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Geopolitics of Trans-Boundary Water Management: Case of Nile Basin Riparian

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Abstract: Water scarcity and lack of proper management of water resource is a major cause of concern in many trans-boundary river basins of the world. Being the longest river the Nile basin which has 11 riparian, holds significant place in geopolitics of trans-boundary water management. Egypt, Ethiopia, Sudan and South Sudan play an important role in the region's hydro-politics. Therefore, these countries have been taken up as a case study to analyse the geopolitical scenario in the basin states.

Keywords*:* geopolitics, hydro-politics, water management, Nile basin, riparian.

INTRODUCTION

Water is an important natural resource that is vital for practically every aspect of human, animal and plant life on earth. Availability of water can make a difference between life and death, between bounty and poverty. Water resources around the world continue to be threatened by population explosions and its many associated effects (like increase in industrialization, urbanization, water pollution, deforestation, etc.) confirming that water is finite and cannot withstand all the pressures on its quality, quantity and life giving purposes. Rivers and lakes serve as reservoirs for human societies and therefore need to be sustainably utilized and conserved in the long run. With the growing demand on national water resources, states are increasingly turning to

strategies of trans-boundary water management. Water scarcity is probably the single biggest threat to hamper food security anywhere in the world.

Around more than 50 percent of the total land surface comes under trans-boundary river basins. The socio-economic and physical diversity among riparian nations[1] which share the river basin led water management difficult, in this regard various international agreements and treaties provide a framework that allows riparian to deal and overcome this diversity under a legal structure. The legal structure may provide for common monitoring and management of the water resources that includes management and monitoring of water quality, water flow and infrastructural development in order to enhance sustainable development of water resources. Thus, this paper looks into the matter with geopolitical perspective. Egypt, Sudan, South Sudan and Ethiopia are the major countries which play a dominant role in geopolitics of water management in the Nile basin region. Therefore, these countries have been taken up as case study for the analysis of the situation.

NILE BASIN

The Nile is regarded as the longest river of the world and is situated in North East Africa. The Nile derives its name from the Greek word "Neilos", that means a river valley or valley. The ancient Egyptians called the river Ar or Aur which means black, as the river flow north-ward and flooded the lands in Egypt leaving behind black sediments. The ancient Egyptians and Greeks gave the basin its oldest name Kem or Kemi, which also means black. The river's water and the fertile soil along its banks provided the ideal settings for the evolution of the civilizations that subsisted in the ancient world. The ancient inhabitants who used to live along the river's banks invented the agriculture and were the first to use the plow.

In the Nile River basin, water management is the cause of concern for water scarcity and food security. In the basin the relationship

[1] The Countries Surrounding the Nile River are referred as Riparian Countries.

between water and food security is a tenuous one, as the links between irrigation and agricultural production remains fragile. The Nile is the longest river of the world and its basin covers 3.3 million km^2 with a length of 6,671 km; its basin covers about one tenth of the African continent. The catchment area of the Nile consists of 11 countries: Egypt, Ethiopia, Sudan, South Sudan, Democratic Republic of Congo (DRC), Burundi, Eritrea, Kenya, Tanzania, Uganda and Rwanda (Map 1). According to a report from the Nile Basin Initiative (2012), total population was 437 million in 2010 in all riparian of that 238 million inhabited in the basin area which account for approximately 54 percent of the total population. It is estimated that by 2025 some 600 million people will be living in the Nile basin countries and more than 300 million in the basin (NBI 2012). The population growth will contribute to the demand for water and the demand for water is already worsened by the industrial and agricultural growth of the region. The threat of droughts is constant and enhances the problem's urgency and at the same time pollution from various land-use activities lowers down-stream water quality. Except Kenya and Egypt, all of the Nile Basin riparian are among the 50 poorest countries of the world, causing their inhabitants more vulnerable to disease and famine. Inequitable water distribution and improper management of the Nile water are the major cause for all the problems, which the region faces.

As mentioned, the Nile basin riparian are among the most poor and food insecure countries of the world and lack of proper water management in the Nile basin is one of the major cause for the situation. The population indicators of all Nile riparian are shown in Table 1.

Table 1: Recent population Indicators in the Nile Basin Countries

Country	Total Population 2012	Population in the Nile River Basin 2012
Burundi	8749387	5147477
DRC	69575394	2643865
Egypt	83958369	80377080
Eritrea	5580862	2096985
Ethiopia	86538534	34862524

Kenya	42749418	16962930
Rwanda	11271786	9310974
South Sudan	9614498	9516014
Sudan	36107585	31538569
Tanzania	47656367	10244308
Uganda	35620977	35418768
Total	437423177	238119494

Source: NBI 2012; and UN 2010.

Map: 1 Political Map of the Nile River Basin Countries

Source: Nile Basin Initiative 2012.

GEOPOLITICS OF TRANS-BOUNDARY WATER MANAGEMENT

Trans-boundary Water

Trans-boundary water may be referred as water body or mainly river which is shared by more than one country. Presently trans-boundary water shares more than 260 international river basins that accounts for almost half of the land surface of the earth and provide home to around 40 percent population of the world and supports an approximately 60 percent of total fresh-water flow on the surface. As water demand increases in all countries, this common water resource faces complex and competing needs of billions of populations for their needs such as for drinking water, food needs, energy and industrial demand, leaving less water often of much lesser quality. Even where robust river basin sharing and its proper management are practiced the uncertainties of climate change may cause difficulties for the riparian to enhance their co-operation for peaceful utilization of water resources.

Not only international rivers are complex in sharing water and water resources but sub-national entities like states, provinces, regions and municipalities need to share and cooperatively manage the water that flow between them. In this way, trans-boundary conflict of water management and tensions among sharing parties are found at all scales. These tensions over water sharing may be seen at the smaller scales, for example within a city or village where no political or physical boundaries are apparent, sharing parties generally find it difficult to share water in a manner that is considered by all to be fair and reasonable. From the international to the local level, similar tensions and opportunities will arise wherever users share a water resource whose quality and quantity affects, and is affected by, all of its users.

Water Management

As mentioned above, half of the earth's land is covered by trans-boundary river basins, which is shared by two countries or more, making many countries dependent on the use of common water resources for national development (Wolf et al. 1999). Individual country alone cannot manage trans-boundary water resources. For example, fish ravels in an up-stream riparian are inefficient, hydro-

power development in a flat down-stream riparian is ineffective, or many developments on boundary stretches are impossible (Mostert 2005). Notwithstanding, co-operation in managing trans-boundary water resources is necessary but can be difficult, not least because property rights are generally ill-defined and disputed. Thus, the water management is very enormous and challenging. The way in which it is presented will significantly influence future manners of macro-economic development potentials and the magnitude of poverty burdens.

As the Nile riparian gained independence from Colonial powers, riparian disputes became international and consequently more contentious, particularly between Egypt and Sudan and Ethiopia. The core question of historic versus sovereign water right is complicated by the technical question of where the river ought to be best controlled – upstream or downstream.

Water is crucial to every form of life and practically every human activity. It is important for agricultural productions, transportation, disposal of wastes, industrial uses and sometime establishes international or national boundaries (Powers 2004). For this purpose, it eludes institutional classification and needs broad inter-sectoral co-ordination for adequate and wholistic water management (Wolf, Stahl, and Macomber 2003). This makes disputes or inefficiencies more likely.

The major characteristic of the Nile basin water resources is their growing 'scarcity' due to various kinds of elements. The dominant water management paradigm across the globe, the Integrated Water Resources Management (IWRM), is proclaimed upon the idea of scarcity in many ways, which has emphasised on demand and management and efficiency in both allocation and distributions of water among the basin riparian. Nonetheless, even in areas of relative adequate quantity of natural water, many people have deficient access to water. Certainly, the African countries where people have the least access to water are not those with the least natural water availability. Therefore, it is clear that among the fundamental causes of lack of access to water, institutional, economic, social and political factors are

just as important as 'hard' technological factors (McGranahan and Satterthwaite 2004).

Additionally, because of the significance of shared water resources and other regional links, water scarcity cannot be seen in a local or even national context but rather as a regional issue. Countries, states, corporations and other institutions have the power to manage and transfer water from one basin to another. Therefore, water scarcity is relative instead of absolute and intermediated by power relationships among other factors within and between countries (Thompson 2000).

Geopolitics of Trans-Boundary Water Management in the Basin Countries

> "Water flows towards the powerful and the rich" (Fradkin 1981, 156)

Geopolitics focuses on the political and strategic significance of geography and how strategy is shaped by geographical factors of any region or country, whereas hydro-politics refers to the study of conflict and co-operation among riparian over shared water. Though the present western geopolitics favour's the Horn of Africa for its strategic and geographic significance in the fight against transportation of commodities, particularly oil, Egypt, situated in one of the most unstable regions of the world, has been seen as a critical ally of the western countries. Consequently, the major industrialized states were unwilling to support anything up-stream on the Nile basin that might disrupt the vital flow of water to Egypt and thus initiate instability there. Meantime, Ethiopia and the upper riparian lacked financial resources to develop the necessary broad irrigation and hydro-electric networks. But with the changing scenario the upstream countries, particularly Ethiopia, have started unilateral, bilateral or multilateral projects on the Nile and its tributaries.

Case of Egypt

The Nile River is the life-line of Egypt. The country owes its existence to the river which provides water for agriculture, industry and domestic use. Nearly the whole population of Egypt resides along the

Nile, and cultivation of crop is dependent on irrigation from the river. Egypt relies on the Nile River for 97 percent of its water needs; despite 95 percent of the discharge originate from upstream states. The Blue Nile, with headwaters in Ethiopia, accounts for 85 percent of the Nile's discharge. Egypt's water use exceeds annual renewable resources within the country (Kemp and Harkavy 1997).

Egypt uses its annual allocation of 55.5 billion cubic meters of water from the Nile, and an additional six billion cubic meters of Sudan's allocation (out of Sudan's 18.5 billion cubic meter of allocated water according to 1959 bilateral agreement), due to Sudan's inability to use its full allocation. Groundwater resources are sizeable: 300 million cubic meters in the Nile delta and 200 million cubic meters in the Nile Valley aquifer. Unfortunately, the groundwater supplies are not economically recoverable and have to be managed closely to prevent a decline in the water table and saltwater intrusion. These two water sources are being used at half the annual renewable rate. Eighty percent of Egypt's water use is for the irrigation of agriculture where water loss is significant due to inefficient water delivery systems.

The Aswan High Dam, completed in 1971, gives Egypt a large measure of control over its national water supply. However, high evaporation rates due to the location and climate reduces the efficiency of the dam. Additionally, the hydroelectric production of the dam only accounts for twenty-two percent of total electrical production in Egypt.

Egypt's land reclamation projects, both in the Nile Delta and Valley, and between the delta and the Suez Canal, and in the Sinai, is considered a priority. Only thirty percent of the lands reclaimed become economically productive. Agricultural expansion is largely a response to the country's growing food deficit. Large portions of Egypt's bulk food needs are met by imports, despite an increase in domestic food production. Self-sufficiency is exhibited in fruits and vegetables, and Egypt is able to export a portion. While the results of land reclamation and agricultural expansion are questionable, they are clearly a national interest (Beschoner 1992).

Case of Sudan and South Sudan

Sudan is allocated 18.5 million cubic meter of Nile water annually by agreement with Egypt, but uses only 12.5 million cubic meters. Over eighty percent of allocated water is used for irrigation of agriculture. The few dams that have been built store eight million cubic meters and satisfy most of Sudan's electricity needs.

Sudan has been developing irrigated agriculture since the 1970's in its plan to become the "breadbasket" of the Middle East. The agricultural schemes have largely failed but great potential still exists provided large investments in infrastructure and proper management are made available. The agriculture sector employs over sixty percent of the population, and accounts for almost forty percent of GDP and 95 percent of exports. However, drought and population displacement have caused widespread food shortages. Unequal distribution of water resource has also been a factor for contention among Nile basin countries. Sudan's economic and political situation jeopardizes irrigation development plans (Beschoner 1992).

The other shift in the Nile Basin's political landscape started with the independence of the South Sudan on 9th July 2011 which was later accepted as a member state of the NBI in 2012 (NBI 2013). As Sudan has lost its oil fields to the newly state of South Sudan, it has an interest in the Nile River water to develop its economy based on agriculture of its own. So the Nile Basin has a new player, i.e. South Sudan, with its own interests in the regime building formations.

Case of Ethiopia

Ethiopia's water supply situation is quite favourable relative to its neighbours, Egypt and Sudan. Total surface water supply is 112.6 million cubic meters, of which 55 million cubic meters can be exploited. There are fourteen river basins with a flow rate of over 100 million cubic meters annually across Ethiopia's borders. The problem for Ethiopia is poor distribution of an abundant water resource. One-third of Ethiopia is prone to drought while 540,000 hectares of land is prone to flooding.

Limited irrigation projects have been undertaken as Ethiopia lacks a comprehensive water and agriculture management program. Hydroelectric production is an area of great potential; however, the ideal sites for dams are at a large distance from centres of consumption. Water projects will be a cause of concern for Egypt and Sudan (Beschoner 1992).

But recently Ethiopia started the construction of Grand Ethiopian Renaissance Dam (GERD) over the Nile two months after the deposition of Hosni Mubarak, the then Egyptian president; Ethiopia inaugurated this mega dam, a multipurpose project with an initial planned generating capacity of 5,250 megawatt (The Economist 2011; Evans 2011). Despite the fact, Egypt at the beginning was against the construction of this dam but the reaction of Egypt was not as belligerent of threat as it was earlier (Oestigaard 2012). Rather the two important Nile basin countries finally pursued in a cooperative dialogue to evaluate the GERD and it's would be consequences on the flow of the Nile water (Hammond 2013). Ethiopia's unilateral dam building construction confirms the changing discourse in the Nile from only talking about hydro-hegemony of Egypt towards negotiations for benefits of sharing the water in cooperative manner.

GEOPOLITICAL ANALYSIS OF NILE RIGION

Egypt claims that it has natural, historical and acquired rights over the Nile and will be ruled by the hydro-political principles of 'prior use', 'primary need' and 'acquired rights'. These doctrines have all been used by Egypt as the most important key during any negotiations or talks with other riparian. Furthermore, generally these rights are referred as Egypt's foreign policy bench-mark which ensures the continuous water flow of the Nile.

Similarly, Ethiopia has even more logically credible and legally defendable claims over the potential of a huge individual water development programme for the Blue Nile and other water resources in the basin. The irrigation potential and developmental schemes for irrigation in Ethiopia has been negligible; at the time, land degradation and inadequate rainfall has altogether caused crop failure in many ways.

Expansion of irrigation facilities is necessary in order to stabilize and promote agricultural productions. Extensive flat and fertile lands in lower basin have great possibility for enhanced irrigation based agricultural productions at large-scale. The potential gross irrigable area is estimated to be 3.5 million hectares. Till now only 5 percent of the total potential has been utilized.

Egypt completely relies on the Nile's water for its almost entire water demand and claims that earlier usage gives it privilege to have a disproportional share of the Nile water resources, for instance more than 90 percent of its total agricultural production comes from irrigated land of Nile water. Therefore, Egypt requires expanding its agricultural land and reducing saltwater intrusion from the Mediterranean Sea to the Nile delta.

Under the agreement between Britain and Egypt in 1882 (which was then the colonial power in Sudan, Uganda, Kenya and Tanzania) and in 1959 between Sudan and Egypt, Sudan and Egypt possess complete rights to utilize 100 percent of the Nile river water. As Egypt must accept other riparian's right to use the Nile water, most of the basins riparian have not established any initiatives that use it extensively. Not astonishingly, over the years other basin riparian have contended the validity of these agreements, treaties and called for their annulment to make way for a more impartial and equal water management systems.

Increasing water demands caused by population growth and economic advancement in all riparian nations have put additional pressure on the scarce water resources and led the increased possibility for conflicts over sharing of water resources in future. However, the necessity to adequately share the Nile's waters also extends the possibility of co-operation. Actually, during last few years the riparian countries have come closer towards co-operation and integrated development of the Nile basin. The Nile Basin Initiative (NBI) was established, in the late 1990s, for the fundamental objective of bringing riparian countries together at one table. The further challenge for riparian is to collectively develop the Nile River Basin and to allocate water to its optimal utilization through sharing the advantages.

The historic development of the Nile Basin consists three main periods during the past 150 years. The first period starting from the late 19th century to post World War II, that was an era of total socio-economic domination by European countries. The second period started from the end of World War II to the late 1980s, when there was a colonial unbundling of exploitation and control, imparting ways to political structures and ideologies determined by the state ideologies growing under the bi-polar world during the cold war. The third major shift has happened during the period starting from end of the 1980s onwards. Since the cold war provided way to new systems for world politics, characterized by single dominated superpower, regime change, realignments and new policy instructions evolved during the 1990s, the economic condition of many riparian shifted to more open and free-market economic systems leading to major socio-economic risks. It is during this era of significant political and socio-economic change that the Nile Basin Initiative has emerged and the major concepts of the Nile Basin Initiative have been formulated.

Eleven countries share the waters of the Nile River Basin, but the main disputes over the water resource has so far involved only three countries – Egypt, Ethiopia, and Sudan; but with a new player, i.e. South Sudan, the geopolitics may change in the near future. Egypt faces the most obvious water crisis, and the situation becomes more severe each year. Its population of 68.5 million is growing by an annual rate of 1.78 percent. Table 2 shows population and its growth rates for Egypt, Ethiopia, and Sudan.

Table 2. Population and Growth Rate of Three Major Nile Riparian

Country	Population in 2000 (million)	population in 2012 (million)	Growth Rate in 2000 (percentage)
Egypt	68.4	84	1.78
Ethiopia	64.1	86.5	2.76
Sudan	35.1	36 (excluding South Sudan)	2.84

Source: CIA-The World Factbook 2000; NBI 2012.

Egypt is very concerned about its ally Ethiopia since roughly 85 percent of the Nile River's run-off in Egypt comes from the Blue Nile.

Egypt has frequently warned Ethiopia not to take any steps that would affect the Blue Nile's discharge. Ethiopia has responded on numerous occasions that it holds sovereign right to use the Blue Nile for the benefit of its own population. Ethiopia has broad plans to develop fifty irrigation and hydroelectric generation projects. As Ethiopia claims a huge share of the Nile head-waters, Egypt will likely experience a slight reduction in Nile water flow (Drake 2000).

Egypt is also apprehensive about Sudan. As Sudan is incapable of expanding its water use at the present, this situation could change in the future. With increased use of Nile waters for agricultural irrigation, Sudan could become the 'breadbasket' of the Middle East. The Nile Waters Agreement of 1929 is one of the important agreements between the two countries allocating the Nile's waters. The Sudano-Egyptian Agreement of 1959 adjusted the 1929 allocation, reducing Egypt's share. Regional economic improvement will require cooperative management of the Nile River and its tributaries. Meanwhile, Egypt has protection of its Nile water resources as one of its key strategic objectives (Kemp and Harkavy 1997).

The Nile River supplies 55.5 billion cubic meters of water, this accounts of 86 percent of the water used in Egypt annually. The Nile River's importance to Egypt is not in its water alone, but also the flow of the river's water. Twenty-eight percent of the country's power is produced from hydroelectric plants on the river. Irrigation from the Nile River supplies water for almost all of Egypt's food production. Already Egypt imports fifty percent of its food requirements. Despite these factors, Egypt's water needs will continue to increase.

As mentioned above, the Nile is the primary source of water for Egypt to satisfy its water demand; significance of the Nile for Egypt is absolute. Due to the variations in the Nile run-off during the long and dry summer seasons, Egypt suffers deficient water supply. The storage capacity of the Aswan High Dam is essential for coping with periods of low flow levels. Settlement in the Nile basin is intimately associated with the river. In Egypt, most of its population is crowded in a habitable, thirty thousand square kilometres, narrow corridor of arable

land along the Nile River and in the Nile Delta (Lowi 2000). Moreover, Egypt is the furthest downstream state in the Nile River Basin.

Lowi uses Egypt to highlight the variety of related features that illustrate the degree to which water scarcity may be regarded as a national security interest. These characteristics are: the nature of water dependency, the quality and quantity of the water resource proportional to present and future demands and, in the case of trans-boundary rivers, the number of riparian states involved, the nature of relations with the other riparian, and finally, geographic position within the basin. For Egypt, arid climate, high population growth, complete dependence on one trans-boundary body of water, in down-stream position, and the threat of important extractions upstream combine to create the perception that water is a vital security concern. Harmful changes to the water resource would threaten Egypt's welfare and would likely generate a hostile response. Egypt's relative economy, military, and political power makes it unlikely that any of the other states involved would take action to provoke a hostile response.

The principal causes for concern in the Nile River Basin are environmental and economic. Lack of written agreements between users of the Nile water is largely a result of Egypt's insistence on its overriding needs. Rapid population growth in the states of the Nile River Basin means that demand for water will increase. Existing water resources will have to be used and allocated more efficiently to meet demand. Otherwise, the consumption and development requirements of some states will not be met. The combination of high population growth and a scare resource will not be sustainable and may prove to be highly unstable. Consequently, 25 years from now, when the population has doubled and there is a lack of water resource cooperation, there could be conflict over control of water of the Nile River Basin (Lowi 2000).

The starting of this international pressure can be seen as the British concerns over the Nile after the occupancy of Sudan and Egypt. In the beginning, during the 19th and early 20th century, the presence of British in Sudan and Egypt directed the Nile River affairs in the whole region. British interest on the Nile water was to secure the productions and

export of large raw cotton fibre from Sudan and Egypt for its industries at home country.

Therefore, sometimes later, water scarcity in Egypt appalled the British and this fear resulted into an agreement between Egypt and Sudan to distribute and regulate the Nile water between them without looking up to any of the up-stream riparian countries. Consequently, Sudan and Egypt importune that the up-stream states don't undertake any project that has direct or indirect adverse impact on the flow and volume of the Nile water without their consent, though 86 percent of Nile water coming to Egypt and Sudan originates in Ethiopia. Contribution of Sudan and Egypt to the Nile water is very nominal. This unequal distribution of the Nile water among the riparian states has been one of the main reasons for tensions in the region.

Currently, there is not any all-inclusive agreement on the Nile water allocation and regulation that applies on all riparian as well as no planning for integrated development of the region. The few existent agreements were entered between some of the riparian, mainly with the objective to ensure the concerns of Egypt or to some extent of Sudan. If Egypt and Sudan did establish an integrated economic and political unit, then all of the mid-stream and down-stream sections of the Nile would be subject to the domestic planning of a single political authority. Furthermore, other interested states, especially Ethiopia with its sovereignty over the head-waters of the Blue Nile, would have to tread with great precaution in any matters that might negatively impact the concerns of what would be one of the largest states in Africa in terms of geography and around the second largest in terms of its population. But today Egypt and Sudan are not unified in the context of their economy and politics. The major reason for this says a lot about the difficulties both countries confront while rationally utilizing the Nile resources. In the past, some sort of unity had been attained but always through the imposition of Egypt-based rule on Sudan.

Changes in political boundaries may convert regional conflict into international disputes, intensifying stress over existent issues. Down-stream riparian countries are not inevitably at a politically favorable condition relatively to their up-stream counterparts. Although, in some

instances relative position of riparian countries leads into comparable power relationships. With up-stream riparian countries having higher hydro-political maneuverability, Egypt had enough geopolitical strength in order to prevent up-stream to undertake its position.

The two agreements of 1929 and 1959 are the key documents, considering its provisions will remain applicable in all circumstances for some parties. Nevertheless, recent statements by many of the riparian ferociously contend this, laying the political establishment for refutal of the agreements on the basis of their un-reasonability as they restricted the up-stream riparian's rights without the consent of those negatively affected. The succession to the 1929 agreement by the former British colonies is also heavily contested by them on legal grounds.

The two down-stream countries of Sudan and Egypt are highly privileged by these agreements to the clear loss of the other up-stream riparian countries. Therefore the challenge is to set the way in which third-party countries can offer adequate incentives for the other riparian countries to minimise their threats related to water scarcity.

It is well documented for Egypt to be a hegemon in the Nile basin region, having utilised a variety of measures in order to sustain its access to the up-stream flow of the Nile. Interestingly, the overall strategy and tactics used by Egypt show similarities to those of Israel, though the extent to which Egypt is willing to initiate armed amenities in reaction to comprehended threats over water resources is perhaps rather less than that of Israel currently. Many of the hydro-political dynamics are driven by posturing and rhetoric, rather than an actual resort to armed force, which is seen to be unsustainable and therefore unlikely in the context of the post-Cold War world of contemporary times.

The Nile Basin Initiative has attempted to defuse the potential and actual conflicts over water resources in the basin since 1998, with only limited success. Recent categoric statements on allocation of water by upper-riparian countries reveal that the problems associated with such allocation have not been resolved, and the shifting of the discourse

towards benefit-sharing has not been successful in achieving the interests of the up-stream countries.

CONCLUSION

All the available data reveals that there is an increasing scarcity of water in the Nile basin region. It is also figured that within the time of 25 years two-thirds population of the world will live in regions having severe water problems. Increasing water demand, inadequate management, unrestrained abstractions and changing climate jointly with the degraded quality of water due to pollution in many parts of the world has put both surface and groundwater resources under severe stress in many parts of the world.

Additionally, trans-boundary water resources confront ethical, cultural and political challenges. Water scarcity in the basin leads to growing rivalry among its different users. Co-operative arrangements, based on a multi-disciplinary approach which integrates socio-economic, scientific and institutional factors altogether, are vital to develop, manage and protect trans-boundary waters in order to avoid conflict, to ensure water security and to optimize the sustainable use of these water resources.

Water is a vital resource at the national, regional and international levels and the Nile River is particularly important for riparian countries. International rivers that account almost half of the total land surface of the earth are associated with the variety of environmental and socio-economic elements and therefore have become very significant for the study of international conflict over water resources.

The geopolitics of trans-boundary water resource management is a main concern for the political system at the level of the governments (geopolitics, foreign affairs) although the Egyptian water authorities for a long time tried to establish a basin-wide water flow regime. Governmental stakeholders (i.e. ministries, governmental bodies) are much involved in international projects (i.e. Nile Basin Initiative sub-projects). Negotiations regarding trans-boundary River Basin Management (RBM) are conducted between delegations mainly

representing the water sector, the foreign affairs ministry and legal experts. Other ministries can bring in their interest mainly (but still to a limited extent) in the process of national policy making. In Egypt and Ethiopia, international RBM is considered a highly salient issue and the heads of states take a strong personal interest. Links between actors and policies from water management and other sectors like housing, land use planning and agriculture exist on the top levels (cabinet) and have been established more recently on lower levels in policy preparation groups in charge of designing 'national water policies'. Often the links between the sectors are more dependent on the persons in charge than their positions within the institutions. At least in Egypt and Ethiopia there are attempts to integrate policies of different sectors referring to river basins at the appropriate unit. Meanwhile the power balance is shifting towards a less prominent role for Egypt, which can improve the cooperation as it can build on equality. The public at large is not at all involved in trans-boundary RBM management other than through the laborious Nile Basin Discourse. For trans-boundary water management it is very significant to give attention outside the water-courses and towards the river basin in order to gain advantages of other available water resources outside the river basin.

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