Towards Transboundary Water Management Policy Regime in the Eastern Nile Basin for Sustainable Water Use and Conservation

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Abstract: This article aims at exploring the need for a sustainable transboundary water management policy regime in the Eastern Nile Basin. It tries to show factors that necessitated the path toward a transboundary policy regime in the Eastern Nile Basin. It also attempts to explain the deficiency of the existing unilateral water management policy regimes, which neither address the issues of sustainable utilization and conservation of the Nile water resources nor the water management issues at the transboundary level. The study employed a qualitative research approach and data were collected through key informant interviews. Different secondary sources of water issues that are transnational are also consulted. The data were analyzed based on thematic analysis method. The key finding of this research indicates that the existing water resource management policy regimes are inadequate, and that there is a clear void in the policy regime hampering sustainable utilization and management of the shared Nile waters among riparian countries. The article finally suggests pathways for replacing the existing Nile water management policy regimes and establishing comprehensive sub-basin-wide policy regimes in the Eastern Nile Basin. A new pathway should satisfy the water needs of the ever-increasing populations and the ever-expanding development requirements in each of the riparian countries through collaboration that enables the countries to deal with the common challenges that are otherwise difficult to address.

Keywords: Eastern Nile Basin; Water conservation; Water management policy regime; Water use

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1. Introduction

In the Nile basin in general, and in the Eastern Nile Basin in particular, the status quo water management regime seems unable to deal with the existing and emerging water management challenges that are transnational (Ali, 2003; Kimenyi and Mbaku, 2015). The demand for transboundary river policy is not unique to the Eastern Nile basin, since the "global water demand is currently said to double every 21 years" due to population growth (Thuo and Ridell, 2015: 222); thus, demanding an effective basin-wide governance regime for international river basins. In the Eastern Nile Basin, the Nile water management gets complicated because of the population pressure, water scarcity, unfair allocation of the Nile water, environmental degradation and overutilization and mismanagement of the Nile River water (Kliot, Shmueli, and Shamir, 2001). Moreover, water nationalism is said to have complicated the efforts of cooperation in a transboundary river basin, like Nile (Allouche, 2005). Studies reveal that unless proper water conservation measures are taken, the water scarcity in the Nile basin could hamper the development prospects of the basin countries (Nile Basin Initiative [NBI], 2020; Abdel-Kader and Abdel-Rassoul, 2010). For instance, Egypt, known for implementing comprehensive water conservation methods in the region, continues to face difficulties in managing water during storage, conveyance, and irrigation. The water wastage is also reported when using the water for domestic and industrial uses. However, some of these conservation challenges, such as the loss of water from storage facilities are difficult to address through unilateral measures.

Thuo and Riddell (2015) contend that the current Nile River water regime is similar to the 2008 financial crisis because the Eastern Nile Basin states continuously favor immediate profits above long-term benefits. If this trend continues, the Nile water economy could collapse. Furthermore, the steady population growth, the impacts of climate change, and environmental degradation in the basin (Swain, 2011) all call for a common regional approach to prevent the looming disaster. New developments like the construction of Grand Ethiopian Renaissance Dam (GERD) (Hassan, 2018) with crowdfunding point to the need for the joint regulation of these reservoirs along the Nile River.

The challenge to transboundary water resource management in the Eastern Nile Basin has been characterized by power and economic asymmetry, differences in the level of water infrastructure development and the prevailing mistrust among the upstream and downstream states (Swain, 2011) despite the Nile Basin Initiative (NBI) claim of building trusts among the basin countries as one of its core achievements (NBI, 2020). Notwithstanding all these challenges, the countries in the basin made a good move toward cooperation, particularly since the late 1990s. Besides, the riparian states in the Eastern Nile Basin, at least in principle, recognized the importance of cooperation and the need for managing the river at the supranational level. A case in point for this was Egypt and Sudan. Egypt and Sudan proposed the establishment of the Nile River Basin Commission (NRBC) despite having withdrawn from the Cooperative Framework Agreement (CFA). However, they failed to reach a comprehensive agreement on the matter, and the other Nile states rejected the proposal, as per Swain (2011). Several authors have attested the long journey made toward cooperation over the management of the Eastern Nile Basin in the recent past (Brunnee and Toope, 2002; Tafese, 2003; Mason, 2004; Tadesse, 2004; Elmam, 2010; Hilhorst, 2016).

However, the process of cooperation is very slow and the negotiation process that hoped to strike a basin-wide permanent agreement was stalled in the Nile basin. This in turn dashed out the hope for the establishment of the Nile River Basin Commission (NRBC) due to the disagreement on Article 14(b)[1] of CFA which is supposed to provide the policy framework for transboundary water management. Moreover, in the Eastern Nile Basin, the joint projects that aim to address transboundary water management challenges through the ENTRO projects were too meager for the basin that

[1] No consensus was reached on the provisionon of the article which read as "not to significantly affect the water security of any other Nile Basin states". The Egyptians proposed to replace this provisionon as " not to adversely affect the water security and current uses and rights of any Nile Basin State".

demands a coordinated response of large magnitude to deal with the challenges of the basin. More importantly, the regional responses have not been institutionalized and incorporated into the national policies of member states as the NBI document also concedes these drawbacks of policy harmonization (Kalpakian, 2015; NBI, 2020).

The NBI projects that are identified, prepared, and implemented by ENTRO were too small compared with the transboundary water management major objectives like: “maximum utilization of the common good (utilitarian approach), conflict prevention and maintaining ecological sustainability” (Kim and Glaumann, 2012: 3). According to Veilleux, Zentner, and Wolf (2014: 3) “… uncoordinated use of shared freshwater resources could result in further challenges with quality, quantity and access issues”. For the river basins that are highly stressed because of environmental degradation, water scarcity, and pollution; “cross-border coordination mechanisms” (Renner, Meijerink, Van der Zaag, and Smits, 2021: 256) need to be given a top priority to sustain the river basin since the livelihoods of millions of people rely on the river water. Unfortunately, regional water institutions like ENTRO have remained ineffective in coordinating water use and management among the Eastern Nile Basin states despite the need for joint responses to enhance water conservation and ecological sustainability. In the Eastern Nile basin, a transboundary water management approach that enhances the welfare of the basin state has the potential to prevent the occurrence of conflict in the basin (Kim and Glaumann, 2012).

Even if the countries of the Eastern Nile Basin declare that they incorporated Integrated Water Resources Management (IWRM) principles in their water resource management policies, so far, the states have been shying away from the issue of managing the Nile River water at the basin scale (Thuo and Riddell, 2015). In the Eastern Nile Basin, especially among the downstream states, the individual state policies that evolved are unable to address the quantity issue as well as water quality problems. In Ethiopia and South Sudan, the water sector is at its early stage of development though they are suffering from environmental degradation and loss of water to evaporation, respectively (Arsano, 2010; African Development Bank [AfDB], 2015).

Thus, this paper argues that the current fragmented and state centric policy regime as well as the malfunctioning regional policy regime in the Eastern Nile Basin are inadequate to deal with water management challenges that are transboundary in nature. To this end, the paper attempts to elaborate the urgent need for adopting a functioning sub-basin wide policy regime in the Eastern Nile Basin with the aim of Nile water conservation and sustainable utilization.

The concept of policy regime

Before moving on to discuss policy regimes, it is vital to provide a space for illuminating the notion of regime theory in international relations. Krasner (1983: 2) defined regime as "implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area of international relations". On the other hand, Keohane (1989c: 4) defined regime as "institutions with explicit rules, agreed upon by governments, that pertain to particular sets of issues in international relations," summarizing the whole component of Krasner’s definition of principles, norms, rules, and procedures as rules of the institutions.

On the other hand, Young, Breitmeier and Zurn (2006: 3) defined regime as “…social institutions created to respond to the demand for governance relating to specific issues arising in a social setting that is anarchical in the sense that it lacks a centralized public authority or a government in the ordinary meaning of the term.” Furthermore, they draw a distinction between regime and organization by saying “…regimes provide the rules of the game; organizations typically emerge as actors pursuing their objectives under the terms of these rules” (Young *et al*., 2006: 4). In most cases, regimes emerged due to a 'well-defined problem’ that needs solutions: problems on how to regulate international river water use and protect these bodies from alien species invasion. Regimes could be arranged quickly to deal with a particular problem or take years of negotiation and bargaining to emerge. Regimes also varied significantly in their forms; some individual regimes are

framework/protocol, whereas others are comprehensive in their nature. Moreover, regimes also adopt different approaches to address particular problems (ibid).

The regime theory argues that states adopt supranational governing arrangements when domestic institutions or unilateral actions failed to deliver the required policy objectives. Moreover, independent states resort to the international institutions when they are no more able to solve "collective action problems among states". The supranational arrangement allows states to "converge their policies" in the respective issue areas. The application of the distributive model of the regime theory helps to shed light on the importance of policy regime as it helps not only to overcome collective action problems, but also to distribute benefits, and costs and provide a solution for the conflict over the sharing of benefits accrued through the collective action of the states (Martin and Simmons, 1998: 756).

May and Jochim (2013: 428) defined a policy regime as "governing arrangements for addressing policy problems". In fact, what is central to the concept is "the notion of addressing problems". When the concept is applied at the supranational level, May and Jochim (2010: 303) defined the term as "governing arrangements that span multiple subsystems and foster integrative policies". In addition, the concept of policy regime can be applied in the context of "analyzing governing arrangements for dispersed problems that lack comprehensive efforts to address them" (May and Jochim, 2013: 429). Stone (2015: 102) argues that regime politics can be understood in two ways: first, by examining how the internal components of a governing arrangement work together to achieve a main agenda, and second, by considering the broader political context and historical changes. Stone and Stoker (2015) also highlight how the priority agenda can shift in response to changes in the political context. The sustainability of a governing arrangement is determined by the extent to which a specific policy goal aligns with broader objectives, as well as the presence of effective communication and coordination mechanisms (Stone, 2015:102). Ultimately, the sustainability of a regime hinges on the availability of resources that align with the pursued agenda (Stone, 2015; Stoker, 1995). Furthermore, the idea of policy regime also includes the extent to which it brought compliance of the regime actors and the degree to which it achieved pareto-efficiency or resolved the problem around which the regime came into being (Bernauer, 2002; Young, 1999).

International river basin is traditionally one of the issue areas where regime theory ideas are applied. Therefore, it is in this sense that this study adopted the concept of transboundary water policy regime to analyze the water management challenges the Eastern Nile basin faces. In most cases, regime theory appears to focus on the impacts of the regime on member countries and hardly captures the involvement of external actors like the Arab League in the Nile water issues.

2. Research Methods

2.1. Description of the Study Area

The Eastern Nile River Basin, with an approximate area of 1, 809, 606 square kilometers, is geographically shared by four countries in North East Africa: Egypt, Ethiopia, South Sudan, and Sudan. While Sudan, South Sudan, and Ethiopia make up 13%, 61%, and 22% of the overall Eastern Nile Basin area, respectively, Egypt alone makes up 4% of it (Abdelwares *et al*., 2019: 2). It drains the Eastern part of the Nile River Basin, which includes Blue Nile, Baro-Akobo, Atbara and main Nile with the exception of White Nile. The region experiences high level of seasonal water variability based on seasons (Tilmant, Marques, and Mohamed, 2015). The Eastern Nile Basin experiences a range of climates, from tropical or subtropical in South Sudan and the Ethiopian highlands to semiarid and arid in Sudan and Egypt (Paisley and Henshaw, 2013). The majority of the Nile's water comes from the Eastern Nile Basin, mainly from the Ethiopian highlands, accounting for approximately 86% of the total Nile flow (Swain 2011). Despite being renowned as a major international river, the development of the Nile River has been somewhat lacking (Elmam, 2010).

Even though the Nile is the longest river in the world, it is relatively a small river when it comes to the volume of the water it carries. Zeleke (2011: 422) aptly expressed this fact as follows: “A giant in terms of length, and a dwarf in terms of the volume of water it carries, the fabled Nile has an annual discharge constituting only a mere 6 percent of that of the Congo”. According to the NBI (2012), among the 424 million Nile basin countries’ populations, 232 million (54%) people live within the Nile basin. Thus, more than half of the Nile basin population relies on the Nile basin water.

2.2. Research Design

This study used a descriptive research design to analyze and interpret the effects of the water management policy regime on the sustainable use of river water in the Eastern Nile basin. Data were gathered from primary and secondary sources. The primary data collection took place in two phases, spanning from 2019 to 2021. Challenges, including the COVID-19 outbreak and accessing key informants, complicated the data collection process. To mitigate these issues, the data collection was repeated to ensure completeness. Additionally, key informants from diverse backgrounds and organizations were involved to enhance the data's quality and accuracy.

The study used purposive and snowball sampling techniques to choose key informants involved in Nile water management through research or working in water-related fields with diverse educational backgrounds. Semi-structured interviews were conducted with key informants from universities, government agencies, intergovernmental organizations, and expatriates at multilateral institutions to explore the topic thoroughly and gather additional insights. Thematic analysis was applied to analyze the collected data, involving reading, grouping, and identifying relevant themes.

Secondary data were gathered from books, research articles, working papers, reports, and policy documents from government ministries and regional organizations.

3. Results and Discussions

The following sections show the impasse of the existing regional and national water resources management policies and additional water management challenges that necessitated a move towards a more comprehensive sub-basin wide policy regime to overcome the water management challenges in the Eastern Nile Basin, particularly with regards to Nile water conservation and sustainability.

3.1. Inadequacy of Existing Regional Water Management Policy Regime for Water Conservation and Sustainable Utilization in the Eastern Nile Basin

According to Cascão (2012), the NBI marks a great departure from the previous effort of establishing cooperation and forming legal regimes in the Eastern Nile basin. The basin countries initiated efforts towards regional cooperation with the launch of HYDROMET in 1967. Since then, two cooperation efforts were made with the formation of UDUNGU in 1983 and TECONILE in 1993 (Elmam, 2010). The formation of NBI was applauded by scholars as well as development partners as a step forward in the cooperation of all the riparian countries. Since its inception in 1999, it has achieved a great deal, particularly by serving as a platform for engagement among riparian countries. Moreover, its attempt at building confidence among the riparian countries, at least locked the riparian countries within the diplomatic engagement with one another.

Despite the appreciation extended to the Nile Basin Initiative (NBI) for its efforts in strengthening cooperation among the riparian countries, it has faced several challenges. Recently, lower-riparian countries have started to withhold their financial contributions temporarily since 2010 due to disagreements over CFA Article 14(b). This has resulted in the reversal of its achievements so far (Awulachew *et al.*, 2012). The disagreement escalated and Egypt and Sudan suspended their regional engagement even-though Sudan rejoined the NBI in 2012 as Egypt insisted to its historical right claim and refused to make concessions of its centuries old Nile water use policy (NBI, 2020).

The proclaimed mission of NBI is intended “to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”. To

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

There are also projects at the stage of identification, preparation, and under implementation with a capacity to further enhance the collaboration among the Eastern Nile Basin countries (ENTRO staff, 30 May 2019). According to Paisley and Henshaw (2013), one of the most noteworthy achievements of NBI was its successful negotiation and implementation of the Nile Basin Interim Procedures for Data and Information Sharing and Exchange in 2009. The other success of the NBI was the development of Operational Guidelines for the Implementation of the Nile Basin Interim Procedures for Data and Information Sharing and Exchanges in 2010. However, after two decades of its operation, the influence of the NBI on member states' water resource policies has remained weak. Even though the member countries' water resource policies recognized the importance of collaboration, the suite of NBI transboundary policy packages were rarely adopted by member states in the Eastern Nile Basin (NBI, 2020). Similarly, previous studies by Bernauer (2002) and Gerlak (2007) show the poor implementation of international agreements by member states.

The existing NBI suite of Nile basin transboundary water management policies are neither properly framed nor prioritized the problems that they intend to address both in terms of its content and implementation strategies (Expert at IWIMI, May 2020). In the Eastern Nile Basin, the severity of existing and emerging water management problems calls for either the effectiveness of NBI's suite of transboundary river policies or the adoption of a new adaptive policy framework that evolves as the problems get complicated (Ibid). An IWIM expert highlights the overlooked issue of Nile River water conservation amidst increasing risks of water demand surpassing supply in the basin. The 2015 NBI Strategic Water Resources Analysis supports this concern, projecting a potential 50% shortfall in Nile River water supply without intervention from member states (NBI, 2015:23). The analysis also predicts a 160% rise in irrigation water demand by 2050, necessitating basin-wide conservation efforts. The Strategic Water Resource Analysis, aimed at addressing water needs of Nile riparian countries, emphasizes the urgency to mitigate water stress (NBI, 2020). Additionally, Wu, Jeuland, and Whittington (2016) foresee a 50 BCM supply-demand gap once basin countries implement current water projects. These studies underline the critical need to prioritize water conservation in the Eastern Nile Basin for the welfare of all involved states.

Furthermore, the NBI Strategic Water Resources Analysis estimates a 17.2 BCM loss of water from Nile Basin reservoirs (NBI, 2020). This calculation does not encompass significant water losses in the irrigation fields of Egypt and Sudan, where outdated practices lead to substantial losses (Mahgoub, 2014; El-din, 2013). The study also overlooks massive evaporation losses from the Sudan marshland in South Sudan.

To tackle the indicated water loss and mismanagement, the NBI and its subsidiary institutions, like ENTRO could have scaled up good water conservation practices. Another potential solution could have been the creation of joint multipurpose reservoirs in areas where the evaporation rate is low, such as the Ethiopian highlands. With water saved because of the conservation measures, it is possible to fairly distribute the physical water as well as the benefits that accrued and in turn lessen the tension over the use of the Nile water among the Eastern Nile Basin States (Ethiopian academia, 2019). Whittington and McClelland (1992) emphasized the need for conservation plans in Ethiopia. They suggested constructing multiple reservoirs throughout the Nile catchment areas to collect all available rainfall runoff during the summer. The stored water could then be released in regulated amounts into the mainstream, thereby regulating the river's flow. The reservoirs constructed for water conservation

could also be used for generating electricity that can be used by member states through the already developed power grid (ENTRO Staff, 2019).

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

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

3.2. The Deficiency of Unilateral Water Management Policy Regimes in the Eastern Nile Basin

The Eastern Nile Basin countries adopted water management policies with the major objectives of providing water for the growing population, economy, and urbanization with the right quantity and quality (Thuo and Riddell, 2015). Egypt as an extensive user of Nile water has been working hard to increase water conservation through designing different water saving strategies and reducing water mismanagement in different sectors of its economy. As a result, the country made a significant journey in conserving the Nile water with an inward-looking policy. The basin-wide approach to conserve the Nile water as proposed by the British hydraulic engineers during the early 20th century hardly adopted and materialized with the exception of the Jongeli Canal which was aborted because of the South Sudanese People Liberation Army (SPLA) attack in 1983.

Although Egypt's efforts in the hydraulic mission addressed water supply issues throughout the 20th century, the country's policymakers noticed the need for a paradigm shift toward demand-side management (National Water Resources Plan [NWRP], 2005). However, the development of the policy with an emphasis on demand side management hardly achieved the required level of water saving. In the irrigation sector alone, Tafesse (2020) reported that 48% of the water was lost due to poor application of water saving technologies and regulations related to water use charges.

Moreover, the Egyptian state's measure to conserve water through regulations like adopting a less water consuming cropping pattern and application of water saving technologies could not keep pace with the growing water demand showing the inadequacy of domestic water saving strategy in Egypt. The current water conservation strategy in Egypt is inadequate to meet the growing water demands. To address this issue, there are two options available: either shift policy from water-intensive agriculture to sectors that consume less water or adopt a basin-wide approach to secure additional water by conserving water in the upstream states. Collaborative mechanisms can be established to mitigate the current challenges in the basin (Sherif, 2014).

Even though the above data clearly indicates the need for water conservation in Egypt and in the Eastern Nile basin countries, the Egyptian diplomat based in Addis Ababa has a view that his country made significant progress and he thought that "Egypt can be a role model in reusing the water resources and water conservation for the whole world". He further noted that even in the irrigation sector the massive drainage networks collect water for reuse after it undergoes some treatments. Therefore, he concluded they [the Egyptians] are well managing the Nile water resources within Egypt; and that Egypt is willing to share its water management expertise with the basin countries (Egyptian Diplomat, May 2020).

The Sudanese draft national water resource management policy and the various water-related legislation do not effectively promote water conservation in the irrigation fields. This is because the country still practices flood irrigation, which leads to the wastage of water. Additionally, the low

budget allocated for the maintenance of irrigation canals further contributes to water waste. On top of that, the country's water resource management policy didn't safeguard the country from siltation problems, and extreme events like floods and drought (Ali, 2003).

Unilateral water management has been the dominant feature of water management practices in the Eastern Nile basin (Thuo and Riddell, 2015). Some of the water resource management policy objectives of these countries cannot be realized without the actual collaboration and coordination efforts. In Ethiopia and South Sudan, the low level of water development demands external funding for boosting the low level of water development in both countries. The efforts of Ethiopia to rehabilitate the degraded lands in the Nile basin over the last four decades made good progress even though the extensive degradation that took place for a long time has necessitated resource mobilization from domestic and external sources. However, it is difficult to access external multilateral resources without an agreement with the downstream states (Allan, 1999). Therefore, Ethiopia needs to make policy adjustments to attract external funding from multilateral sources for the development of the water sector as well as efficient management of its water resources. Similarly, South Sudan demands external support for capacity building and project funds to develop its water resources which demand cooperation with the downstream countries, particularly with Sudan as the water issue was not discussed and resolved by the 2005 Comprehensive Peace Agreement (CPA) (Salman, 2011b).

The Eastern Nile Basin countries have recognized the significance of integrated water resources management (IWRM) as a means of managing shared water resources. This is evident from the incorporation of IWRM as a crucial element in their respective policy documents, namely the Ethiopian Water Management Policy of 1999, Egypt's NWRP of 2005, South Sudan's Water Policy of 2007, and Sudan's Draft Water Policy. Despite the recognition of IWRM principles as an approach to governing the Nile, no coherent regional policy document that guides Nile River governance or a regime is evolved based on the idea of a distributive model. As a result, the Nile basin remains exposed to the threats of climate change, environmental degradation, and water mismanagement. Moreover, as most states have already started or planned to exploit the Nile water resource without the appropriate water use policy for the entire basin, it is difficult to tap the limited Nile water resources and this can result in a conflict of interest among the Nile water users (Wheeler *et al*., 2018).

The implementation of IWRM as an approach not only avoids policy fragmentation to govern the Nile water resources; but also promotes cooperation and institutionalized governance. In the major international river basins that adopted a common policy framework to govern the basin resources, degraded river water, and its environment were rehabilitated. In addition, standards that member states expected to meet were set (Norman, 2015).

The incorporation of the IWRM principle in the water resource management policies of the Eastern Nile Basin states (the 1999 Ethiopian water policy, 2005 Egyptian National Water Resource planning, 2001 Sudanese Draft Policy Document and 2007 South Sudan water resource management) hardly brought policy convergence as it promotes "river basin planning" (Kibaroglu, Cakmak and Dogan, 2007: 51) among the upstream and downstream states. The water resource management policy regime remains fragmented along the national borders. This shows the adoption of ideas and concepts that were generated at the international level, though embraced by riparian states; they hardly affect state practices unlike the expectation of regime theorists which predict such policy convergence.

According to an expatriate (February 2021) based in Addis and familiar with the Nile water resources management, the sustainable utilization of the Nile much depends on a setting up of a permanent supranational institution. He further noted that though the countries in the Eastern Nile Basin seem to have different water development priorities and incompatible interests; there is a potential for policy convergence in the Eastern Nile Basin. The expatriate expressed the policy convergence point in the following ways:

> The Ethiopian demand for water development including the construction of reservoirs and protection of the reservoirs from silts through watershed protection activities is also helpful for the downstream states in two ways: first, it helps to store the Nile water in Ethiopia where the evaporation rate is relatively low, and second, the environmental protection activities and the construction of the reservoirs which Ethiopia could use for different development purposes can hold back and mitigate the siltation problems from which the Sudanese reservoirs have been suffering.[2]

Similarly, Ethiopian academia with a hydraulic engineering background (February 2021) forwarded an idea that complements the views of the above expatriate. He states: "I do not see any viable alternative than institutionalized cooperation among upstream and downstream states. The alternative to cooperation is a denial of opportunities to the future generation to thrive and prosper". He noted that governance arrangement at the supranational level could resolve the current quagmire "by conserving Nile water from evaporation by building hydraulic infrastructures jointly in low temperature and narrow valley of Ethiopia as well as joint projects that emphasize supply-side enhancement collaboratively where every state benefits from such collective action".

Regime theorists have a view that when a unilateral actions or domestic institutions have difficulty to achieve policy objectives, states resort to international institutions to overcome the challenges or help them "converge their policies" (Martin and Simmons, 1998). The idea is that national water policies have exhibited limitations to deal with water management challenges that are transnational in nature as indicated above. This implies that the existing national water management policies in both the upstream and downstream states need to be reformulated towards a transboundary river policy for the common benefit of all the Eastern Nile basin states as the existing fragmented policy regime is inadequate to deal with water conservation challenges. The findings of the previous works by Ali (2003), Tesfaye and Brouer (2016), and Salman (2016) corroborates the views expressed by the expat and Ethiopian academia.

3.3. Existing and Emerging Transboundary Water Management Challenges

The need for sub-basin wide policy regime is required not merely/just to deal with the existing common challenges in the Eastern Nile Basin. In the sub-basin, there are also emerging common challenges that demand an urgent collective response from the part of the basin countries. The policy regime theory also argues that policy regime helps to deal with emerging challenges that are transnational or difficult to resolve through unilateral actions (Jochim and May 2013). According to Stone and Stoker (2017), members of the regime could effectively deal with these challenges by allocating resources that commensurate the goal being pursued. This study identified some of the salient challenges which require such collective response through transboundary policy regime such as climate change impacts, joint regulation of mega reservoirs, environmental degradation and siltation problems, and the politicization and securitization of the Nile water use as witnessed in the recent past.

3.3.1. Climate change

As a result of global climate change, the challenges international river basins face are expected to compound in the coming few decades coupled with the increasing demands for more fresh water and the deterioration of the quality of the water (Marty, 2001). In the Eastern Nile Basin, the basin countries already started to experience these problems. Therefore, to cope with the challenges, Marty (2001: 23) states that "Basin states should coordinate or even better integrate their respective policies, and they should establish legal regime, which covers the whole of the basin and defines the rights and duties of all actors using the basin resources". On the other hand, Thuo and Riddell (2015) noted the impacts of climate change are expected to worsen increasing the severity of drought and flash floods in the Eastern Nile basin. According to the Intergovernmental Panel on Climate Change [IPCC] (2014), the African continent will experience more warming with a potential increase in extreme

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

events. Similarly, the Sahel and Sahara Observatory (OSS) (2017) predicted high temperature in North East Africa with a potential to increase the evaporation of the freshwater resources from the Nasser Lake thus increasing the amount of water lost to evaporation.

Despite the growing challenges that posed threats to the sustainable utilization of the Nile River, the Regional policy regime's response to deal with the problem is not satisfactory. The regional institution, ENTRO, established a pre-warning system and has implemented projects that mitigate the flood vulnerability of the society in a flood-prone area of Sudan (NBI, 2020). However, the ENTRO still struggles to coordinate the actions of the basin states as well as set up a clear climate change adaptation strategy with the exception of upgrading the various water and meteorological gauging sites in the basin. Obviously, the watershed project that ENTRO has undertaken in the Ethiopian highlands marks the possibility of joint intervention to cope with climate change impacts in the Eastern Nile Basin regardless of its limited magnitude.[3]

3.3.2. Joint development and regulation of mega reservoirs

In the Nile basin in general and the Eastern Nile basin in particular, scholars warned that the lack of coordinated use of the water led to water mismanagement. In this regard, Kimenyi and Mbaku (2015:xi) warned that the inability of the Nile basin countries to reach a consensus on allocation of the Nile water exposed the river to "inefficient and wasteful use of the common pool resources" which further undermined the sustainability of the Nile river. Likewise, the Economist magazine in its August 3rd, 2017 issue warned that the Eastern Nile countries should not only focus on the timing of the GERD reservoir filling but also the operation of the dams along the Nile river during negotiation among the three countries. The magazine reported that "[n]o where in the world are two such large dams on the same river operated without close coordination," citing the studies conducted by MIT researchers (The Economist, 3 August, 2017). In corroboration with the above views, Professor Hassan rightly said "[t]he lack of coordination between the Nile Basin countries, especially Ethiopia and Egypt concerning the use of water, will cause great harm to the downstream countries" (Hassan, 2018:48). Even though the recognition of the Eastern Nile basin countries' interdependence through the Nile is a step forward, the basin countries are still lagging behind both in strategic diplomatic engagement and the strengthening of basin institutions. The case in point is that Egypt has abstained itself from NBI engagement since 2010 though that abstention detrimental to Egypt's water interest as realities on the ground are radically changing among the upper Nile states (ENTRO Staff, 2020).

Ethiopian academia (2019) has a similar view with regards to the need to coordinate the dam operation of the thirty (30) water reservoirs that spread along the Nile basin countries holding more than 200 BCM of water. Without the coordination to operate the dams, the climate change effects which are expected to aggravate the two extremes of flood and drought made the management of water resources extremely difficult in the Eastern Nile Basin. The collaborative management of water reservoirs is crucial for ensuring the safety and stability of large dam structures in the basin. During the negotiation phase, Egypt expressed concerns about the safety of the Grand Ethiopian Renaissance Dam (GERD), calling for an independent team to investigate the concern. The team's report concluded that the dam meets all technical standards and poses no risk to the safety of the structure (The Ethiopian Reporter (Amharic), 24 Nov 2019).

3.3.3. Environmental degradation and siltation problems

The Nile environmental degradation, particularly in the Ethiopian highlands, has been worsened despite the successive Ethiopian governments' intervention to protect and rehabilitate the Nile environment. The agreement responds through a regional approach to deal with the problem of land degradation through ENTRO is too late and too small given the extent of the problem and its negative impacts on the remaining downstream states. For instance, the NBI (2015: 2) reported that the NBI

[3] Interview with ENTRO staff on May 30, 2019. at ENTRO office in Addis Ababa.

estimated the current cost of the degradation at around 670 million USD if the countries failed to cooperate and jointly deal with the land degradation in Ethiopia alone. This report further indicated an estimated economic loss of 4.5 billion USD (NBI, 2015) if this trend continued for the coming two decades without a joint intervention from the basin countries.

The soil degradation has led the removal of the fertile topsoil that has impacted land productivity. This process led to the expansion of agricultural lands to the marginal lands intensifying the removal of the topsoil which resulted in deforestation and therefore the exposure of the degraded land to drought and other climate irregularities with the ramification on river flow regimes. On the other hand, the siltation problem in the Sudan has already affected the storage capacity of these dams and therefore the sustainability of dams and irrigation canals. The removal of silts and heightening of the reservoirs has sapped the limited financial resources of the Sudan (Mason, 2004). NBI (2015) reported that Sudan incurred an annual cost of 7.5 million USD to remove silt from the Roseiries dam alone. Unless collective joint measures are taken, the consequences of the degradation in the Ethiopian highlands have a far reaching consequence that might affect the flow regime of the Nile water that arrives in the downstream states (NBI, 2020).

3.3.4. Politicization and securitization of the Nile water use and conservation

In the Eastern Nile basin, the course of action taken by the riparian states by politicking and securitizing the Nile issue never resolved the allocation of the water resources of the Nile or any of the major collective action problems in the basin. The existing river management regime neither protected the river from the different challenges nor brought efficient utilization, hence demanding a change of governance approach. The extreme dependence of some of the riparian states on the Nile made cooperation over the use and management of the river very complex and tough. Moreover, the concentration of the population and economic activities in the Nile valley forced countries like Egypt and Sudan to politicize, internationalize, and securitize the Nile issue. Egyptian scholars like Hassan (2018) concede the internationalization of the Nile water use when he stated that "…the Grand Ethiopian Renaissance Dam is regarded as an Arab Gulf issue and not just a purely Egyptian affair" (Hassan, 2018: 43).

Egypt in particular views the Nile as the highest political and national security over which they are unwilling to negotiate and reach compromise thus halting efforts to institutional joint governance of the river water (Kalpakian, 2015). In the basin so far countries like Egypt, which can save water through the adoption of laws and policies and also recycling of the wastewater (Abdel-Kader and Abdel-Rassoul, 2010) have not been willing to use the saved water to equitably share with upstream Nile states. This could create a favorable condition to reach an agreement on the Nile water use and management among basin states. Instead, Egypt opted for reclaiming desert lands outside the Nile valley with the saved water than using that for more cooperation with upstream states (Allan, 1999).

From a normative perspective, the regional mechanisms like ENTRO could overcome the challenge of securitization and politicization through the systematic promotion of water supply enhancement. On the one hand, and water conservation among the lower riparian states, on the other, so that the states in the basin could reach agreement on the use and management of the basin. The regional mechanisms can achieve this goal only through a policy framework that enables the states of the basin to coordinate their water management and use in the Eastern Nile basin (Ethiopian academia, 2019). Once a given river basin's collective action problem has got security relevance, nations in the river basin struggle to reach a common understanding and agreement dooming the chance for cooperation and institutionalized governance. However, this policy position hardly contributes to the health of the basin and exposes the river to several collective action problems which can only be solved through common policy frameworks and joint governance mechanisms (IWIMI expert, 2020)

In the international river basins, where the river basin collective action problems are not securitized and politicized, there are opportunities for cooperation and resolving or mitigating the identified collective action in the basin. There is also a great chance not only for jointly mitigating the problems

but also for institutionalized governance of the river to jointly address similar collective action problems permanently. Such cooperation and joint governance are possible in the basin where the collective action problems have no security relevance for the co-riparian states (Schmeier, 2013).

In the Eastern Nile Basin, if the politicization and securitization of the Nile River continue, the lives of the millions of people that rely on the river will soon or later be jeopardized as the existing governance of the River is dominated by politics and security issues. Little is recognized about the looming threats because of climate change, urbanization, population growth, and economic growth which demand a new legal, institutional, and sound water policy to ensure the sustainability of the river and meet the new ever-growing demands for freshwater use.

The domination of Nile River management with politics and security so far has not moved the states in the basin to face the real challenge of the river. As a result of political deadlock over allocation issues, the challenges to the river basin and its ecosystem have been neglected. In the Eastern Nile Basin, both the water and the health of the Nile environment have paramount importance for the sustainability of the Nile and the livelihood of millions of people that rely on the river water resources. The protection and conservation of the Nile environment and its water are of utmost importance due to the large number of populations that depend on the Nile water. Moreover, the threat of droughts and the impact of climate change could greatly influence the flow regime of the river, which in turn could affect the quantity of Nile water available to its users. Despite all sensitivities of collective action problems in the basin, the politicization and securitization of the Nile water will help neither the health of the river and its environment nor resolve the challenge of joint governance that characterizes the basin. Indeed, the policy of internationalizing the Nile water politics and securitization has not brought security and mutual understanding and hence the effectiveness of institutionalized governance of the river. It rather resulted in increasing tension and the expansion of mutual suspicion among the riparian states beyond the water sector.

The Egyptian government brought the Nile case to the Arab League and they declared their support for Egypt. Through the ministry of foreign affairs, Ethiopia expressed her concerns about the decisions of the Arab League regarding the Nile (Addis Standard, 2019). Egypt also strongly demanded the involvement of the United States of America and World Bank first as observers though America tried to impose the terms of the agreement through its treasury officials which Ethiopian authorities declined to accept (Arsano, 2020). These actions demonstrate Egypt's push to politicize the Nile dispute, overshadowing the aim of both parties for the sustainable management of river water.

Egypt has already securitized its access to the Nile water. Successive Egyptian leaders have already declared others' access to the water as a national security matter. Indeed, they threatened to use force in case states like Ethiopia dare to claim the fair share of the Nile water for their development. Egypt leader Anwar Sadat after the conclusion of the Camp David agreement with Israel declared that Egypt would go to war if her water right is threatened by upper riparian states implying the securitization of the Nile water access (Hassan, 2018).

The desecuritization of the water issues in the Nile basin holds great benefits for all the basin countries. It can promote cooperation and economic interdependence in the basin countries, thus producing more economic potential than the actual benefit that can be reaped by securitizing the Nile issue (Grandi, 2016). The call for the Nile river governance regime change intensified from scholars as well as development practitioners in the recent past. Indeed, many people are seeking alternative governance for transboundary water regimes in the Nile basin because the current regimes are not effective in efficiently using water or protecting the water and its surroundings from potential threats to the basin's water resources (Kimenyi and Mbaku, 2015; Grandi, 2016).

The securitization and politicization of the Nile River can be toned down if the riparian states search for an alternative source of freshwater by investing in emerging technologies and reducing over-dependence on the Nile as the source of freshwater. The third method is to advance technologies that rigorously encourage water conservation among water users and to advance rules and regulations that do the same. It is thought that the high pricing policy will discourage overuse and waste of water and

encourage water conservation. To prevent states from enacting policies that securitize and politicize water, all of the aforementioned actions are extremely important.

4. Conclusions and Recommendations

This article aimed to present the necessity of replacing the fragmented water resource management policies specific to each country with a sub-basin-wide policy regime in the Eastern Nile Basin. The research findings indicate that addressing the common challenges in water management and collaborating on Nile water conservation and protection not only helps alleviate possible water scarcity in the basin but also promotes peaceful relations among the basin countries. The additional conserved water could help maintain and increase the water flow and mitigate possible water resource scarcity for all basin countries. Conserving the Nile basin also contributes to global efforts to mitigate the impacts of climate change and water scarcity. A joint effort towards a sub-basin-wide policy regime will create shared ownership of the Nile River and fair and equitable resource management and use among the basin countries. However, the research also suggests that it is essential to diffuse tensions among the basin countries regarding the legal issues surrounding the Nile River ownership and foster collaboration among states to establish and maintain a sub-basin-wide policy regime. This requires continuous and persistent diplomatic efforts from all concerned countries to reach an agreement or consensus on how to manage and use the resources of the Nile. Given the current situation in the region, diplomacy appears to be the only means of dealing with Nile politics.

The findings of this study have significant implications for the ongoing discourse on water resource management in the Nile basin and can provide valuable insights for policymakers and stakeholders in the region and beyond. However, the findings could only address the necessity of such regimes without delving into the determinants of policy regime effectiveness in resolving common water management challenges. Therefore, further research is crucial to uncover the factors that determine the effectiveness and actual contribution of such a transboundary water policy regime in addressing collective action problems in a transboundary river context.

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