile. Therefore they distanced themselves from the key issues of the river. Thirdly, the biased treatment of international agencies and donor countries has also adversely affected the bilateral as well as the multi-lateral relationships among the riparian states. The former Soviet Union at one point gave a substantial amount of financial assistance for the construction of the Aswan High Dam which has greatly increased the irrigation capacity of Egypt and to a certain extent made this country the only beneficiary of the water at the expense of others. The African Development Bank, on the other hand, denied a loan to Ethiopia that was aimed at

harnessing the Blue Nile (Aleltu Hydro-electric Project) as Egypt managed to have the loan blocked using its economic and political leverage.¹¹⁷

The lending policy of the World Bank also calls for a 'no objection stance' by co-basin states for projects submitted to the bank by one of these countries. Although the operational directive of the bank requires the consent of all the affected riparians before releasing funds for water projects, the condition in the Nile Basin is such that the downstream countries are consulted for projects undertaken in the upstream countries for a 'no objection statement', while the upstream countries are not consulted on projects undertaken in the downstream countries. For example, the Ugandan Government was instructed by the World Bank to obtain a permit from Egypt in order to secure a loan for the hydraulic works in Lake Victoria.¹¹⁸ Lastly, civil war and political instability in most of the countries have often changed the political climate of each state, and made it extremely difficult to achieve long-term basin cooperation. In the 1970s and 1980s Ethiopia was, for example, in a continuous civil war, that rendered the development and cooperation of the Nile almost impossible. Likewise, due to the ongoing civil war the Sudanese Government is not in a position to participate in any major cooperative schemes of the Nile.

2. Common Challenges

The Nile Basin countries face colossal challenges concerning their future water resources development. These challenges present themselves in terms of complex social, economic, political, nature-related problems, which call for holistic and integrated approaches. These countries must tackle these challenges so as to contribute to the development of the basin for the benefit of all riparians.

117 Tafesse, T.: *Hydropolitics of the Nile Valley: Retrospect & Prospect*, Addis Ababa University, 1997, p. 8

118 ¹¹⁸ *Ibid.*, p. 8.

The key challenges in the Nile Basin are the following:-

Population growth: The population has doubled between 1960 and 1990 and will grow almost five-fold between 1990 and 2025. The population of the Nile Basin is estimated by the World Bank to exceed 600 million in 2025. Rapid urbanization places the environment under excessive pressure. On the other hand, the increasing number of people, the demand for more water is also inevitable.

Aridity: It is a phenomenon of permanent shortages of water caused by a dry climate. Much of Kenya, Sudan and 61 % of Ethiopia and all of Egypt are arid. The arid zones in each of the countries require water obtained through technological means from the Nile or otherwise.

Drought: There are cyclical occurrences of dry seasons. Drought has been catastrophic in many parts of the countries. Experts believe that the major drought cycle in Ethiopia occurs every ten (sometimes less) years. To a certain degree, all Nile Basin countries have been affected by drought. The effects of drought can only be mitigated by utilizing available water in the river systems.

Desiccation: This is the drying up of the landscape. In particular soil desiccation can result from activities such as deforestation, overgrazing, over-cultivation, soil erosion etc. Presently much of the 39 % highlands of Ethiopia have been affected by desiccation. The inhabitants of the desiccated areas tend to migrate to the river valleys in the lowland areas where river water resources are available.

These factors have created scarcity of water. In the Nile Basin countries find themselves threatened by the ever -increasing water scarcity. The Nile Basin is one of the most problem-ridden regions of the world.

To be more specific, half of the riparian countries are among the world's ten poorest countries. Yet the Nile holds great potentials to foster economic development. This could be attained through power generation, food production, industrial development, environmental conservation and other related development activities. In order to realize this potential, the Nile Basin countries have come to recognise that they must take concrete steps to address these challenges and that cooperative development holds the greatest prospect of bringing prosperity to the whole region.

An earnest effort at breaking the current impasse over the Nile should begin by removing the current psycho-political obstructions to dialogue and by taking considering the commonalities into consideration. There is widespread poverty and high dependence on agriculture. The riparian states are unable to feed themselves, from domestic produce or afford to import food. The majority of riparian states don't have financial capacity to start large-scale engineering works, including water projects. This has geared the Nile Basin states towards setting in motion various forms of cooperation. As shown in this paper, poverty is the ultimate cause and the main source of mistrust and conflict in the region. Alleviating poverty is not only morally right; but also essential for meaningful and effective basin-wide cooperation. The common challenges which all riparians face is making their neighbours and co-basin partners to reach a satisfactory solution.

Recent attempts to establish mechanisms for basin-wide or sub-basin cooperation may bring this stalemate to an end. A fresh start and bold measures should be taken to face the current and future challenges by correcting past mistakes. Charting new courses would enable all the riparians of the Nile Basin to be full participants in the use and development of their common water resources.

3. The evaluation of a cooperative spirit in the Nile Basin

With the aim of forging cooperative agreements on a variety of issues, various attempts have been made to establish a number of Nile based organizations in the last thirty years. The main task was to bring all the countries of the Nile Basin under one umbrella towards sustainable development of their shared water resources. It started with the Hydromet, and still continue with the Nile Basin Initiative Effort. This section is a review of these important developments which paved the way for mutual (upper stream and down stream) countries benefit and practical cooperation.

3.1 The Hydromet Survey Programme

The Hydromet Programme (the Hydro-meteorological Survey of Lakes Victoria, Kyoga and Albert) began in 1967 with a two-year preparatory phase, during which the East African Nile Waters Coordinating Committee negotiated the financial and logistical arrangements with the United Nations Development Programme (UNDP) and the World Meteorological Organization (WMO).

After gaining independence, the upper basin states of East Africa called for an intensification of cooperation among the Nile Basin states. The control of regulation of the equatorial lakes in the Nile River system would offer several advantages bearing on the economic development of all the basin states. These advantages included possible schemes for irrigation to realize agricultural growth; to start the swamp reclamation to institute hydro-electric generation; to assist the development of transportation, fisheries, recreation and to rationalize domestic and industrial utilization. These possibilities were emphasized by the unprecedented overflow of the lakes in the early 1960s, with consequent flooding and submersion of the shorelands. For Lake Victoria, the annual level started rising in November 1961 and reached its peak with a maximum rise of two and a half metres in May 1964. The problem was to establish the course of this development. Lack of adequate data

appeared to be a stumbling block for any analysis. This necessitated a hydrological survey of the Lake Victoria catchment and surrounding source areas of the waters of the Nile. Later, this led to the establishment of the Hydro-meteorological Project.

The long-term objective of the Hydromet was to develop and conserve the Nile Basin water resources. The short-term objectives were the establishment of a hydro-meteorological network for data collection and the development of a mathematical model to study the water balance of the upper Nile Basin. The Hydromet Programme was a broad-based effort to collect and analyze data on hydro-meteorological aspects of the upper White Nile drainage system. The original plan of operation was signed by the founding members; i.e. Egypt, Kenya, Sudan, Tanzania and Uganda in May 1967 and stated¹¹⁹:

"The objectives of the project are the collection and analysis of hydrological data of the catchments of Lakes Victoria, Kyoga and Albert in order to study the water balance of the upper Nile. The data collected and the study are expected to assist the countries in the planning of water conservation and development and to provide the groundwork for inter-governmental cooperation in the storage, regulation and use of the Nile."

The organization facilitated the data collection of the equatorial lakes. The objectives of the Hydromet failed to include the main players in the Nile Basin. For instance, Ethiopia could only join the Hydromet as an observer in 1971. In 1972 Burundi, Rwanda and Zaïre (the DRC) joined the programme as full members. The Hydromet was financed by the United Nations Development Programme for the first two phases until 1982 and later used their own resources until 1992. Most of the projects proposed by the Hydromet grouping were not realized.

119 Proceedings of the Meeting of t Ministers, 1992, p. 36.
100

M.M Tawfik, the last director of the Hydromet, stated that from 1962 to 1992, the Hydromet pursued its goals in five sets of five-year plans. The director pointed out the following objectives were achieved by Hydromet:¹²⁰

- A basin-wide hydro-meteorological network was established.
- A considerable amount of hydro-meteorological data was collected and analyzed.
- Quantitative and qualitative research and studies were conducted.
- A considerable number of national professionals were trained in the relevant specialized fields.
- Mathematical and water-quality models were developed to assist the participating countries in their development plans.

Considering the financial constraints it faced and the changing political climate in the region, Hydromet's achievements were indeed considerable. In addition, the Hydromet Programme was the first post-colonial regional forum for international cooperation in the Nile Basin; and its experiences are valuable for current efforts to promote sustainable development.

3.2 The UNDUGU Group

The UNDUGU Group (Brotherhood in Swahili) was formed in 1983 through the initiative of Egypt with the aim of protecting its permanent interest in the Nile Basin. The UNDUGU was an extension of the permanent Joint Technical Commission created by the 1959 agreement. This group consisted of Egypt, The Central African Republic, Sudan, Uganda and Zaïre (the DRC); Burundi and Rwanda joined later, and subsequently Kenya, Tanzania and Ethiopia began to attend the UNDUGU meetings as observers. The aim was to form a Nile Basin Economic Community.

¹²⁰ ¹²⁰ Ibid, p. 5-6.

Among other objectives, a possible power grid connection between the Inga Power Station in the DRC and the Aswan has been envisaged by UNDUGU.

At the request of Egypt and UNDUGU, the UNDP carried out a feasibility study to determine cooperation among these countries. Their first priority was for infrastructural development and the enhancement of commercial, exchanges. A draft memorandum aimed at firming up the legal basis for cooperation among the UNDUGU Group countries was prepared but not signed. The Technical Committee which was set up to examine the report, presented a draft memorandum containing a framework for cooperation (not including water and energy) to the 10th Ministerial Group in 1993. The main objectives of the UNDUGU grouping had been to forge cooperation in areas of infrastructure, environmental cooperation, culture and trade. The grouping was disbanded without achieving its aim. In conclusion, this group could not overcome the economical and political problems it encountered and is no longer active. The UNDUGU grouping was later succeeded by the forming of three more organizations: The Nile Basin Integrated Development (1988), the Technical Cooperation Commission for the Promotion and Development of the Nile (TECCONILE)(1992) and the Nile Basin Cooperative Framework.

3.3 The Kagera River Basin Organization (KBO)

At sub-basin level the Kagera River Basin Organization (KBO) was set up in August 1977 between three of the four basin states of the Kagera River, namely Rwanda, Burundi and Tanzania. The fourth state, Uganda, acceded to it later. A survey and a basin plan was carried out between 1971 and 1976 with the UNDP financing the studies for a major hydro-electric project at the Rusomo Falls with an installed capacity of 615 MW. This project was finalized through the Belgian Government's financial assistance. The KBO had to deal with virtually all the activities carried out in the Kagera River Basin.

These activities included: Water and hydro-power resources development; the furnishing of water and water related services for mining and industrial operations; the supply of drinking water; agriculture and livestock development; forestry and land reclamation; mineral exploration; disease and pest control; transport and communications; trade, tourism, wildlife conservation, fisheries and aquatic development; industrial development and the protection of the environment. The Kagera Basin Project, which was initiated in 1970, comprised two phases:

Phase 1 - Consisted of data collection and analysis

Phase 2 - Comprised mainly sectoral studies, pre-feasibility studies and the preparation of an indicative basin plan.

Its operations were directed by a Technical Committee consisting of the three member countries of the KBO. Since external support phased out in 1986, the KBO has shown limited activity. In general, an attempt was made to revitalize the KBO and to concentrate on a few specific projects to achieve more progress despite limited funds.

3.4 The TECCONILE

The Hydromet Survey Programme terminated in 1977; but the project office at Kampala continued to process data and to prepare and distribute annual publications for the member states. When the TECCONILE (Technical Cooperation Committee for the Promotion and Development of the Nile Basin) was established in 1992, the former Hydromet office served as the secretariat of the Committee. TECCONILE is the direct successor of the Hydromet Programme and its long- and short-term objectives were as follows:¹²¹

Long-term objectives

¹²¹ Proceedings of the Meeting of Ministers, 1992, p. 38.

- To assist participating countries in the development, conservation, and use of the Nile Basin water resources in an integrated and sustainable manner through basin-wide cooperation for the benefit of all, and
- To assist participating countries in the determination of the equitable entitlement of each riparian country to the use of the Nile waters.

Short-term objectives

- To assist participating member states in developing natural water resource master plans and in integrating them into a Nile Basin Development Action Plan, and
- To assist participating member states in developing the infrastructural capacity, and techniques required for the management of Nile Basin water resources.

Egypt, Rwanda, Sudan, Tanzania, Uganda and the DRC became members of the TECCONILE, whilst Burundi, Ethiopia and Kenya maintained their observer status. Eritrea joined the observer group after it gained its independence from Ethiopia.

All recent attempts to establish mechanisms for basin-wide or sub-basin cooperation have either ignored Ethiopia or only allowed it marginal participation as an observer in the Hydromet, the TECCONILE or the UNDUGU Group. The above-mentioned organizations concentrated more on issues dealing with water saving, storing and utilization, preparation of master plans in the co-basin states and capacity building. The organizations secured financial support from the UNDP, the World Bank and the Canadian International Development Agency (CIDA). The establishment of a multitude of Nile-based organizations indicate some hope for cooperation, but the issues affecting all riparian states should be addressed properly. These organizations will become effective only if they shift their agenda from technicalities to the main problem of water redistribution. Due to the burgeoning population growth, recurrent droughts, famine and the crippling dependence on rain-fed agriculture, the need for

countries of the Nile to share the waters of the Nile has become more pressing than ever before. The White Nile upstream riparians show a tendency of being complacent or indifferent with the vital question of water redistribution. This attitude could either be due to the prevalence of a large and stable amount of rainfall within their territories and/or the availability of sources other than the Nile.

4. A major departure towards cooperation in the Nile Basin

Despite previous problems, the Nile riparian countries have now embarked on a new spirit of cooperation, with clear departure from confrontational past to a cooperative future. This spirit was triggered for the first time in the history of the Nile by an Agreed Minutes signed between nine of the riparian states, in September 1998 in Arusha, Tanzania. The countries of the basin were embarking on cooperation "without prejudice to all the rights and obligations each riparian state has under international law to the equitable use of the waters of the Nile." The cooperation between the upper and lower riparians to share water resources equitably may finally lead to the avoidance of conflict and even to the intergration of basin countries. The cooperation in water resources will also favourably impact on other economic and political areas.

4.1 Economics of the Nile

Population growth increases the demand for more water for agriculture and industry. Many countries fall in the category of "water source" nations. It is projected that in Africa alone 300 million people (a third of the continent's population), will be forced to live with water scarcity by the year 2000. Nine of the fourteen countries that constitute the Middle East already face the problem of water scarcity. This problem also applies to the Nile riparian countries because all of them have an increased population growth (plus /minus 3% per annum). This could make water a scarce commodity. The dimension of economics in the Nile is much more complex than in any other river basin in the world.

These states currently possess 40 % of Africa's population and 10 % of its under-developed landmass. The total population of the basin will rise from 245 million to 859 million by the year 2025.¹²² The population of the three principal Nile Basin countries, namely Egypt, Sudan and Ethiopia, who now account 157 million people, is projected to reach 388 million by the year 2050.¹²³ Looked at from another perspective and considering the current population projections, Egypt's population, which is now about 10 % larger than that of Ethiopia, would be 20 % lower by the year 2025.¹²⁴ Given these scenarios, there would be a high demand for water by each of the riparian states, particularly for agriculture. The countries of the Nile's upper basin have so far developed very little of their respective Nile waters. These countries' utilization of the waters for irrigation and hydro-electric power generation is almost negligible. (See tables 8 & 9)

The two downstream riparians are better off both in irrigation and hydro-electric power generation. The downstream countries are not only dependent on waters received from outside their territorial jurisdiction but are also the sole beneficiaries of salt and alluvial soils

122 Tvedt, T.: The Management of Water and Irrigation: The Blue Nile

123 BBC News, Online, 17 July 1999.

124 Whittington, D. & McClelland, E.: "Opportunities for regional and international Cooperation in the NileBasin," Water International, Volume 17 YEAR!!!

washed down from the hilly terrains of the upstream countries, especially from the Ethiopian plateau.

Table 8 - Cropland and Irrigation

Country	Cropland total area (in hectares)	Irrigated land as % of cropland	Irrigated land as % of cropland
Burundi	1,332,000	4	5
Egypt	2,560,000	100	100
Ethiopia	13,930,000	1	1
Kenya	2,420,000	2	2
Rwanda	1,120,000	0	0
Sudan	12,478,000	14	15
Tanzania	5,230,000	1	3
Uganda	6,705,000	0	0
DRC	-	-	-
Eritrea*	-	-	-

Source: Tvedt, Terje.: The Management of Water and Irrigation: The Blue Nile, (eds) Doornbos, M. et al, Beyond Conflict in the Horn , James Currey, London, 1992 p. 84 .
World Bank Report, 1995.

* Separate figures for Eritrea were not available

Table 9 - Hydro-electric Power Resources

Country	Technical Potential (in Megawatts) MW	Installed Capacity (in Megawatts) MW
Egypt	3210	2700
Burundi	289	12
Ethiopia	4000	230
Kenya	814	354
Rwanda	600	56
Sudan	380	225
Tanzania	4000	259
Uganda	1200	156
DRC	1200	156
Eritrea*	-	-

Source: Tvedt, Terje.: Ibid p. 85

* Separate figures for Eritrea are not available.

Table 10 - Present and future consumption by country and water use

Country	Present Consumption (BCM/YR)			Future Consumption (BCM/YR)		
	Domestic	Industrial	Agricultural	Domestic	Industrial	Agricultural
Ethiopia	0.24 b	0.07 b	1.90 b	1.26 b	0.96 c	33.20 c
Kenya	0.35	0.08	0.18	1.04	0.18	0.31
Sudan	0.74	0.15	16.82	1.50	1.00	26.80
Egypt	2.96	6.52	49.73	3.00	8.30 b	54.40
Burundi	0.04 b	0.00	0.06	0.10	0.00	2.74
Rwanda	0.04	0.01 b	0.10 b	0.07	0.01	0.82
Tanzania	0.10 b	0.02 b	0.36 b	1.10	0.21	0.92
Uganda	0.06 b	0.02b	0.12 b	0.24	0.12	3.97
DRC	0.40 c	0.18	0.12	1.23	0.63	0.05
TOTAL	5.10	7.05	69.39	9.54	11.41	123.21

Source: "Policy Paper on Water Resources Development and Management", African Development Bank (ADB), 1994 & Country Paper of Ethiopia - paper presented at the 3rd Nile 2002 Conference, Arusha, 1995.

NB - These figures are the estimated future consumptions in the Nile Basin by the year 2020. Another estimate of water demand in Ethiopia for the year 2000 is 0.64 BCM, 0.17 BCM and 3.41 BCM, for domestic, industrial and agricultural uses, respectively (Review of water resources issues in Sub-Saharan Africa, ILRI, 1993).

The economic realities show how the riparian countries of the Nile's entanglement escalated as the demand for water resources increased to satisfy the economic needs of the growing population. The fresh water resources are limited, and statistics show that at present 1.5 billion people in eighty countries are short of fresh water. In twenty-nine countries, 450 million people have inadequate water supply for living. Estimation says that before the year

2025, one billion people will be refugees for reasons of water shortage¹²⁵ The Nile Basin cannot be considered isolated from the rest of the world because the same consequences and implications would also apply to the Nile Basin. All the riparian countries of the Nile must deal with the problem of the conflicting trend of an increasing food demand and the decreasing water availability for agriculture.

In terms of economic benefit, the lower and upper riparian countries could gain great advantages from cooperation. Cooperation could be a force to foster peace, and to induce old enemies to cooperate for the common good. Cooperative efforts finally could lead to:

- Full-scale basin-wide economic integration.
- Win-win formula with acceptable and workable mechanisms accommodating the common economic interest and legitimate needs of each of the riparian states.
- Export of hydro-electric power.
- Increased food production for export as well as for self-sufficiency purposes.
- Development of modern inter-state water and roadways.
- Increased cross-border trading.

These are all examples of the value for cooperation in the Nile Basin, which will bring favorable economic results to each individual country and to the basin as a whole.

4.2 Nile Basin Initiative: Common platform for sustainable development

In 1998, all the Nile riparian states (except Eritrea) joined in the dialogue. Together they designed a transitional institutional mechanism that included all the Nile Basin countries as equal members, to succeed the TECCONILE and function until a formal cooperative framework could be implemented. This transitional mechanism was officially launched in February 1999, and comprised a Council of Ministers of Water Affairs of the Nile Basin

125 [http://www. enviroinfo.org.ch/Resource Conservation](http://www.enviroinfo.org.ch/Resource Conservation)

(Nile-Com), a Technical Advisory Committee (Nile-Tac), and a Secretariat (Nile-Sec) located in Entebbe, Uganda. The overall process was officially named the Nile Basin Initiative (NBI). (See Annex B for the NBI Structure).

The NBI is a transitional regional partnership that united the ten countries of the Nile Basin. The Nile Council of Ministers, which comprised the Minister of Water Affairs from each riparian state, constituted the highest body of the NBI. The daily work included the preparation of project documents and was undertaken by the Nile Secretariat and assisted by the Nile team. The Nile Technical Advisory Committee (Nile-Tac) was a composition of legal and water experts. Nile-Tac was divided into two working groups to evaluate the preparation work and give their approval at key points during the process. These working groups met for the first time at the NBI Secretariat Offices in Entebbe, Uganda, at the end of August 1999. They met again in Entebbe during the first half of December 1999 and in Addis Ababa, Ethiopia, early in July 2000 following the 8th Nile 2002 Conference.

The initiative was guided by a shared vision "to achieve the sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources". To achieve the shared vision, the riparian countries developed a strategic action programme that focused on the two complementary ideas: a shared vision and action on the ground. These ideas were mutually reinforcing a common vision providing a framework for practical activities, which, would make the vision a reality. These ideas would be translated into action through two complimentary sub-programmes:

- A basin-wide shared vision programme to create a coordination mechanism and "enabling environment" for cooperative action, and
- Subsidiary action programmes, which would plan and implement action in the field at the lowest appropriate level, taking into account benefits and externalities of planned activities in other countries.

The envisaged cooperative framework charted a parallel approach towards the development of the Nile. The task of the first project, under the shared vision, will be the creation of an enabling environment for investment and action on the ground, within a basin-wide framework. It comprises five broad themes:

- Cooperative Framework (Project D3, ongoing)
- Confidence building and stockholder involvement
- Socio-economic, environmental and sectorial analysis
- Development and investment planning
- Applied training.

4.3 Shared Vision Programme

The primary purpose of the Shared Vision Programme (SVP) is the creation of an environment for investments and implementation of the programmes within a basin-wide framework. The programme, as originally conceived, comprised five broad theme areas. The shared vision is underpinned by a cooperative framework. Supporting this "roof" are four major basin-wide theme areas that are the pillars of the basin-wide Shared Vision Programme. Other activities will be added as they are needed and agreed upon. All activities within these tasks have a major capacity-building component and contribute to human resources development within the basin by, providing the "foundation" of the proposed programme. The programme is intended to promote the shared vision through a limited but effective set of basin-wide activities and projects. Based on the work of seven working groups, a portfolio of seven priority projects was prepared through a unique multi-country, multi-sectoral, participatory process.

The portfolio included four sectoral projects: environmental management, power trade, efficient use of water for agriculture and water resources planning and management. Three cross-cutting projects related to confidence building, stakeholder involvement, benefit

sharing and integration and applied training. The most important of the five themes of the shared vision was the first one - the Cooperative Framework D3, which was an ongoing programme sponsored by the UNDP where three experts from each riparian country were delegated to compile the general principles governing relations between all the riparian countries on the use of the Nile waters. Most importantly, the experts had to adopt basic principles concerning the Nile, similar to those already in place and applicable in other basins. This would enable the riparian states to share and allocate the waters of their shared resource.

The committee of experts, deliberated on the principles of the framework agreement on the basis of the non-negotiable uses of international watercourses. For the last three years they could not come up with an agreed framework and have decided to submit their report to the Nile-Com for further instruction. The SVP is a broad-based programme for collaborative action, exchange of experience and capacity building. Countries of the Nile Basin recognized, in 1998, that cooperative development held the greatest prospect of bringing benefits to the whole region. Out of this recognition they joined in a dialogue to create a partnership to facilitate the common pursuit of sustainable development and management of the Nile waters.

The strategic action programme of the NBI is an umbrella that included two sub-programmes whose aim was to promote the shared vision. This shared vision would be targeted to alleviate poverty by creating benefits for all the people in the Nile region. The umbrella consisted of the Shared Vision Programme (SVP) and the Subsidiary Action Plan (SAP). Implementation of the SVP was expected to cost US\$ 122 million, while the cost for feasibility studies and detailed designs of investment programmes (through the SAP) was estimated at US\$ 79 million. Funding for NBI facilitation, programme management and oversight, as well as dialogue, would cost an estimated US\$ 10 million. In all, it will cost about US\$ 211 million to support the strategic programme of the NBI.¹²⁶

126 <http://www.lho.nl/news>

An appeal was made for international funding and was launched in Geneva, in June 2001, during the Conference of the International Consortium for Cooperation in the Nile (ICCON)¹²⁷ between the ten riparian countries, donors and financial institutions. At the end of the meeting this forum pledged US\$ 140 million. This was a remarkable achievement in the history of Nile Basin cooperation. This gathering was a very important platform. It was the first of its kind to fight poverty and to promote sustainable exploitation of the river Nile for the benefit of all countries in the region. The donor support showed a general optimism regarding international support for the projects.

4.4 Subsidiary action programs

The second track, which is the Subsidiary Action Programme (SAP), would comprise the actual development projects at sub-basin level involving two or more countries. This would allow the move from planning to action. In order to implement the SAP, Nile countries were expected to participate on the basis of the sub-basin they share in common. As a result, the countries of the Nile are sub-divided into the Eastern Nile consisting of Ethiopia, Eritrea, Egypt and Sudan, and the Southern Nile, with Rwanda, Burundi, Tanzania, Kenya, Uganda, the DRC, Sudan and Egypt. At sub-basin level the countries identified would have joint and mutually beneficial investment opportunities in the form of a Subsidiary Action Plans (SAP'). Working jointly within their respective groups, countries of the NBI have come up with projects that will yield investment opportunities for mutual and equal benefit.

The Eastern Nile Subsidiary Action Programme (ENSAP) seeks to initiate a regional integrated, multi-purpose programme through an initial set of investments. Within the regional context, the ENSAP states have identified seven sub-projects. These projects are in the areas of integrated water resources management, flood management, power generation, inter-connecting irrigation and drainage and watershed management. The irrigation projects

¹²⁷ This is a forum for dialogue on the options and opportunities for the development and management of the Nile Basin.

intended for Ethiopia included those to be constructed around Lake Tana (which has the capacity to irrigate 50,000 hectares), and another near Nekempte and Didesa, in western Ethiopia. The latter plans to irrigate 80,000 hectares by using water from the Didesa River. Ethiopia also intends to develop two hydro-power projects that would generate about 3,000 MW. They are planned for construction at Kara Dobi (Blue Nile) and Baro-Akobo-Birbir rivers.

Another "fast track project" proposed by the three countries include the Eastern Nile Simulation Project, for power generation between Ethiopia and Sudan and watershed management in the Baro Akobo Basin. These irrigation and hydro-power projects are the first of the 46 projects that Ethiopia has proposed under the ENSAP. Egypt and Sudan have 10 hydropower, irrigation and watershed management projects.

The Nile Equatorial Lakes Subsidiary Action Programme (NELSAP) also seeks to achieve joint action on the ground to promote poverty alleviation, economic growth and the reversal of environmental degradation in the sub-basin. The NELSAP countries have identified twelve multi-country projects. These projects target investments in the agricultural and fisheries development, water resources management, hydro-power development and high tension transmission lines.

The two sub-basin expert groups are currently identifying cooperative projects for implementation, by first assessing the upstream and downstream impacts, as the Subsidiary Action Programme (SAP) is founded on the principle of equitable utilization, ensuring benefits for all parties and distributing benefits, costs, and risks equitably. The following are listed as potential SAP projects:

Water Resources Management Projects which included:- Water supply and sanitation; irrigation and drainage development; fisheries development; hydro-power development and pooling; watershed management; sustainable management of wetlands and bio-diversity

conservation; the sustainable management of lakes and linked wetland systems; river regulation; flood management; desertification control; water quality management and water use efficiency improvements.

Possible joint development projects would focus on three major areas:-

Infrastructure: Regional energy networks, including power inter-communication development, telecommunication development, regional transport including rail and road networks, river and marine navigation and aviation.

Promoting trade and industry: This includes fostering border trade, industrial development, regional tourism development, promotion of private investment and joint ventures, the marketing and storage of agricultural products and forest crop harvesting.

Health and environment, and other: Malaria and other endemic disease control, the protection of wildlife, environmental management, disaster forecasting and management.

Both sub-basins through the SAP have achieved the following:

- ENSAP and NELSAP experts working groups have been established.
- Consecutive meetings of the Council of Ministers at sub-basin level have taken place and this has created a way to a new spirit of cooperation.
- Consultants processed and finalized project identification documents for the SAP.
- The Nile-Com was submitted. The ICCON for mobilization of funding for pre-feasibility and feasibility designs.
- The first historical meeting in Geneva between ICCON and the international donor community and the Nile Basin countries.
- The donor countries pledged initial financial support of at least US\$ 140 million to finance the full program.

In addition, for the first time in the history of the Nile Basin (during the recent Ministerial level meeting in Khartoum in March 2001), consensus was reached among the Eastern Nile Basin countries to execute joint and independent irrigation and hydro-electric power and watershed management. The realization of these projects will serve as an initial test on whether the visions of the countries for cooperation could become a reality.

Cooperation regarding the Nile has now reached a stage where the countries have started facilitating conditions and paving the way for the establishment of visible legal and institutional frameworks and entering into negotiations concerning the water sharing entitlement criteria. Confidence building remains a major task of the Nile Basin countries to achieve before any feasible cooperation in the equitable utilization of the waters of the Nile can begin. It is already evident that countries in the sub-basin and those on basin level have played collaborative roles during the past seven years. This serves as a promising testimony towards the realization of the common goal of equitable water sharing for the gradual eradication of poverty. The Nile countries have entered into a new chapter and will tackle challenges for the future to improve the standard of living for their people through collaboration rather than confrontation.

4.5 The Nile Issues Dialogue Forum

To achieve a viable development in the Nile Basin in all aspects, the cooperation of all professionals, decision makers and political leaders of the basin states as well as external support agencies is required. In this regard "The Nile 2002" series of conferences is one of the latest ongoing attempts for greater understanding, which provides unofficial and informal venues for the exchange of views and the fostering of cooperation for the development of the basin. The Nile 2002 Conference is the first major initiative that started in 1993 to facilitate cooperation in the use and management of the Nile waters. The first Nile 2002 Conference was held in Aswan, Egypt (February 1993), followed by the second in Khartoum, Sudan (January 1994), the third in Arusha, Tanzania (February 1995), the fourth

in Kampala, Uganda (February 1996), the fifth in Addis Ababa, Ethiopia (February 1997), the sixth in Kigali, Rwanda (February 1998), the seventh in Cairo, Egypt (March 1999) and the eighth conference was held in Addis Ababa, Ethiopia in 2000. The last conference will take place in 2002.

The conferences culminate in 2002 and will adopt main strategies for resources and action programmes for the riparian countries within the context of the integrated Nile Basin development. For six consecutive conferences, Ethiopia only maintained an observer status but started participating as a full member in the 1999 conference. The main objectives of the 2002 Nile Conference are the following:

- To bring together experts from the Nile Basin, international experts and external support agencies to address specific topics relating to the development of the Nile Basin.
- To discuss national water resources management strategies and action programmes for the Nile Basin countries and their harmonization within the context of integrated Nile Basin development.
- To discuss options for a cooperative and institutional framework, and appropriate instruments for the Nile Basin.
- To provide policy directives and visions for policy makers.

The Nile 2002 Conference Series brought a new and congenial atmosphere in which the Nile question would be discussed openly and be resolved for mutual satisfaction. The dialogue forum was created to the delegates of all riparian states:

- To air their views.
- To present their cases.
- To participate in the debates and suggest structures for cooperation for the peoples of the Nile Basin in all development matters that could promote peace and understanding.

The valuable ideas generated by the 2002 Conferences, will shed some light on the important environmental and economic considerations that need to be addressed as a basin wide approach. The ongoing dialogue in the 2002 Conferences is important considering the suspicion and misunderstanding built up over the years between the upper- and lower-riparian states.

In general, what has been achieved by the series of 2002 Conferences demonstrated a step forward in fostering cooperation in countries of the Nile Basin. The dialogue forum will serve as a significant force to shift the Basin from an era of confrontation to a new age of cooperation.

4.6 The Nile Basin and the International Community

In the past and currently, several international organizations, donor countries and agencies have been involved in studies and development of the Nile Basin. The UNDP, the World Bank, the African Development Bank, the European Union, USAID, CIDA and a few countries have been involved in financing studies and development work in Egypt and Sudan as well as in the upper riparian states. The United Nations, through its various agencies and regional offices such as the ECA, UNEP, FAO, WMO, UNICEF, has also implemented various programmes for several years in the countries of the Nile Basin. During the Cold War the countries of the Nile Basin belonged to different camps, and civil war and political instability in most of the basin states often changed the political agenda of each state. For this reason, long-term basin wide cooperation was extremely difficult to achieve.

This was also aggravated by unbalanced involvement of international agencies and donor countries. They adversely affected bilateral as well as multilateral, relationship for example, the former Soviet Union gave substantial financial assistance for the construction of the Aswan High Dam. This has greatly increased the irrigation potential of Egypt and to a

certain extent made it the beneficiary of an unjust status quo. The African Development Bank, on the other hand, denied a loan to Ethiopia that was aimed at harnessing the Blue Nile (Aleltu Hydro-electric Project) as Egypt managed to have the loan blocked, using its economic and political leverage.¹²⁸ The lending policy of the World Bank calls for a "no objection stance" by co-basin states for projects submitted to the bank through one of the co-basin countries.

The operational directive of the bank requires the consent of all affected riparians before releasing funds for water projects. The downstream countries were consulted for projects undertaken in the upstream countries for a "no objection statement" while the upstream countries were not consulted on projects undertaken in the downstream countries. For example, the Ugandan Government was instructed by the World Bank to obtain a permit from Egypt in order to secure a loan for the hydrological works in Lake Victoria.¹²⁹ Egypt alone (since the Camp David Accord) was fortunate enough to be the recipient of more than US\$ 60 billion from the United States, not to mention the US\$ 3.5 billion it receives annually from the same donor, while other riparian countries experience economic hardship. The demise of the Cold War brought a change in the Nile Basin, and opened the way for regional cooperation through the assistance and goodwill of international partners and donors.

The NBI and the World Bank are working together to achieve basin-wide cooperation in the 21st century. The NBI countries are committed to give continued support for their share of the program and the donor partners are committed to work with the Nile states to secure the financing for the first phase, as well as for future phases of investment. The International Consortium and Cooperation on the Nile (ICCON) established through the assistance of the

128 Tafesse, T.: *Hydropolitics of the Nile Valley: Retrospect and prospect*, Addis Ababa University, 1997, p. 8

129 *Ibid*, p. 8.

World Bank plan to achieve a long-term partnership between the Nile states and the international community. This unique forum will coordinate donor support for an action plan and will convene a Consultative Group (CG) meeting. ICCON is seen as a partnership between and among the Nile countries and the international community. ICCON seeks to raise and coordinate funding from bilateral, multilateral, and private funding entities, in support of cooperative water resources management and development and other related projects in the Nile Basin.

ICCON held its first meeting in June 26-28 2001 in Geneva, Switzerland, by bringing together the international donor community and NGO's in support of the NBI - a cooperative programme to address poverty, environmental degradation and instability in the the Nile Basin. The newly formed Consultative Group (CG) expressed their support for the initial goals, and their committment to working with the Nile states in the future. The CG also indicated their support to implement the full programme of the NBI presented to ICCON. The programme included:-

- Implementation of a basin- wide research programme.
- Capacity building and technical assistance (the Shared Vision Programme).
- Preparation for cooperative, socially and environmentally sustainable sub-basin investment programmes in the Eastern Nile and the Equatorial Lakes region.

The first phase of this investment programme is anticipated to cost about US\$ 3 billion. The development partners pledged initial financial support of at least US\$ 140 million to finance the full programme. The donor partners are committed to work with the Nile states to secure the financing for this phase, as well as for future phases. The successful launch of ICCON constituted a new partnership for the Nile Basin states and the international community, working together to improve the lives of the peoples of the Nile Basin. In matters of an equitable utilization of the waters of the Nile the involvement of international agencies like CIDA, the UNDP, the World Bank is essential. The function of other agencies such as UNICEF, FAO, UNEP and the European Union is to cooperate and ensure food security in

the region as a whole. The participation of the World Bank and its partners will facilitate cooperation among the Nile states and encourage development of this vast and huge resource for the benefit of 300 million people. Here we find the most impoverished people and 5 of the 10 least developed countries in the world. In doing so, it is hoped that the support of the international community will also play a positive role. The World Bank should reconsider its lending policy by which lower riparian countries will not be allowed to dictate terms by taking undue advantage of the "no objection clause" to veto or prevent the implementation of projects on the upper reaches of the Nile, where poverty, malnutrition, drought and famine are rampant.

The intervention of the World Bank along with the donor community can play a big role in building confidence to bring about an atmosphere conducive to development and induce a change in the unjust status quo, which prevails in the Nile currently. The support from the international community and international financial institutions is crucial for any serious strategy for poverty alleviation and education and for utilizing the foreign investments where needed.

4.7 The Vergers Win-win Formula in the basin

The Nile Basin countries are historically, politically and economically interdependent and bound by the Nile River umbilical cord. But lack of genuine cooperation that has so far characterized the Nile serves no purpose other than deepening differences among the riparians and aggravating the state of poverty in the basin. The most fundamental solution to the problems concerning the utilization of the waters of the Nile is regional or basin-wide cooperation in water development. Water can both be a source of cooperation or conflict: water is so vital in this volatile troubled region that it could be a force for encouraging peace and for inducing old enemies to cooperate for the common good. History and current events show that so far it proved to be a disruptive influence and a course for conflict. It is

regrettable that the Nile has been the source of conflict mainly between Egypt and Ethiopia. It is clear that both countries stand to gain from cooperation. Egypt in particular has more to gain than any other co-riparian from increased cooperation.

According to Kinfu Abraham:

*"The attempt by Egypt to maintain the status quo (leaning) on historical rights will be untenable morally, ethically and politically for it would be tantamount to depriving others of life while caring for their own."*¹³⁰

Zewde Abate's remarks deserve to be mentioned here :¹³¹

"... water management in the highly water dependent Nile Basin is a complex and multi-faceted challenge, a broad and integrated approach should be taken."

It is very difficult to come out with a clear solution that would satisfy every Nile Basin state. Some suggestions could forge a win-win formula to break the stalemate and pave the way towards settling the current problems:

- Egypt and Sudan should erase the 1959 agreement, which was a bilateral deal that ignored the natural rights of all the other riparian states. It should be revised and re-negotiated to accommodate the interests of all the co-basin countries.
- Establish water allocation mechanisms agreed on by all the basin states based on an equitable formula.
- Increase joint water saving technologies such as drip irrigation which gives only as much water as crops need and deliver it directly to their roots (so-called 'green

¹³⁰ Abraham, K.: "The Nile Issue: psycho-political hurdles to an agreement and the way forward towards rapprochement, " *EIIPD Journal* , series No. 14, Addis Ababa.

¹³¹ Abate, Z.: The integrated development of Nile Basin waters. center of Near Middle Eastern Studies, SOAS, University of London. 1990.

water'). It is a more efficient use and reduces the release of water at Aswan for navigational purposes. This could also save much needed water in the Nile Basin.

Cooperative water development efforts would lead to increased usable water supplies for everyone, as well as other benefits like hydro-power generation. Cooperation on projects would lead to job creation and prosperity in areas, which are unlikely to have any other chance of development. The increasing population puts great pressure on water resources because of the need for more water for irrigation agriculture to increase the food production and for sanitary and industrial use. On the other hand, shared water resources are dwindling in many places in the world. The result could be a water war. However, cooperation between upper and lower riparians to share water resources equitably may avoid conflict and even lead to integration of basin countries in their cooperation on the water resource allocation. The allocation policy should establish the minimum acceptable flow from each basin. The advantage of which is that it can be used flexibly to set seasonal standards for natural and local anomalies and river quality in fluctuating demands.¹³²

The Nile is no exception to other international rivers which have managed to find an amicable breakthrough and reached a winning formula for the reasonable and equitable utilization of their water resources. The sustainability of the river as well as the prosperity of the people of the basin is best served through a suitable arrangement for common benefit. The riparian countries of the Nile should foster a spirit of inter-dependency because their future development is inextricably linked to the hydrological cycle of the river. Reaching an amicable settlement in negotiations regarding an international river may certainly prove frustrating and, at times, cause seemingly insurmountable problems to the concerned parties. To rectify this situation, the intervention of neutral third parties as facilitators may play a significant role in easing the problems. In this regard, the role of the

¹³² Ibid, p. 98.

World Bank in negotiating the 1960 water treaty between India and Pakistan is worth mentioning.

Other areas where third parties can make a difference is in participation in capacity building programmes in the riparian countries of the Nile . It is worth noting here that water in its elemental state affords limitless opportunities for distribution of benefits among the countries served by the river. As already indicated, water has in a multiplicity of natural uses. Depending on the geographical location, and hydrographic, hydrological, climatic, ecological and other natural factors, water can be used in a variety of ways in different circumstances. Inter-state cooperation guided by a win-win formula could ensure equitable benefits to each country, depending on its relative location and natural advantage.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

The current level of cooperation and positive developments in the Nile Basin are remarkable. The Nile riparian countries are expected to moving in the right direction by setting aside their differences and share the water resources to make social and economic progress a reality. For centuries, the lower riparians have exploited the Nile River to the detriment of others. If this continues unabated, the hand-to-mouth existence of millions of people would further deteriorate; and this in turn heightens the tension between the riparian states. Egypt is slow to change this state of affairs. Though, it would be in Egypt's best interest to agree on equitable utilization of the Nile waters by cooperating with other countries to the implementation of different projects at sub-basin level.

As long as population continues to grow in any region, the issue of water and other natural resources will play an important role in regional politics. The Sudanese civil war, for example, is getting a new dimension by intertwining with the natural resources. Apart from religious element, its abundant and untapped oil resources became one of the main reasons of the conflict which is one of the longest civil wars in Africa.

One of the major challenges facing the Nile Countries is the fact that there is more demand than supply of water. In this regard, all Nile Basin Countries would benefit from working together to reduce evaporative losses on a basin wide scale. In this respect, The NBI is a landmark as it initiated constructive dialogue among historical adversaries.

Of course, Egypt wants to be regional power house as there is a rising influence from South Africa after the end of Apartheid.¹³³ However, the unprecedented move of some upstream countries to abrogate the 1929 treaty between Egypt and Britain could have substantial pressure on Egypt to revise the treaty and strike a deal with them on how to use the Nile waters equitably. It has been pointed out that cooperation between upstream and downstream countries in the Nile Basin brings common benefit as it could result in more efficient use of the waters.

One of the premises for possible future cooperation is the necessity to develop major sub-basin projects such as: building power stations on the Nile tributaries and dam at Lake Tana in Ethiopia as sharing water in a high and cool area is much more efficient and reasonable than sharing water in such a hot and dry area like Lake Nasser which was created by the Aswan High Dam.¹³⁴ According to an estimation, however, the water available at Lake Nasser could increase to 15 billion cubic meters per year by preventing evaporation and seepage.

133 <http://www.ethiopianreporter.com>

134 Tafesse, T.: *Hydropolitics of the Nile Valley: Retrospect and prospect*. Addis Ababa University. 1997 p.8

This thesis has attempted to review the enormous potential of the Nile Basin by referring and analyzing technical data and doing an in-depth study of the hydro-political situation as well as the historical and legal backgrounds of the current problem. Therefore, for a lasting solution to the Nile problem, I would like to put forward the following recommendations for consideration:

- Priority should be given to avoid mutual suspicion and build confidence among riparians.
- The current process which is on the right track to bring all-inclusive cooperation in the Nile Basin should continue.
- A legal regime stipulating the need and determine the rights of each individual riparian country (based on equitable allocation of Nile water resources) should be agreed upon and strengthened.
- A sub-basin approach should be adopted to help materialize a firm foundation for future basin wide cooperation with institutional framework.
- Sustainable peace and prosperity in the Nile Basin can be achieved through engagement in constructive diplomacy and transparency.
- The international community has to play an important role in all aspects of the Nile Basins development process.

Countries in the basin seem to be realized that equitable utilization of the Nile waters would lead to the creation of long lasting peace, security and cooperation in the region. It would also ensure sustainable development as well as safeguard and promote the interests and economic rights of the peoples of the Basin. All the riparian states can only win the future challenges and improve the standard of living of their peoples through cooperation rather than confrontation.

BIBLIOGRAPHY

I BOOKS

Abate, Z.: The integrated development of Nile Basin waters. center of Near Middle Eastern Studies, SOAS, University of London. 1990.

Allan, J.A.: "Nile Basin Water Management Strategies." in Howell, P.P and Allan, J.A.(eds) The Nile: Sharing a scarce resource Cambridge University Press. 1999 p.317

A.H. Garretson.: The law of international drainage basin. Ocean A Publication Inc., New York. 1969 p. 256. See also W.A. Hence.: The geography of Modern Africa. Colombia Picture Press, New York. 1967 p. 119

Bullock, J. & Darwish, A.: Water Wars, Coming Conflicts in the Middle East Victor Gallancy, London, p. 105.

Collins, R.O.: The Waters of the Nile: Hydropolitics and the Janglei Canal, 1900-1988 Oxford, 1990, pp. 400-413.

Cheesman, R.E.: Lake Tana and the Blue Nile Frank Cross and Company Limited, London. 1968 p.14

EL – Sadeq-Mahdi: Nile Water: The Promise and the Threat, Cairo, 2000, p 30

Ethiopian Valleys Development Studies Authority. "Ethio-Sudanese Relations with Respect to Water Resources". Monograph in Amharic, Addis Ababa. 1991 p. 2. See also C.R. Joy.: Island in the desert: the challenge of The Nile Coward McCann Inc, New York. 1967 p. 87

Howell, P.P. and Allan, J.A.: The Nile. University of London. 1990 p.15

Houle, A.: "The Roots of Organizid Internal Armed Conflicts In Ethiopia, 1960-1991."

In Trevdt, T. (ed) Conflict in the Horn of Africa: Human and Ecological Consequences of Warfare; Uppsala. 1993. Research programme on Environmental Policy & Society, Department of Social & Economic Geography, pp 27-45

Hurst, Black & Simaika, *The Future Conservation of The Nile*, Cairo, 1946, Vol. VII.

Judge, S.: "The Nile River of Hope or Conflict?", *Trans-boundary Resources Report* 8, No. 2, 1994.

Kliot, N.: Water Resources and Conflict in the Middle East, Routledge, London & New York, 1994. p.51.

O'Cannel, D.P.: State Successions in Municipal Law & International Law, Cambridge University Press, Cambridge, Vol. II, 1967, p. 247.

Okidi, C.: "Development and the environment in Kagera Basin under the Rusumo treaty, Discussion paper No. 284, Institute for Development Studies, Nairobi, Kenya, 1986.

Petrides, S. P.: The boundary question between Ethiopia & Somalia: a legal and diplomatic survey with 20 maps. People's Publishing House, New Delhi. 1983 p. 9-12

Silverman, J.M.: "Historic patterns of natural rivalries and interstate conflict in mainland and south-east Asia." In Zacher, M.W. & Milne, R.S. (eds) Conflict and stability in south-east Asia Anchor Books/Doubleday, New York, 1974, p. 46-47.

Swain, Ashock: Ethiopia, the Sudan and Egypt: The Nile River Dispute, *The Journal of Modern African Studies*. 35.4, pp.675-694

Tafesse, T.: *Hydropolitics of the Nile Valley: Retrospect and prospect*, Addis Ababa University, 1997, p. 8

Tilahun, W.: Egypt's Imperial Aspirations over Lake Tana and the Blue Nile, United Printers Ltd., Addis Ababa, 1979, p. 75.

T.Tvedt.: "The management of water and irrigation: The Blue Nile." in Doornbos, M.(ed) Beyond conflict in the Horn of Africa James Curry Ltd., London 1992 p.82

Namrath Alfred: *Egypt the land between sun and Nile*, Kummer and Frey. Berne. 1920 p.32

Ntambirweki, J.: "Colonial treaties and the legal regime of the Nile Valley: Re-thinking the legal framework into the 21st century", paper presented at the 4th Nile 2002 Conference, Kampala, Uganda, 1996.

Waterbury, J.: Hydropolitics of the Nile Valley, Syracuse University Press, New York, 1979. p. 89-90.

W.A. Klerru.: The Nile Waters questions: Political aspects of utilization of the Nile Waters. Unpublished PH.D dissertation. UCLA. 1962 p. 6

II. OFFICIAL DOCUMENTS

Ethiopian Ministry of Foreign Affairs, Press Release, 17 February 1978.

Ethiopian Valleys Development Studies Authority."

White Engineering Corporations-

Central statically office, Staticall Abstract, 1977.

Ethiopian Valleys Developments Authority, Addis Ababa, 1991.

National Expo, 1978

CSA (Central Statistics Authority)(1995) The 1994 Population and Census of Ethiopia, Office of Population and Housing senses Commission, Addis Ababa.

Unite Nations Development Programme, Human Development Report. Oxford University Press, 1994

Ethiopian technical Experts paper presented to the first Nile 2002 Conference held Aswan, 1993.

Country paper of the Republic of Kenya presented at the 5th Nile Conference in Addis Ababa, 1997.

Ministry to Land Reclamation, Country Report on Regional and Water Development, Nairobi, Kenya, 1997.

Ministry of Water Resource, Country Report of Ethiopia presented at the Nile 2002 Conference Addis Ababa, 1997

United Nations. Development prgramm Human Development Report, Oxford University Press, 1995.

Country paper of DRC presented at the Nile 2002 Conference Addis Ababa , 1997.

The Law of the Non-navigational Uses of International Water couse, UNGA, A/ch. 4/L493, 12 July 1994.

The 1995 agreement On Cooperation for sustainable development of the Mekong River Basin

III. PUBLICATIONS

Ethiopian Observer VdII, Number2, January 1958.

Sudan Focus "Stirring up Red Sea and Nile controversy. London 1996.

Economic Intelligence Unit, London, 1975

Africa News Online-Tanzania ascertains environmental safety in Lake Victoria.

Facts about Uganda, 1991.

Transboundary River/Lake Basin Water Development in Africa: Prospects, problem, and achievements, Dec. 2000 P. 19

The world Fact Book, 1992.

Africa South of the Sahara, London, 1994.

Europe World Year book, London, 1993, 1979

Encyclopedia of the Third world (4thed) 1ed. George Thomas New York, 1992, New York, 1993.

The Democratic Republic of the Sudan The Gezira Schme, past and present January 1970.

Africa Diary, February 12-18, 1975.

Middle East Economic Digests, Weekly News Analysis and forecast, Vol.23, No.1, January5, 1979.

Pan-Arab-Al-Hayat interview with Ethiopian Prime Minister Meles Zenawi, May 1998.

BBC News, Outline, 17 July 1999.

IV. INTERNET SOURCES

[http://www. enviroinfo.org.ch/Resource Conservation](http://www.enviroinfo.org.ch/Resource%20Conservation)

<http://www.lho.nl/news>

<http://www.ethiopianreporter.com>