



Ethiopia and the Nile: The Dilemma of National and Regional Hydro-politics

Executive Summary of the PhD Thesis

Yacob Arsano

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Cover photo

The Nile Falls near Bahir Dar, Ethiopia, in September; the level of water (and sediment from erosion) is high, as this is the end of the rainy season. (Photo by Kaspar Hurni)

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1 Introduction

The Nile waters system consists of numerous tributaries and headwater lakes. Lake Victoria in the equatorial region and Lake Tana in north-western Ethiopia are the most significant natural reservoirs in the upstreams of the Nile. Of the four major tributaries, the Abbay (Blue Nile), Tekeze (Atbara) and Baro-Akobo (Sobat) originate in the Ethiopian highlands, while the White Nile originates in the Equatorial Lakes region. The Ethiopian headwaters provide 86% of the annual volume of the waters of the Nile, while the remaining 14% comes from the Equatorial Lakes region through the White Nile system. Egypt and Sudan are net recipients of the Nile waters that come down from the two headwater sub-systems.

In accordance with the Nile Basin Initiative (NBI) the basin is divided into two sub-basins, namely the Eastern Nile Basin and the Equatorial Nile Basin. The two sub-basins provide two contextual realms for strategic action programs and diplomatic initiatives. The on-going and strategically conceived subsidiary action programs on the Nile are clustered into the two sub-basins, namely, ENSAP (Eastern Nile Subsidiary Action Program) and NELSAP (Nile Equatorial Lakes Subsidiary Action Program). The Equatorial Nile sub-basin comprises Burundi, DRC, Kenya, Rwanda, Tanzania and Uganda. The Eastern Nile Basin comprises Ethiopia, Eritrea, Sudan and Egypt. In the context of the Eastern Nile Basin, Ethiopia is the country furthest upstream and provides almost all of the water resources; Egypt is the country furthest downstream and almost all of the water it receives originates in the Ethiopian highlands.

On the other hand, there are no institutional and /or legal mechanisms to regulate the utilisation and management of water resources in the Nile Basin in general and the Eastern Nile Basin in particular. The absence of a legal /institutional framework and the prevailing “anarchic” approach to the utilisation and management of the Nile waters have given rise to the unregulated competition and interstate rivalry between Ethiopia and the two downstream nations, i.e. Egypt and Sudan.

The particular focus of the present study is on Ethiopia and the Nile vis-à-vis the Eastern Nile Basin. The study aims to understand the prevailing national and regional dilemma of hydro-politics in the Eastern Nile Basin - the dilemma between inadequate capacity and unsustainable use at the national level on the one hand, and inadequate cooperation and mutual insecurity at the regional level on the other. While the need for and dependence on shared water resources are on the increase, the pattern of unsustainable utilisation of water resources has not changed. The study further assumes that increased political, institutional, security and economic capacity at national level, and a cooperative framework and a mutual security environment at regional level, will likely lead to sustainable development of water resources both at national and regional levels.

2 Context

Historically, water utilisation in the Eastern Nile basin has been unilateral, and there are no comprehensive inter-riparian legal or institutional modalities to facilitate cooperative development and joint planning activities between upstream and downstream riparian areas. Alternatives to unilateral and conflicting water utilisation approaches with potentially mutual benefits are not being seriously considered. A comprehensive approach to the Nile waters question can best be dealt with in national and regional contexts.

2.1 National context

Ethiopia has 123 billion m³ of surface water available annually (Ethiopia, MWR, 2002: 6). But a mere 3% of this amount remains in the country, while the remainder flows to neighboring countries in all directions. By far the greatest proportion flows to the Nile system. Ethiopia's western rivers – the Abbay (Blue Nile), Baro/Akobo (Sobat) and Tekeze (Atbara) – together contribute 86% of the Nile waters as measured at Aswan (Elhance, 1999: 67). Master plan studies of the three Ethiopian Nile headwaters have been completed, and the final reports have been published for Abbay, Tekeze, and Baro/Akobo, as well as for some other major river systems, such the Ghibe/Omo and Awash basins. Similar studies are about to begin for the Wabeshibelle and Gana/Dawa basins in the eastern part of the country.

It has been estimated that 2.58 million ha are available for potential irrigation in all of Ethiopia's basins. So far, however, only 4.3% has been developed (Ethiopia MWR 2002: 5). Of this developed acreage, 0.6% is in the Abbay Basin in the valley of the Fincha tributary (field note from the management of the Fincha agro-industrial enterprise, June 2001). There are longstanding traditional small-scale irrigation activities in the headwater zones of the Ethiopian Nile valley. This was observed during field visits in the Guder valley in April and June 2001. Historically, however, many large-scale water projects on the tributaries of the Ethiopian Nile were aborted for various reasons, including policy constraints and lack of financing.

The Ethiopian Government formally enacted a national water resources management policy for the first time in 1999, and issued a water management proclamation in 2000. The new policy and legislative measures are evidence of a contemporary approach to promote national efforts to achieve the desired goal of 'efficient', 'equitable' and 'optimal' utilisation of the available water resources in the country. The Ethiopian national water policy document specifically acknowledges that water resources management in Ethiopia has failed to bridge the spatial and temporal variability of the total annually available water in the country. It further admits that poor performance in the nation's water development sector is the cause for its slow agricultural development and low crop productivity. It unequivocally admits that lingering poverty stems from inadequate development of the country's water sector. Further evidence of poor performance in Ethiopia's water sector is that only 72% of the urban population and 23% of the rural

population in Ethiopia has access to clean water (Aberra Mekonnen and Deksios Tareegn, 2001), while only 13% of the population has access to electric power (Debebe 2002: 7).

2.2 Regional context

The riparian states of the Eastern Nile basin have pursued unilateral and conflicting approaches to the utilisation of otherwise shared water resources, avowedly driven by their respective national interests. The political expressions of these national interests have resulted in controversies and tense relationships between Ethiopia and her two downstream neighbors, Sudan and Egypt. Throughout the Twentieth Century the two downstream countries were the sole beneficiaries of the Nile's waters, basing their respective claims on a doctrine of 'historical' and 'natural' rights. Upstream Ethiopia, on the other hand, not only repudiates the claim and the status quo established by colonial and post-colonial accords to which it is not a party, but also, and in reaction to this, holds to the doctrine of 'absolute territorial sovereignty'. Ethiopia's position is shared by the Equatorial Lakes states, particularly Tanzania, Uganda and Kenya. Hence, the bottom line of hydro-politics in the Eastern Nile basin is a dilemma characterised by holding to the status quo or finding alternative ground on which to forge long-term mutual interests and cooperation.

At present, there are no legal or institutional arrangements to harmonise upstream-downstream water utilisation interests at sub-basin or basin levels. Nor are there any mutually acceptable customary modalities that might be acceptable for inter-riparian water utilisation and management. The lack of active engagement in mitigating the numerous water-related problems has given rise to environmental and security concerns in the riparian states. The one agreement signed between Egypt and Sudan in 1959 was only a bilateral one, and was reached solely between these two nations furthest downstream. Furthermore, the agreement effectively excluded the upstream states from taking part in the negotiation process as well as in the actual agreement, while the two countries furthest downstream agreed between themselves on the 'full utilisation' of the Nile waters (Waterbury 2002).

Due to the lack of adequate upstream-downstream water utilisation and management, all three riparian countries of the Eastern Nile have been challenged by various complex problems: excessive erosion and land cover loss in upstream Ethiopia; flood and silt accumulation in the midstream Sudan; and excessive water loss through evaporation in downstream Egypt. Watershed management and environmental protection can best be handled at a regional level. This includes flood and drought management, mitigation of erosion and sedimentation, irrigation and drainage development, hydroelectric power development, and power pooling.

The relevance of the ongoing Nile Basin Initiative (NBI) will have to be viewed in this context. This rather ambitious initiative intends/aims to establish regional cooperation and build mutually beneficial relationships among the ten co-riparian nations, namely Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda,

Sudan, Tanzania, and Uganda. The Nile basin countries, as well as the international community, seem to have realised the intimate linkage between environmental factors and regional security in the Nile Basin. Hence, the national states of the Nile Basin and international agencies like The World Bank, UNDP and CIDA have recognised the importance of developing regional relationships through the NBI.

With the objective of making the NBI strategically more meaningful, the basin is divided into two sub-basins, namely the Eastern Nile Basin, comprising Ethiopia, Eritrea, Sudan and Egypt; and the Nile-Equatorial Lakes, comprising: Burundi, Egypt, DRC, Kenya, Rwanda, Sudan, Tanzania and Uganda. The two sub-regions are to subscribe to respective sub-regional strategic action programs known as ENSAP (Eastern Nile Strategic Action Program) and NELSAP (Nile Equatorial Lakes Strategic Action Program).

The NBI has charted two ambitious goals. On the one hand it aims to enhance the socio-economic development of riparian countries through sub-basin cooperation in a variety of fields. On the other hand, it works to establish a legal and institutional framework that will have the effect of regulating inter-state utilisation and management of shared water resources. While the first goal has moved forward with slow but smooth steps and progress towards win-win arrangements, the second goal has been locked up in slow-moving and mutually unacceptable national positions (Panel of Experts, NBI 1999, Unpublished Report).

The NBI was conceived in 1998 as a strategic program for the Nile basin, with the initiation and support of the World Bank and with the close collaboration of UNDP and CIDA. The four goals of the NBI are: 1) building confidence among the basin states; 2) changing perceptions on issues concerned with the Nile waters; 3) realising that cooperation is more beneficial than confrontation; and 4) knowing the extent of the water resource potential for inter-state collaboration (Nile Council of Ministers 1999: "The Agreed Minutes").

The NBI was formally set up in February 1999 in Dar-Es-Salaam, Tanzania, with all water ministers of the riparian countries agreeing to come up with a Subsidiary Action Program (SAP) and Institutional and Legal Framework referred as the "D-3 Project". The explicit motto of the NBI is "Sustainable development of the River Nile for the benefit of all". A provisional structure, comprising the Council of Water Ministers (Nile COM), the Technical Advisory Commission (Nile TAC) and the Nile Secretariat (Nile Sec) was set up, and terms of reference for smooth functioning of the NBI were drawn up.

3 Focus

The main focus of the present study is to examine the conditions, elements and driving forces of the dilemmas of hydro-politics at both the national and regional levels in the Eastern Nile basin. The study also focuses on how these can be transformed into a cooperative and sustainable water development approach. First, the hydraulic policy of Ethiopia vis-à-vis the downstream nations of Egypt and Sudan is given particular emphasis. An attempt is made to explain the many predicaments that have existed and that still exist as impediments to water resource development at the national and the inter-state levels in the Eastern Nile basin. In doing this, the study further focuses on political, legal/institutional, economic/developmental and strategic factors (national arena on the left in the diagram below). Second, it focuses on the hydro-political dilemma of the eastern Nile region comprising Egypt, Sudan and Ethiopia.

At the regional level the riparian states seem to have been decidedly unilateralist in their respective national water development strategies (regional arena on the right hand side in the diagram below). An attempt is made to explain the perceptions and fears that the upstream-downstream co-riparians have about one another. Opportunities for cooperation, and how to move from the prevailing situation of slow development and little capacity to one of sustainable development, are explored, as indicated by the direction of the arrows in the diagram below.

As can be observed in Figure 1, there are four loops, drawn with arrows in clockwise directions. The column on the left represents the national level and the column on the right represents the regional level. The upper row shows the state of unsustainable water resource development at both the national and regional levels. The lower row shows transformed water resource development at both the national and regional levels. The broken arrows in the directions of the national and regional arenas in the upper row show the possible external support that may catalyze transformation from an unsustainable state to a sustainable state of water development.

1. The loop on the upper left represents the national level of hydro-politics in the Eastern Nile basin. It shows the prevailing situation of unsustainable water resource development at the national level. The chain of factors that characterizes this includes: slow economic development, low political capacity, internal tension, and an inadequate policy and institutional framework at the national level.
2. The loop on the upper right represents the regional level of hydro-politics of the Eastern Nile basin. It shows the prevailing situation of unsustainable water resource development at the sub-basin level. The chain of factors here consists of uneconomic water use, absence of a regional policy framework, a regional security dilemma, and contested legal doctrines.

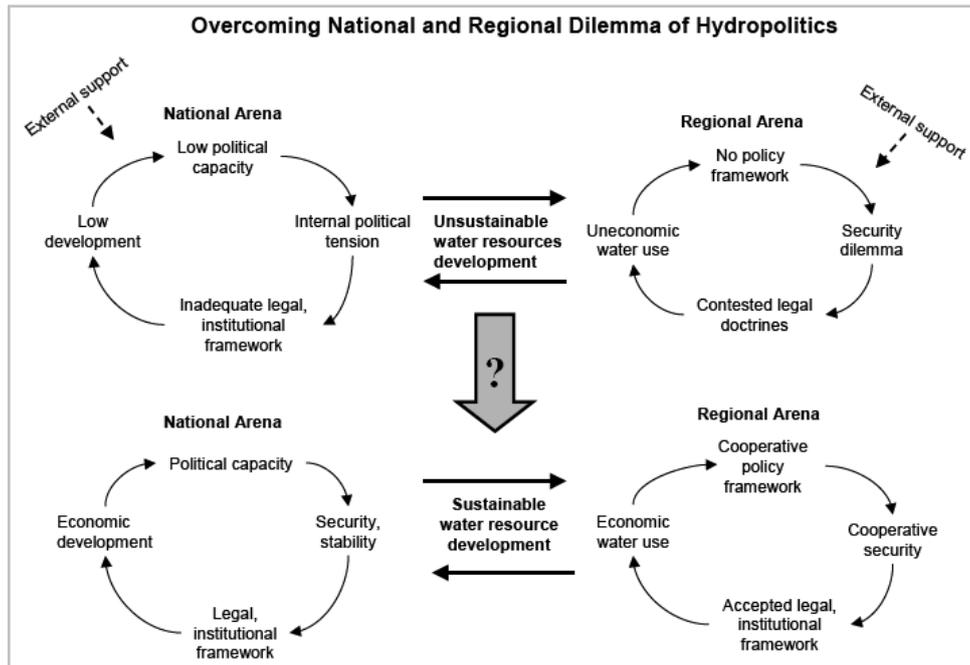


Figure 1 Conflict Transformation Mode
Source: Sketch developed by Yacob Arsano.

3. The loop on the lower left represents a possible prospect of sustainable water resource development at the national level. Such a scenario can be obtained if and when the political capacity is improved, internal tension abolished, the political system stabilised, the inadequacy of the legal and institutional systems improved, and the financial, technological and human means of development are made available.
4. The loop on the lower right-hand side represents a possible prospect of sustainable water resource development at the regional level. This can be realised if and when there is a cooperative policy framework to which the sub-basin states adhere; a cooperative and mutual security system is established; a mutually acceptable legal/institutional framework is established; adequate financial, technical and human resources are made available; and environmentally sound and economically rational water resource development is pursued by the riparian states of the Eastern Nile basin.

As the two-way arrows between the two upper loops show, the present state of affairs is one wherein unsustainable water resources development at the national arena has a negative impact on water resource development at the regional level, as well as the other way round.

Similarly, the two-way arrows between the two lower loops show that sustainable water resource development at the national arena will positively influence water resource development at the regional level, as well as the other way round.

The broad downward arrow, with a question mark inside it, represents a hypothetical assumption that prevailing unsustainable water resource development, both at national and regional levels, can be transformed to sustainable water resource development if mutually supportive changes take place both at the national and regional levels. Greater political capacity, regional security and internal political stability, a lucid legal/institutional framework and greater resources for economic development are the desired changes at the national level. Similarly, an interstate cooperative policy framework, mutually pursued interstate security architecture, a mutually acceptable legal/institutional framework, and an environmentally sound and economically sustainable water utilisation regime will have to be established at the regional level. The strands of positive development in the two arenas do positively influence each other and further catalyze the establishment of mutual trust and interstate cooperation as *modus operandi*.

4 Four Approaches to Upstream–Downstream Cooperation: A Theoretical Framework and Hypotheses

Ever since the turn of the 20th Century, the utilisation of trans-boundary waters for economic purposes has posed a big challenge. Inasmuch as the water resources are shared, the upstream and downstream riparian states will have to agree on the principles and mechanisms of water utilisation. Riparian states tend to become sensitive as freshwater resources become scarcer. They become keen to know what their upstream or downstream counter parts want to do. No single riparian country will solely exploit the shared waters without regard for other co-riparian states. Traditionally every state had the exclusive sovereignty over natural resources, water resources included. With the world becoming increasingly interdependent in terms of economic, environmental, security and legal/political relations, the concept of exclusive national sovereignty over shared water resources no longer lends impetus to cooperative enterprise.

The following section attempts to present salient theoretical issues as regards sustainable utilisation and management of shared water resources. Security, environmental, economic and legal approaches have been selected in order to explain the theoretical issues of cross border water use and management. A theoretical discussion of the four realms will provide a helpful explanation and analysis for understanding the national and regional hydro-political dilemma of the Eastern Nile basin.

4.1 Security approach

Many scholars conclude that there is a positive relationship between resource scarcity and conflict. Freshwater is taken as the most important natural resource, and nations have increasingly vied for greater control. This is mainly attributed to the growth of population, structural dependence on agriculture, and the expansion of agriculture as a leading sector, especially in economically less developed countries, such as those in the Eastern Nile Basin. There are two schools of thought with regard to the increasing conflict over shared water resources. One school perceives that the increased competition over freshwater resources inevitably entails conflict between riparian states. One of the exponents of this school, Buthros Buthros Ghali, the former Secretary General of the United Nations, predicted in the early 1980s that “water would be a source of international conflict,” as cited by Waterbury (2002: 9). Joyce Starr (1991) wrote about the possibilities of water wars. Thomas Homer-Dixon (1994) underlined his expectation that conflict over the earth’s natural assets will grow, owing to increasing population growth and economic development. Arthur Westing (1986: v) argued that human history is an account of resource wars. Along the same lines, and some years later, Falkenmark and Widstrand (1992) argued that world history is replete with wars and conflicts over access to freshwater resources. Falkenmark (1990) takes the scenario even further and sees water as a factor in international disputes and conflict in the future. Gleick (1993: 79) contended that freshwater resources are objects of military campaigns and

conquests as long as they provide economic and political strength to nation states. A decade or so earlier some military analysts, such as Thompson (1978: 62-71), claimed that freshwater resources were becoming increasingly scarce, and that they would increasingly become a source of conflict.

In reference to the Horn of Africa, Eva Ludi (2002: 23) concludes that “regional issues have an imminent potential for conflict and are linked in one way or another to land and/or water scarcity”. With regard to a positive relationship between conflict and lack of capacity, she writes: “In principle conflicts might escalate due to the incapacity of local and traditional authorities to regulate growing tensions; [or] due to lack of policies to deal with such issues on a national level; or due to a low level of regional cooperation” (Ludi 2002: 23).

The other school of thought views water resources as an arena for future cooperation and common security. Elise Boulding (1993, 2002), for instance, explains at a rather simplified level that water flows like everything in nature. No state boundary, no barbed wire, no wall can stop water from flowing along its natural course, from its source to its final destiny. The significance of this simple explanation by Boulding underscores a common fact that actors, such as political decision-makers, tend to forget about or choose to ignore as not important. Boulding reminds us that water does not know state boundaries, it only knows its natural course.

Because water knows no boundaries, numerous states are bound to share the same watercourse at the upper or lower or middle course. And this is also why numerous river basins become the shared property of two or more sovereign states. There are some 240 river basins in the world that are shared by two or more countries. About 40% of the world’s population and 50% of its land resources are found in these shared river basins (Dolatyar and Gary 2000: 7). Other authors present varying figures. Scott Barrett (1994: 2), for instance, claims that there are 200 river basins shared worldwide. Elhance (1999: 4-5) on the other hand asserts that there are 215 shared river basins around the world and these are distributed as follows: 57 in Africa, 35 each in North and South America, 40 in Asia and 48 in Europe. Elhance further explains that 65% of continental Asia, 60% of Africa and 60% of South America are covered by shared water basins. Some countries such as Uganda and Paraguay lie entirely within shared water basins. According to the same author, 300 treaties have been signed with regard to shared waters throughout the world between riparian countries, and more than 3000 treaties have provisions relating to water questions (Elhance 1999: 5). The table below shows a sample overview of such an effort. John Waterbury (2002) has provided a distribution pattern of international water agreements across the continents. Obviously the table, while indicating the pattern of accords, does not include all of them.

Table 1: International agreements on River Basins

River basin	Location	Countries sharing	Status of cooperation
The Indus	Asia	India, Pakistan	Bilateral accord
The Ganges–Brahmaputra	Asia	India, Bangladesh, Nepal	India–Bangladesh bilateral accord
The Tigris–Euphrates	Asia	Turkey, Syria, Iraq	Turkey–Syria & Syria–Iraq bilateral accords
The Jordan	Asia	Israel, Jordan, Syria, Palestine	Israel–Jordan bilateral accord
The Nile	Africa	Egypt, Sudan, Ethiopia, Eritrea, Kenya, Tanzania, Burundi, Rwanda, Uganda, DRC	Egypt–Sudan bilateral accord
The Niger	Africa	Mali, Nigeria, Niger, Algeria, Guinea, Cameroon, Burkina Faso, Benin, Cote d'Ivoire, Chad	Multilateral accord
The Senegal	Africa	Senegal, Mali, Mauritania	Trilateral accord
The Zambezi	Africa	Zambia, Angola, Zimbabwe, Malawi, Mozambique, Botswana, Tanzania, Namibia	Zambia–Zimbabwe bilateral accord
The Colorado and The Rio Grande	North America	USA, Mexico	Two bilateral accords
The Mekong	Asia	China, Cambodia, Laos, Viet Nam, Thailand	Multilateral accord (without China)
La Plata	South America	Brazil, Argentina, Paraguay, Uruguay, Bolivia	Multilateral accord
The Danube	Europe	Romania, Yugoslavia, Hungary, Austria, Czech Rep. Germany, Slovakia, Bulgaria, Russia, Switzerland, Italy, Poland, Albania	Several bilateral and multilateral accords
The Rhine	Europe	Switzerland, Germany, France, The Netherlands, Austria, Luxembourg, Belgium, Lichtenstein	Several bilateral and multilateral accords
The Columbia	North America	USA, Canada	Bilateral accord
The Great Lakes	North America	USA, Canada	Bilateral accord

In contrast to the second school of thought, integrated management of water resources in shared water basins has not been an easy matter, owing to the fact that in numerous cases explicit implementation procedures and institutional mechanisms are not in place. It is for this reason that Dolatyar and Gary (2000: 7) argue that “water security is already one of the most crucial elements in the foreign policy considerations of many

countries". In response to this concern, and realising the importance of cooperation with respect to shared water resources, riparian states and multilateral agencies have elevated the issue of shared water resource management to a new level of diplomatic engagement. There is ample evidence of riparian states that have already made successful efforts to reach agreement of some form and on some level, as can be observed in the table provided above. Inter-riparian disputes about 'who gets what' will, however, keep riparian nations wrangling.

Basing his thoughts on the environmental context, Baechler (2002: 539) reminds us of the existence of many intricacies, including: multiplicity of parties, asymmetry of power between the contending parties, and the existence of other factors external to environmental issues. He prefers to consider environmental conflict resolution at a different, but higher level. First of all, Baechler explains that 'conflict resolution' or 'conflict management' is not enough. Rather, he suggests that going a step further or higher is necessary. By doing so he introduces the concept of 'conflict transformation'. Although he agrees that an organisational approach to conflict management is useful, he argues that proper institutionalisation will be necessary for its fruition. According to him, "conflict resolution has to deal adequately with so-called process and structures," the notion of which "stems from a modern scientific concept used to describe phenomena in nature, that comprise process and structure, at the same time" (Baechler 2002: 540).

In conflict transformation, Baechler further argues that, "we embrace the challenge to change that which has torn us apart and build something we desire" (Baechler 2002: 540). Baechler's view is that in 'process' and 'structure' phenomena, challenges are embraced in order to change the undesirable status quo to a desirable result. There is strong support for this view, in what Jerome Delli Priscoli (1990: 10) suggests, when he says: "help parties to own both the problem and the solution". In the same vein Oran R. Young, a prominent theorist on international organisations, notes that "Institutional design emerges as a process of steering complex bargaining toward coherent and socially desirable outcomes." (Cited in Delli Priscoli 1996: 30).

The growing need for cooperation on trans-boundary waters is viewed as inducing a shift from the 'traditional national security' perception to a 'common security' perception. For Boulding (1993: 202), "traditional definitions of security are bound up with concepts of the state as a defender of boundaries within which its citizenry is safe from threats to survival, whether those threats are military, economic or involve environmental resource deprivation". In reality, security must be collaborative if it is to be effective. Boulding (1993: 202) further suggests that common security is concerned with linking peace and environment, developing global regulatory systems through treaties, and making a shift from military preparedness to diplomatic preparedness.

It is quite understandable that bilateral and multilateral agreements have not yet been achieved in many shared river basins. Examples of shared river basins that currently have no riparian accords in place are: the Amazon River in South America, shared by Peru, Ecuador, Colombia and Brazil; The Congo River in Africa, shared by DRC, Cen-

tral African Republic, Angola, Zambia, Tanzania, Cameroon, Burundi and Rwanda; and the Syr Darya and the Amu Darya rivers in Central Asia, shared by Kyrgyzstan, Kazakhstan, Turkmenistan, Tajikistan and Uzbekistan. In other major river basins the existing accords do not encompass all riparian states. The 1959 ‘full utilisation’ accord in the Nile basin, for example, refers only to the two most downstream nations, Sudan and Egypt. The other seven nations at the time of signing, and now also Eritrea, another riparian country emerging in the basin, are not parties to the accord. The long-negotiated Mekong River Agreement of 1997 did not include China, the most powerful upstream state in that particular sub-region. Such partially or selectively inclusive riparian agreements may not or do not achieve collective security across the basin. The exclusion of some countries may even create a future security threat.

If we look at the three Eastern Nile basin countries, the existing status quo hangs on a delicate balance with no equilibrium. As a result of the 1929 Anglo-Egyptian Nile waters agreement, Egypt was able to obtain an almost unrestricted amount of water. Sudan bid for a greater share upon her independence in 1956. It took protracted negotiations for Sudan to have a greater share as determined by the terms of the 1959 agreement. The amount set for Sudan in the agreement was 18.5 billion m³ per year (Egypt and Sudan 1959: Nile waters Agreement, art. 2(4)). Sudan has indicated time and again that the agreed amount did not and does not indicate the water resource needs of the country. This can be clearly observed in the latter’s statements during the negotiation of the agreement in the 1950s and in the later day Sudanese Government statements (Collins 1990: 247-269). Ethiopia, on the other hand, was not a party to both the 1929 and 1959 Nile agreements. It has so far been able to utilise 0.6 billion cm³/year of the planned 6 billion cm³ /year in 1964 (Interview, Finchaa Irrigation management: 2001). As Ethiopia is not a party to the 1959 agreement, the amount that it has been able to utilise has only been determined by the country’s economic, technical and security capacity. As can be seen from various water planning documents, Ethiopia’s stated needs for water utilisation are much greater than the country has been able to put to any gainful use. Inter-state conflict over water resources in the Eastern Nile basin has been averted, not due to any established mechanisms in place, but rather to low-level engagement in the utilisation of the water resources in the upstream countries.

There is a growing realisation that increased utilisation of water resources is indispensable for the immediate alleviation of food shortages, as well as for agricultural and agro-industrial development and power generation. It goes without saying that water resource utilisation in each of the Eastern Nile Basin countries, especially in the upstream countries, will likely increase. This has already been clearly indicated in the respective national strategic development plan documents. In the interest of preventing any eventual water conflict, the riparian states will have to address trans-boundary water development and inter-state security concerns as inseparable issues. Wenger and Möckli explain that “security and development find common ground” (Wenger and Möckli 2003: 25). Inter-state security has a relaxing effect on riparian states and encourages them to opt for mutual cooperation on shared water resources. Future conflict prevention can be sought through more active engagement in adopting alternative and

mutually beneficial ways and means of water utilisation and management, both at the national and the inter-state level. In this regard, Wenger and Möckli explain that conflict prevention will have to be approached as a long-term process, involving the goals of providing systemic interaction, establishing the structure and addressing the immediate issues at stake (Wenger and Möckli 2003: 41).

Learning from the two schools of thought and the concept of collective security, the following hypothesis can be suggested. Successful negotiation and establishment of a treaty regime in the Eastern Nile basin, in the first place, will likely rid the protagonist riparian states of mutual insecurity. Second, a legal agreement becomes the basis for the long-term creation of a common security zone in the direction of mutual national interest through cooperative mechanisms. On the basis of historical observation, and also from a practical point of view, the national level capacity of the riparian states will likely determine how soon and on what terms cooperative mechanisms are achieved.

4.2 Environmental approach

The international community has been alarmed by the ever-increasing scarcity of freshwater resources, which calls for serious mitigation sooner rather than later (FAO, 1995: 4). It is no surprise, therefore, that concern and debate have focused on water issues for more than a decade. The UN system sponsored the International Conference on Water and Environment (ICOWE) in Dublin, from 26 to 31 January 1992. The ICOWE appealed for an innovative approach to the assessment, development and management of freshwater resources. The Dublin Conference further provided policy guidelines for the Rio Conference on Environment and Development, which was to be held in June 1992. The Rio Conference, in turn, recommended a reform of freshwater policy throughout the world. The World Bank's comprehensive water policy of 1993 defined new objectives. FAO recently established an International Action Program on Water and Sustainable Agricultural Development (IAP-WASAD). In the same way UN specialised agencies, international and local non-governmental organisations and bilateral assistance agencies have all been busy keenly taking part in programs related to water resources.

The dictum 'water is life' is commonplace nowadays. Water is an immediate and essential part of our environment. The need to reckon with environmental aspects is becoming a criterion in development planning of activities related to water development. This was clearly emphasised during the Global Summit in 1992 in Rio, and the summit's document was incorporated in Chapter 18 of Agenda 21 (UNCED 1992). Thomas and Howlett (1993: 19) view the Rio perspective on the place of water in our environment optimistically, and suggest that international consensus has been reached on the urgent need for integrating management of water resources as a prerequisite for socio-economic development and conflict mitigation in the future.

A nationally confined and fragmentary approach to shared water resources is and will remain an intractable problem. The solution to this, however, rests on a holistic environmental approach at a basin-wide scale. Environmentalists rightly argue that grave

consequences of environmental degradation and resource scarcity are not confined to national borders and will inevitably affect all parties in one way or another. There is also an increasing need for awareness of environmental security. Environmental security can only be safeguarded through the collaborative effort of states in developing shared regimes pertaining to freshwater basins. There is a growing realisation that environmental security will not be achieved through military action. One important reason for this is that national territorial boundaries and natural resource boundaries may not be the same. Historically, national boundaries evolved in political processes that might have included military means. But natural resources such as rivers or freshwater lakes cross political boundaries. Thus any one state cannot and should not claim authority over such an international resource. Understandably, freshwater is a vital resource and requires more special attention. Lest the environmental security of all parties be in jeopardy, states in an eco-geographical region will have to create a sustainable form of environmental collaborative security. The key issue here is to understand the limits to the (relative) carrying capacity of a particular environmental asset and to know how to manage and use it sustainably now and in future.

The concept, “sustainable development” was first mentioned by the World Commission for Development and Environment (WCED 1987) in its report, “Our Common Future”. The report of the WCED viewed environment and development in a unified manner, and suggested the establishment of a new approach to economic growth, one in which the criteria would be ‘meeting the needs of the present generation without compromising the needs of future generations’. This concept was widely accepted. Hence, according to the World Bank report (1992: 8), meeting the needs of the present generation implies an essential aspect of sustainably meeting the needs of subsequent generations. This is a new approach to economic development. Equitably sharing limited resources, using available resources efficiently, and applying environmentally sound technology to them is the essence of this new concept. This suggests that our economic goals must be adjusted in view of ecological possibilities, and goals and priorities modified accordingly.

The basic tenets of sustainable water use rest on equity, efficiency and ecological integrity. All this prepares the ground for the establishment of a cooperative international system, which will serve as a mechanism for national and inter-state security. Efficient utilisation of water resources should be a guiding criterion that decreases the rate of evaporation, prevents erosion, and minimises flood occurrences, silt accumulation and soil salinisation.

Given the ecological characteristics of the Eastern Nile basin, one hypothesis plausibly suggests that construction of dams in upstream Ethiopia, where the climate is temperate, can provide a more sustainable alternative to constructing a dam in the desert climate of a downstream area. Further benefits derived from having a water reservoir and water management in the upstream area include possibilities such as irrigation, generation of hydroelectric power, and prevention of soil erosion in Ethiopia; eliminating the hazards of seasonal floods and silt accumulation in Sudan; and avoiding excessive evaporation

for net increase of freshwater in downstream Egypt as well as in midstream Sudan. Construction of dams in Ethiopia would offer opportunities for irrigation and hydroelectric power generation in Ethiopia, and would increase the total availability of freshwater in all the riparian countries, including Egypt, which is furthest downstream.

4.3 Economic approach

The essence of an economic approach to freshwater management is the efficient use of available water resources at a given time and under given environmental circumstances. The economic management of trans-boundary water resources can best take place on a basin-wide, sub-basin or regional level. This, however, presupposes peaceful interaction between the riparian countries. Some three decades ago, Hirschleifer, et al. (1969: 2), underscored that water is a commodity and, just like other goods, societies want it in order to satisfy the needs of their members. The basis for the economic argument is to treat water the same as any other commodity. As the slogan goes, "Water! Water! Everywhere but at a price!" The proponents of water economics explain that water scarcity could easily be solved with economic instruments because it is a renewable and reusable resource. In aggregate, so they explain, there is more than enough water worldwide. The challenge is thus a question of spatial and temporal distribution. Overcoming this challenge depends largely on the willingness of people (especially the political actors) to use water resources economically. The following table by Baumgartner and Reichel (1975) indicates that the proportion of freshwater resources is but a small fraction (a mere 2.6%) of the total available water resources worldwide. This small proportion, however, demonstrates the availability and abundance (36,020,000 km³) of freshwater resources, although they may be costly to obtain. Various sources, and the amounts and proportions of the Earth's available water resources, are provided in Table 2.

Table 2: Globally available water resources

Source of water	Volume, 1000 cubic km	Per cent of total available
Oceans	1,348,000	97.39
Polar icecaps, icebergs, glaciers	27,820	2.01
Ground water / soil moisture	8,062	0.58
Lakes / rivers	225	0.02
Atmosphere	13	0,001
Total	1,384,120	100
Fresh water	36,020	2.6

The available freshwater resources are found in different forms and places. By far the biggest proportion is found outside the easy reach of humankind. The bulk (77.23%) exists in the form of polar icebergs, icebergs and glaciers. The next largest amount (22.81%) exists in the form of groundwater resources at various depths in the earth. The proportion of freshwater resources contained in rivers and lakes is relatively small (0.353%). It is interesting to note that the total amount of freshwater carried in the riv-

ers is a mere 0.003% of the total freshwater resources available worldwide. Most state or non-state actors vie for the use of river water resources, obviously, and because access to rivers is much less costly compared to other freshwater resources. Table 3 summarises the types and amount of freshwater available globally.

Table 3: Type and amount of globally available freshwater

Type and form of fresh water	Per cent of total
Polar icecaps, icebergs, glaciers	77.23
Ground water to 800 m. depth	9.86
Ground water from 800 m. to 4000 m. depth	12.35
Soil moisture	0.17
Fresh water lakes	0.35
Rivers	0.003
Hydrated earth minerals	0.001
Plants, animals, humans	0.003
Atmosphere	0.04
Total	100

Source: Baumgartner and Reichel (1975: 14)

In almost all cases of cross-border water resources, planning for water development is carried out nationally, with little or no regard to the overall water resources balance along the watercourse. National planners seldom if ever take into account the present and future water use needs in other countries within the same water-course. In national level planning, the integrity of the water cycle is often disturbed to such an extent that the law of supply and demand for water is disrupted. National planners are generally guided by the water requirements of their respective countries and do not necessarily take into account the total supply of water in the watercourse. Nor do they take into account the water needs and requirements of other co-riparian countries. This problem is attributable to the technocratic and elitist handling of the planning of water resources development that takes place exclusively at the national level. It is for this reason that Dolatayar and Gray (2000: 6) advise that “when water resource management is properly handled, it can provide the basis for economic growth, improvement in living standards and socio-political stability”.

Another study on the economics of water by Winpenny (1994: 9) contends that water has been mishandled for too long as if it were limitless and freely available. The above author wonders why both consumers and suppliers do not recognise its economic value. According to Winpenny, water scarcity can be explained by three factors: 1) Water is under-priced compared to its real cost of delivery. 2) Water is under-priced compared to its environmental costs. 3) Water is often a public good; and for this reason it becomes difficult to extract an economic price from users.

The economic management of water is possible both at national and cross-national levels. Two forms of cross-national water management can be suggested: 1) recycling or quality renewal, and 2) 'virtual' water transfer. With regard to the first, the quality of water lost during its use upstream must be restored. An example would be the desalination of the Colorado River by the United States of America in Mexico. Due to extensive irrigation use of the waters of the Colorado within the United States, the river loses its natural quality by the time it reaches Mexico. The second type of transfer relates to virtual water as a form of quantity transfer. In keeping with the economic value of water, countries may opt to buy food grains at economically advantageous prices if water resource development is too costly, or if it is politically or otherwise impossible to develop in one's own national territory. This scheme in fact can be planned at a cross-national level through collaborative planning by using the comparative advantages of different countries. In summary, economists point out that water resources are best put to efficient and sustainable use where the economic application is most advantageous, irrespective of national boundaries.

Up to now water utilisation and management in the Eastern Nile basin has been far from a basin-wide approach. Water development strategies that are confined to a national level seem to be elitist-driven and very technically oriented. The obvious flaw in this prevailing approach, although politically maintained, is a contributing factor in slowing national water development, and this is not something the respective governments can claim as an achievement. Soil erosion and land cover loss in Ethiopia, silt accumulation and decreasing water quality in Sudan, and land salinity and excessive evaporation in Egypt can be understood as a consequence of national water development strategies that ignore a basin-wide approach.

Using water resources in one country without considering the supply and demand patterns in other co-basin countries will likely lead to uneconomic utilisation. We can, therefore, hypothesise that a basin-wide approach to water resource development of the Eastern Nile will result in more efficient use and increased economic benefits for all three riparian countries: Ethiopia, Sudan and Egypt.

4.4 Legal /institutional approach

The ownership question and the issue of the rights of use of the water resources that border or flow through a country's territory is the basis of legal discourse. The basic assumption is that riparian nations have juridical rights to shares of the water resources. Dolatyar and Gary (2000: 39), for instance, explain that law is a major determinant in finding and maintaining legitimate and sustainable solutions should conflicting claims of equity or other issues on shared water resources arise. They further contend that "...without appropriate legal channels and adequate rules, the potential for conflict over water increases both at local and international levels" (Dolatyar and Gary 2000: 39).

The search for establishing legal rules for managing water utilisation is not new. Upstream and downstream users must agree on mechanisms to allot the water resources from the shared water basin. Especially in Third World countries, riparian agreements

are often inherited from the colonial past or induced by external institutions like the World Bank. The World Bank's Operational Directive 7.50, for example, requires that riparian nations must agree amongst themselves as a prerequisite for providing investment support for their cross-border water resource development (World Bank 2001).

Establishing legal mechanisms in the first place and integrating cross-border cooperation between riparian nations greatly depends on the ingenuity and wisdom of the political actors and diplomatic negotiators. In other words, establishing and maintaining legitimate and sustainable solutions for shared water resources requires short-term sacrifices for long-term benefits. The reason behind this assumption is that without clearly laid down rules, the utilisation and management of shared water resources and their proper development will be severely constrained.

In many areas of the world, international agreements have created amenable conditions for upstream-downstream cooperation. International treaties on shared water resources date back centuries, although the pace of their development is rather slow. At present well over 2000 international agreements exist as regulating instruments in over 240 shared river basins (Blake et al., 1995: xiv). Over 286 agreements deal with freshwater issues (Vlachose 1990: 186; Frey 1993: 58; Naff 1994: 272). Such treaties attest to the possibility of peaceful water use. If conditions for a global water law are ripe, the answer as to whether peace prevails or not will still be a matter of opinion. Bailey (1996), for instance, advocates a global water authority. The idea can be said to be promising. One must, however, take into careful consideration that there are many technical, legal, political and even geopolitical complexities to be reckoned with. Delicate factors to take into account include: whether a country is an upstream or downstream country, or whether it shares a river as a border, and the relative economic power and relative military strength of a riparian country.

As a result of this, several water law doctrines have emerged in the search for plausible criteria for defining the water rights of riparian nations. These comprise: 1) The doctrine of absolute territorial sovereignty; 2) The doctrine of absolute territorial integrity; 3) The doctrine of community of property in the waters; 4) The doctrine of limited territorial sovereignty; 5) The doctrine of optimal development of the river basin. Trolllden (1992: 79) presents a detailed description of the doctrines.

The doctrine of absolute territorial sovereignty refers to the principle that a state's sovereign rights are reserved to make full utilisation of all water resources within its territory, irrespective of the effects beyond its territorial jurisdiction. This doctrine is associated with the so-called Harmon Doctrine, named after US Attorney General Harmon, who developed the doctrine with regard to the 1895 dispute between the United States of America and Mexico over the use of the Rio Grande River (Thomas and Howlett 1993: 16).

The doctrine of absolute territorial integrity, in contrast, asserts that no riparian state can change the natural flow of a river. One of the proponents of the doctrine, Oppenheim (1948: 430), wrote as follows: "It is the rule of International Law that no state is

allowed to alter the natural condition of its own territory to the disadvantage of the natural conditions of the territory of a neighbouring state. For this reason, a state is not only forbidden to stop or to divert the flow of a river which runs from its own to a neighbouring state, but likewise to make such use of the water of the river as either causes damage to the neighbouring state or prevents it from making proper use of the flow of the river.”

The doctrine of community of property in the waters argues for a reasonable share or equitable use by all riparian states, not causing unreasonable harm to any other riparian state. Henry Farnham was the chief exponent of this doctrine. He argued that international watercourses are the common property of all states through which the waters flow. He further argued that no state shall intervene to diminish the resource for others sharing it (cited in Thomas and Howlett 1993: 16).

The doctrine of limited territorial sovereignty restricts state sovereignty and binds riparian states to share water resources according to such criteria as prior appropriation, arable land and population (Frey 1993: 58). This doctrine further holds that each riparian state, regardless of whether an international watercourse originates in or traverses its territory, has a vote in deciding what measures are adapted within the watercourse as a whole. The state, however, which has been using the water the longest, has some priority (Wolf and Dinar, 1994: 81; Thomas and Howlett 1993: 17).

The doctrine of optimal development of the river basin advocates the development of a river basin without regard to national boundaries (Falkenmark 1986a: 108; Frey 1993: 58; Wolf and Dinar 1994: 70). This theory incarnates contestable notions such as: “optimal”, “reasonable”, and “equitable” allocation criteria. Moreover, the doctrine presupposes the existence of basin-wide institutions. This doctrine comes closest to the economic theories discussed earlier. It aims at the most efficient use of water in a basin.

The actual situation of a watercourse dispute may not hold to one or another water use doctrine. In the first place, the watercourse-related doctrines exist as theoretical schema, only potentially usable in a body of a future water law, and only when this is supported by bilateral and multilateral accords. In the meantime, therefore, in case of contestation between riparian states over the question of shared water resources, the riparian states would rarely opt to go to the International Court of Justice, preferring to hold to the particular legal theory which best justifies their demands, and using it as bargaining chip. Hence it can be construed that downstream riparian states reject the doctrine of absolute sovereignty, while upstream states reject the doctrine of absolute territorial integrity. This situation emanates from the basic problem of the absence of binding treaties to govern the general and specific terms of shared waters, and the lack of essential inter-riparian institutions to assure compliance among the users of a given watercourse (Naff 1994: 272).

Specific basin-focused treaties are, traditionally, a practical arrangement by which the riparian countries can bring together a set of effective legal instruments for mitigating and solving disputes that might arise over shared water resources. Such agreements

often provide for the establishment of joint river commissions. In some cases, the commissions merely have advisory functions. But in other cases they may have decision-making authority. The achievements of joint river commissions may vary greatly in different river basins. The well-functioning river commission of the Rhine with decision-making control is elaborated by Schulte-Wulver-Leidig (1992), the river commission of the Senegal by Haddad and Mizyad, (1996), and the river commission of Indus by Alam (1998), and Mehta (1986).

Supra-national institutions have been evolving, but as can be expected, rather slowly. They may generally be envisaged as efficacious in addressing the interests of communities in member countries. The first of these attempts is the Helsinki Rules (HR) of 1966, on the uses of the waters of international rivers. The International Law Association (ILA) produced the Helsinki Rules. Some provisions by the ILA, however, caused controversy as to their meaning and interpretation. The provisions, for example, that embody the notions: “reasonable” and “equitable” sharing of the water resources and “international drainage basins” have been contested. Hence, undivided support for the Helsinki Rules could not be obtained. Some states support the concept of ‘international watercourse’, others the concept of ‘international drainage basin’ (Thomas and Howlett, 1993: 7), obviously in view of their perceived national strategy of dealing with other co-riparian states.

The second attempt at the codification of international water resources law is the Convention on the Law of the Non-navigational Use of International Water Course (LNUWC). It was adopted by the UN General Assembly Resolution of 21 May 1997, with a vote of 103 in favour, three against and 27 abstentions (The Water Page, 1997a; 1997b). The great significance of the Convention is that it aims to shift international water disputes from contests of power to fair rights and mutual obligations. The responsibility of each state is inherent in the provisions: to use water resources efficiently and to avoid depriving or damaging the interests of co-riparian states. The International Law Commission is an autonomous body, which was entrusted by the UNGA resolution (UN, 1997) to promote international water law. Actually the commission had been working on this task since 1970. It is noteworthy that the two principles in the convention, the one of ‘equitable use’ and the other of not causing ‘appreciable harm’ are in a way similar to the other two doctrines, namely, the doctrine of ‘absolute territorial sovereignty’ and the doctrine of ‘absolute territorial integrity’. The upstream countries maintain the doctrine of ‘absolute territorial sovereignty’ and the principle of ‘equitable use’, while the doctrine of ‘absolute territorial integrity’ and the principle of ‘no appreciable harm’ are upheld by the downstream countries.

Doctrines are extensions of traditional national security interests and manifest sovereign rights. Conventions are an attempt to create supra-national legal frameworks within which riparian countries relate to each other as regards the utilisation of shared water resources. Even if conventions exist, their efficacy depends on the willingness of riparian states to accept them and be bound by them. Doctrines and conventions exist, but

riparian states have yet to negotiate with one another on the best terms that enable them to have a mutually acceptable legal and institutional framework.

It can be hypothesised that legal and institutional frameworks are sine qua non for guiding and regulating inter-riparian cooperation over the utilisation of shared water resources. Furthermore, existing doctrines and conventions do not yield cooperative behaviour among co-riparian states without negotiated and mediated agreements. A negotiated legal/institutional framework can be suggested as a reference and as a guiding principle when riparian states relate to one another in water resource development activities within individual countries and between countries.

5 Wider Significance and Application

In view of syndrome mitigation, the study aims to make a useful contribution towards preventing, mitigating and transforming upstream-downstream conflict in the Eastern Nile Basin. The study concentrates on core problem analysis. It probes the national and regional predicaments of cooperation imbedded, among other things, in regime incapacity, inadequate policy /legal /institutional frameworks, low economic development and mutually perceived state insecurity.

In view of transfer of knowledge, the study program from the very inception was bundled in a tandem PhD research format linking downstream and upstream perspectives. The two PhD candidates have all along coordinated research methodology and approach, shared findings and benefited from each other's experience, while their respective research progressed independently. The results in progress were shared with the academics from the universities and water resources- related institutions in the three Eastern Nile basin countries, in a series of workshops organised at a neutral venue. The transfer of knowledge in this particular case took the form of an Interactive Dialogue Workshop.

The deliberation prompted the participants from the otherwise protagonist nations to search for a "Mind-Map" of sustainable cooperation among the riparian states. The final outcome is expected to inform about the concepts, instruments and methods of enhancing cooperation over the shared water resources. The direct stakeholders, researchers, and academia, as well as those institutions and individuals interested in conflict transformation, may find the results of the study a useful learning resource.

Field study and direct observation in the three upstream valleys of the Nile Basin (Abbay, Tekeze and Baro-Akobo) reveal that the more intensified utilisation of water resources urgently requires upstream-downstream collaboration to establish inter-state policy, institutional and planning regimes for water utilisation and management.

In view of social and economic significance, the result of the study may be applicable in a number of ways. (1) The on-going Nile Basin Initiative as well as the Eastern Nile Subsidiary Action Program will likely benefit, especially in terms of conceptualising the necessity of integrated approach in terms of institutional development, economic planning, security infrastructure and sustainable use and protection of the shared environmental assets. (2) With regard to global perception of change, the study establishes that riparian nations are inextricably bound together by geographical facts, and that options for war and conflict can only be to their mutual detriment. Cooperation on shared resources in general and water resources in particular is the only option for mutual benefit and win-win solutions.

Historically, water utilisation in the Eastern Nile Basin has been unilateral and there are no comprehensive inter-riparian modalities that can facilitate cooperative development and joint planning activities between upstream and downstream riparian states. Possible

and mutually beneficial alternative to the unilateral and conflicting water utilisation approaches are not seriously addressed. This study contributes towards concepts and imperative needs for comprehensive approach both from regional and national contexts, especially drawing on the following assumptions:

1. Identification of the elements of national and regional dilemma of hydro-politics: Findings will help national and regional policy-makers understand the essential weaknesses at national and interstate level, and help raise the level of conceptualising the causes and circumstances of the lingering tension between the upstream and downstream nations in the Eastern Nile Basin.
2. Shift of paradigm: Riparian actors will discover that the only plausible way for sustainable water development on trans-boundary rivers is through interstate collaboration on the basis of reckoning with the advantages from the view point of mutual security, best use of the environmental resources, economic use of the increasingly scarce water resources, and conflict prevention through legal/institutional mechanisms.
3. Riparian cooperation: Upstream and downstream countries will have second thoughts about cooperation on joint and cross-border programs, for instance, in the areas of joint watershed management, joint power production, joint water conservation activities and collaborative strategies of irrigation development. The study will help the riparian nations move away from adversity and hostile postures and choose the alternative of mutual trust, shared vision, and cooperative investment to enhance joint capacities for sustainable development of the shared water resources. It goes without saying that cooperative relationship at interstate level will have a direct and a trickle-down effect on intercommunity interaction for economic cultural and scientific fields. Expanding and maturing cooperation will provide a sustainable ground for conflict transformation in the Eastern Nile Basin.

6 Conclusion

A unilateral and exclusionist approach to the management and utilisation of shared waters of Eastern Nile basin has prevailed for too long. The cost of non-cooperation has resulted in hydraulic tension among the upstream and downstream riparian states. With a view to creating a community of interest in the Eastern Nile basin, it becomes necessary to determine the extent of various interactions between and among the countries in the sub-basin. There is a need to know which activities should be given more attention, in order to intensify these activities to create a community of interest. Building on what already exists, and establishing and expanding many more areas of interaction, will likely contribute towards making the riparian countries permanent partners rather than misguided adversaries. External actors and international agencies can play a useful role in facilitating these efforts in collaboration with the riparian governments and other actors within the Eastern Nile basin. The modalities of interaction will have to be chosen carefully and in a mutually acceptable manner. This will help to further enhance mutual empathy between the peoples across the state borders and accentuate shared visions and mutuality of interests. Certainly such interactions can be used as a baseline to resolve the more entangled hydro-political issues at interstate levels.

Learning from the concept of mutual security and establishing inter-state conventions or treaty regimes in the Eastern Nile basin will help the riparian states build mutual trust and confidence. Such a common security zone would satisfy national interests through cooperative mechanisms. State capacity on national level will greatly influence when and how such a cooperative mechanism can be realised. Eastern Nile basin countries can create inter-state mechanisms to overcome the prevailing political, environmental, legal and institutional predicaments in order to attain a sustainable system of water utilisation and management. Using water resources in one country, without considering the supply and demand patterns in other co-basin countries, will likely lead to uneconomic utilisation. A basin-wide approach to water resources development in the Eastern Nile basin will encourage the efficient use and increased economic benefits for all three riparian countries: Ethiopia, Sudan and Egypt.

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The Nile waters system consists of numerous tributaries and headwater lakes. The Ethiopian headwaters provide 86% of the annual volume of the waters of the Nile, while the remaining 14% comes from the Equatorial Lakes region through the White Nile system. Egypt and Sudan are net recipients of the Nile waters that come down from the two headwater sub-systems. In accordance with the Nile Basin Initiative (NBI) the basin is divided into two sub-basins, i.e. the Eastern Nile Basin and the Equatorial Nile Basin. No institutional and legal mechanisms to regulate the utilisation and management of the Nile's water resources exist. The absence of a legal and institutional framework and the prevailing "anarchic" approach to the utilisation and management of the Nile's waters have led to unregulated competition and interstate rivalry between Ethiopia and the two downstream nations (Egypt and Sudan). This study aims to understand the prevailing national and regional dilemma of hydro-politics in the Eastern Nile Basin - a dilemma between inadequate capacity and unsustainable use at the national level on the one hand, and inadequate cooperation and mutual insecurity at the regional level on the other. While the need for and dependence on shared water resources are on the increase, the pattern of unsustainable utilisation of water resources has not changed. The study assumes that increased political, institutional, security and economic capacity at national level, and a cooperative framework and mutual security environment at regional level, will likely lead to more sustainable development of water resources both at national and regional levels.