



The Dispute Over The Nile River Involving The Grand Ethiopian Renaissance Dam

Sengketa Sungai Nil yang Melibatkan Bendungan Grand Renaissance Ethiopia

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Abstract

This study examines the complex conflict over the Nile River, focusing on the Grand Ethiopian Renaissance Dam (GERD) and its implications for regional socio-economic development. The research adopts a systems perspective to analyze the dynamics between Egypt, Sudan, and Ethiopia. It highlights the challenges of water management in the Nile River Basin, shared by eleven African countries, and delves into the geopolitical, environmental, and socio-economic factors at play. The research team, composed of Latin American scholars, acknowledges their outsider perspective and strives to incorporate a wide range of views. The findings discuss the historical treaties, current negotiations, and the importance of a balanced agreement that considers the interests of all parties, the threat of climate change, and sustainable water management practices. The study concludes with insights that could inform similar disputes in other transboundary river basins and underscores the urgency for cooperative solutions to prevent humanitarian crises.

Keywords: Nile River, GERD, Causal Loops, System Perspective

Abstrak

Penelitian ini menelaah konflik kompleks atas Sungai Nil, dengan fokus pada Dambaan Besar Renaissance Ethiopia (GERD) dan implikasinya terhadap pengembangan sosio-ekonomi regional. Penelitian mengadopsi perspektif sistem untuk menganalisis dinamika antara Mesir, Sudan, dan Etiopia. Ini menyoroti tantangan pengelolaan air di Cekungan Sungai Nil, yang dibagi oleh sebelas negara Afrika, dan menggali faktor-faktor geopolitik, lingkungan, dan sosio-ekonomi yang bermain. Tim penelitian, yang terdiri dari para sarjana Amerika Latin, mengakui perspektif luar mereka dan berusaha untuk memasukkan berbagai pandangan. Temuan mendiskusikan perjanjian sejarah, negosiasi saat ini, dan pentingnya kesepakatan yang seimbang yang mempertimbangkan kepentingan semua pihak, ancaman perubahan iklim, dan praktik pengelolaan air yang berkelanjutan. Studi ini diakhiri dengan wawasan yang dapat menginformasikan sengketa serupa di cekungan sungai lintas batas lainnya dan menekankan urgensi solusi kerjasama untuk mencegah krisis kemanusiaan.

Kata kunci: Sungai Nil, GERD, Loop Sebab Akibat, Perspektif Sistem

Introduction

Water management in transboundary freshwater streams has been pointed out as one of the wicked problems of the century. The combination of infrastructural projects, water-demanding crops, climate change, and overpopulation and their impact on the development of the countries involved have the potential to become the most relevant source of conflict that the world would face in the upcoming years.

The Nile, the longest river in the world, is a source of life and prosperity in Africa, but recently has also become the reason of conflicts among riparian countries. The dispute involving the Grand Ethiopian Renaissance Dam (GERD) has gained international repercussions. While Ethiopia has claimed her own right for development, downstream neighbors Egypt and Sudan feel threatened.

While this conflict has conventionally been analysed as a resource dispute, this work uses a systems perspective to delve into the conflict between Egypt, Sudan, and Ethiopia regarding the use of the Nile River stream, starting from the construction of the Grand Ethiopian Renaissance Dam and its implications on the region's socio-economic development.

Our team is composed by two Latin American researchers (Brazil and Chile) with no background in international water disputes nor related topics. However, having clear consideration of the particular elements of the case we have chosen, we strongly believe that this research can help others, at a global scale, to understand similar local issues regarding the use of transboundary water streams.

We also consider relevant to state that our analysis and interpretation of the facts involving the Nile River dispute is limited to the perspective of foreign observers and biased by the western view of this political conflict. Being aware of this, we have tried to include a broad range of visions and expert opinion to tackle the goals of this research.

To address the complexity of this grand challenge, we have set the following principles regarding the boundaries of the system: The Nile River Basin is shared by eleven African countries which benefit from this natural resource. However, we have focused on the dynamics between Ethiopia, Egypt, and Sudan. Sudan has chosen to follow Egypt through the contested 1959 Treaty on Nile River waters. Please note that throughout this document we have clustered both countries, referring to them as both "Sudan and Egypt" and "downstream countries", interchangeably. We have decided to omit any analysis on the Tigray war in Ethiopia, respecting the boundaries of the system we established at the beginning of the research. This is because the Tigray conflict involves other complexities not necessarily related to the grand challenge we have chosen.

The Dam and the Dispute Over the Nile

Located in a desert area, most of the Egyptian population are organized and settled around the

Nile. “Egypt has been the principal hegemon state in the Nile basin” (Tekuya, 2018), being recognised as a ‘hydraulic state’ (Wittfogel, 1957) that has “successfully mobilised the Nile water resources for millennia” (Cascao et al., 2008). To do so, Egypt had controlled and influenced the further basin regions to protect their resources. However, this status quo has been challenged by the construction of the GERD upstream.

More than 300 million people from 11 countries depend on the waters of the Nile, some of them almost exclusively relying on the river as their source of freshwater. According to Cascao et al (2008) “most of the eleven upstream Nile riparian countries are classified as ‘least developed countries (LDCs) that are eager to get their populations out of extreme poverty’”.

GERD is the largest hydropower project in Africa, with an expected capacity to produce 6,000MW of energy (Water Technology, nd), which means economic and social development for Ethiopians as it will enable them to produce electricity for domestic use as well as for export. However, downstream countries Egypt and Sudan see this project as a threat as it is located on the Blue Nile, which supplies around 80% of water during the rainy season. Both countries are highly dependent on the river freshwater, which provides 97 and 77 percent for each one respectively, having limited alternatives for their domestic use, agriculture, and industry (Malerba & Wiebe, 2021).

The construction of the dam by Ethiopia started in 2011 as a secret project. The Ethiopian government did not consult its neighbours and took advantage of the Arab Spring when Egypt was dealing with the social uprising and internal political crises, being unable to interfere in Ethiopian plans. Currently, the dam is in the phase to be filled. It can take a period that can vary from around 3 years to more than 10 years to be completed due to its high capacity of 74 billion cubic meters of water (Samra & Ali, 2021).

The time to fill this reservoir is one of the main points of rivalry. For Ethiopia, the less time the better, as they will be able to start producing electricity sooner while for Egypt and Sudan more time means less risk for their water supply being affected. The negotiations get more complicated when they try to address future water crises and establish bidding deals related to water security and the control of the dam. Egypt, Sudan, and Ethiopia recognise the importance of an agreement, but for over a decade of attempts and even with external mediation, they have not been able to achieve a deal that could be considered beneficial for them all. These tensions have also been marked by declared threats. In 2021, for instance, the government of Egypt claimed that there could be a war if some country removes a drop of water from them.

Iceberg Model

Throughout our research journey, we have realized that the dam is just the tip of the iceberg as the geopolitical conflict was the bigger and central point of this conflict. The following analysis is

also described in Figure 1.

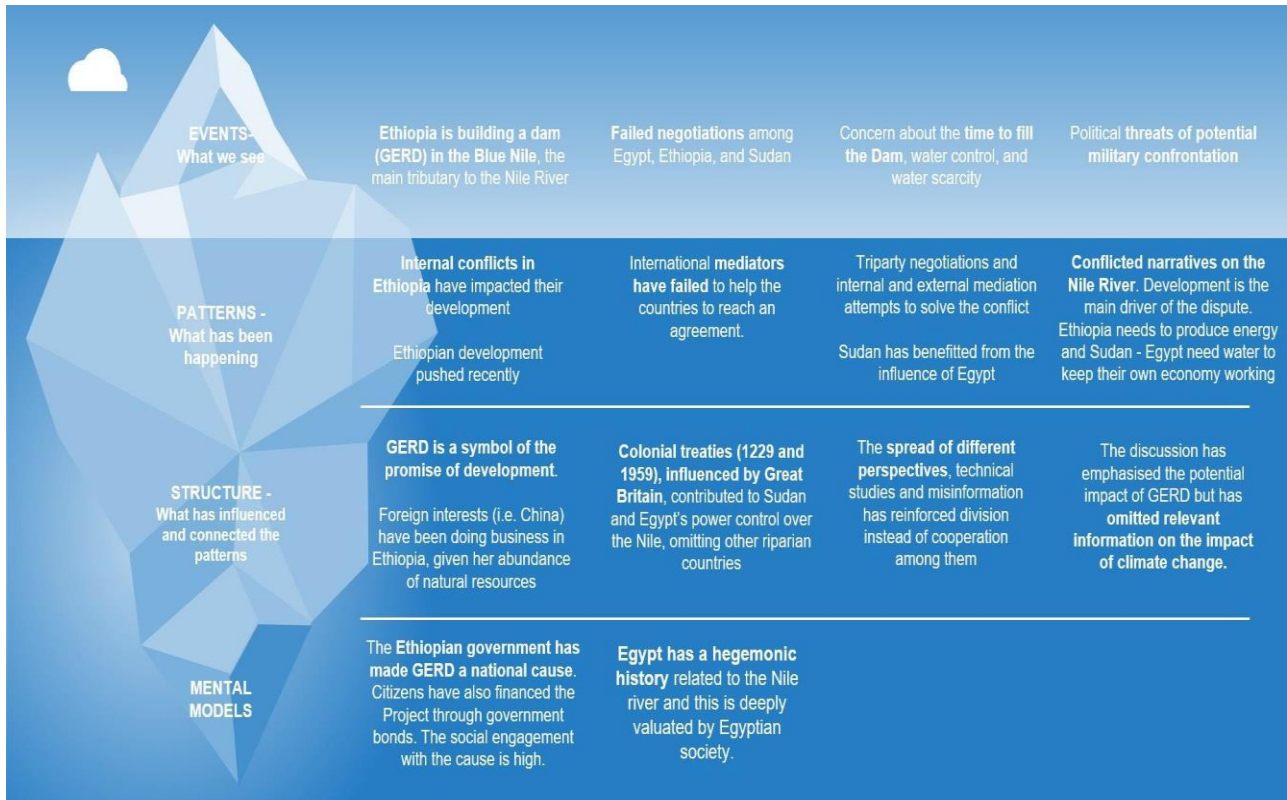


Figure 1: Iceberg Model on the GERD dispute over the Nile River (Note: Own work, based on bibliographical sources of this research).

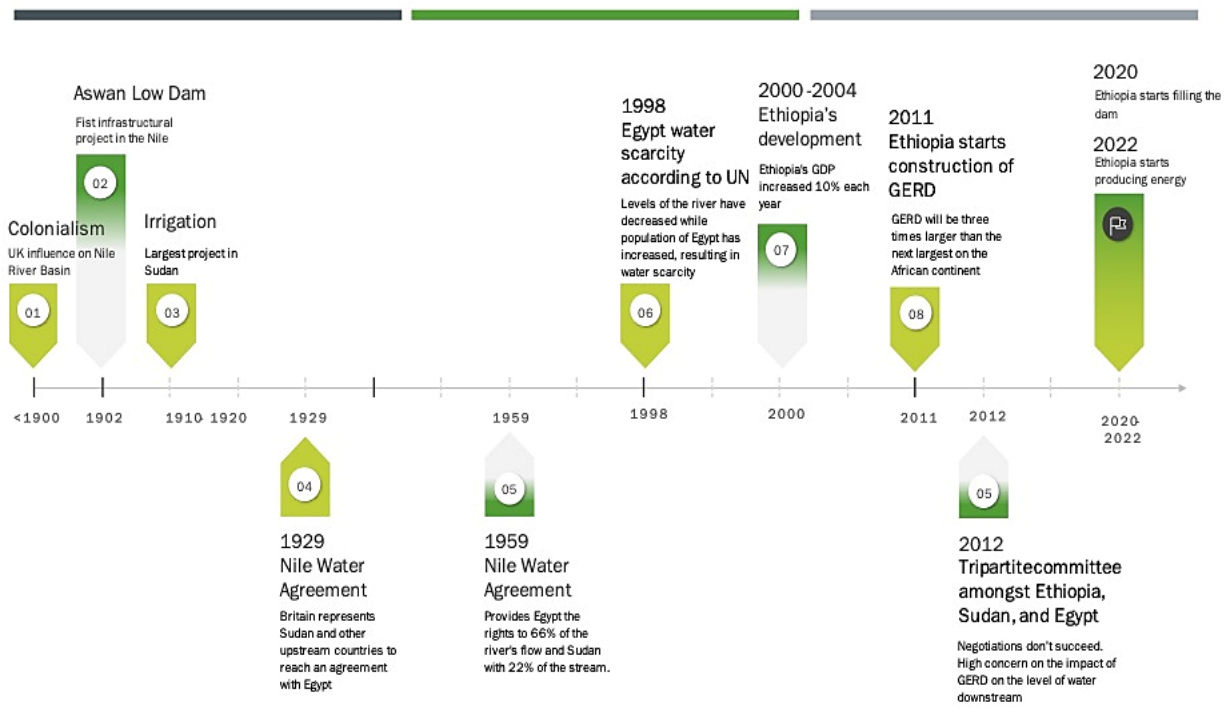


Figure 2: Chronology of the relationship between Egypt, Sudan, and Ethiopia regarding the Nile River during the last century (Note: Own work, based on bibliographical sources of this research).

Events

The building of GERD in the Blue Nile is the triggering fact that activate the system dynamics. Moreover, failed political negotiations among Egypt, Ethiopia, and Sudan for over a decade are also part of the perceptible dynamics, alongside the raising concerns about the time to fill the dam, water security management and future water scarcity. The most recent event are the threats of potential military confrontation in the region.

Patterns

Ethiopia has faced severe internal conflicts during the last century, which have restricted her possibilities of economic growth. However, in recent years, the development of Ethiopia has increased steadily. The country intends to foster its socioeconomic growth by the production of energy from the GERD, creating more infrastructure and opportunities (Mbaku, 2020).

On the other hand, Sudan and Egypt affirm that their industry and agriculture production can be negatively affected by the impact of the dam on their sources of water. Egypt argues to have historical rights on the Nile, while Ethiopia defends her natural and sovereign right on upstream Blue Nile waters, which leads to conflicted narratives on the use of the Nile River. These different interests have impacted their triparty and international mediation attempts to achieve an agreement.

Structure

One key insight of this work is the fact that the structure of the system has been shaped throughout history and past events. The interference of Great Britain during colonialism, and consequent treaties, have given economic benefits to Egypt and Sudan, omitting Ethiopia and other riparian countries.

The colonial agreements promoted by Great Britain over the Nile, namely the 1929 and the 1959 treaties, are also part of the structures (Tekuya, 2018). These treaties were not signed by Ethiopia and thus, they lack validity to help addressing this dispute.

Additionally, the discussion has emphasised the potential impact of GERD but has omitted relevant information on the impact of climate change, which appears to be a major threat. In fact, recent analyses shows that the first stage of the dam filling had no significant impact on the water downstream (Wiebe, 2001).

Mental Models

The Nile River means survival for Egypt and, as the least downstream country within the basin, he does not accept to talk about equal share as the use by others can impact them. This also explain why the Egyptian hegemony over the river “has been sustained by an overwhelming

asymmetry in power, made easier through the enduring weaknesses of riparian competitors” (Cascao et al., 2008).

On the other side, Ethiopian government has made of GERD a national cause. In a society so divided by ethnical conflicts and high levels of poverty, the construction of the dam is promoting patriotism and hope among citizens, who are also contributing through taxes and government bonds to financing the dam (Abteu and Dessu, 2019).

Method

Our research method begins with the recognition that the conflict surrounding the Nile River and the construction of the GERD is not merely a resource dispute but a complex system involving a multitude of socio-economic, political, and environmental dimensions (Cascao, 2009; Swain, 2011). To navigate this complexity, we employ a systems perspective, which allows for the examination of the interdependencies and interactions among the various components of the Nile River basin ecosystem (Conca, 2006).

We initiated our inquiry by defining the system's boundaries, focusing primarily on the countries directly affected by the GERD—Ethiopia, Egypt, and Sudan. This delimitation is informed by the understanding that while the Nile Basin is shared by eleven countries, the dynamics of the GERD primarily involve these three nations (Yihdego et al., 2016).

In conducting our systems analysis, we applied several methodologies:

Stakeholder Mapping: We identified and analyzed the roles and influences of various stakeholders, including governments, international organizations, financial institutions, and local communities. This helped us understand the power dynamics and interests that shape the conflict (Reed et al., 2008).

Historical Contextualization: We examined the historical treaties and agreements that have shaped the current state of affairs, providing insight into how past events influence present negotiations and power structures (Tawfik, 2015).

Iceberg Model Application: The Iceberg Model facilitated our exploration beyond immediate events to underlying patterns, systemic structures, and mental models that drive the conflict. This model helps in identifying not just what is happening but why it is happening (Stroh, 2015).

Causal Loop Diagramming: We constructed causal loop diagrams to visualize the feedback loops and causality within the system. This aids in understanding how certain actions can produce intended and unintended consequences over time (Sterman, 2000).

Scenario Planning: We explored potential future scenarios based on different outcomes of the dam's filling process and associated negotiations. This helped in assessing the implications of various strategies and decisions (Schwartz, 1996).

Gap Analysis and Leverage Points Identification: Drawing from Donella Meadows' work, we

identified the leverage points within the system where interventions could lead to significant and sustainable change. This included examining gaps in policies, agreements, and infrastructure (Meadows, 1999).

Synthesis of Perspectives: Recognizing our position as external observers, we synthesized a broad range of expert opinions and regional perspectives to provide a balanced analysis. We aimed to mitigate our western bias by actively seeking diverse viewpoints (Smith & Wandel, 2006).

Throughout our research, we remained aware of our limitations and the complexity of the system. We acknowledged that each step in our methodology could only provide a partial view of the intricate tapestry that is the Nile River dispute. By synthesizing these partial views, we aimed to offer a comprehensive understanding that respects the system's complexity and provides insights that could contribute to a peaceful and sustainable resolution of the conflict (Zeitoun & Warner, 2006). The final output of our research is intended not just to elucidate the situation surrounding the GERD but also to serve as a methodological framework that can be applied to similar transboundary water disputes around the world (Wolf et al., 2003).

Result and Discussion

Stakeholders Map

Governments of Ethiopia, Sudan, and Egypt, as well as the tripartite committee composed by them, appears as a core part of the negotiations, as shown in the following stakeholders mapping (Figure 3).

A series of political, technical, and financial actors appears involved in the system dynamics. However, the main findings are: a) Despite their influence, the United Nations and the World Bank have not been able to establish more influential relationships to tackle the dispute. b) Diplomatic African actors like the Nile Basin Initiative (NBI) and the African Union have also failed in influencing the system to reach a solution. c) Chinese government has become an influential actor to the Ethiopian side of the system, not only providing engineering services through public companies (Sinohydro Corporation and SGCC Co.) but also contributing with complementary infrastructure (Addis Ababa-Djibouti railway and high voltage grid implemented by SGCC Co.) as well as funding for the GERD project itself (Chinese Export-Import (EXIM) Bank). d) Ethiopia and Sudan are still subject to financial help from international institutions promoting development, but Egypt does not appear as a beneficiary since is not considered a less-developed country (LDC).

Finally, the map suggests that the power to reach a solution is only relying on the three governments involved as main actors and its tripartite committee.

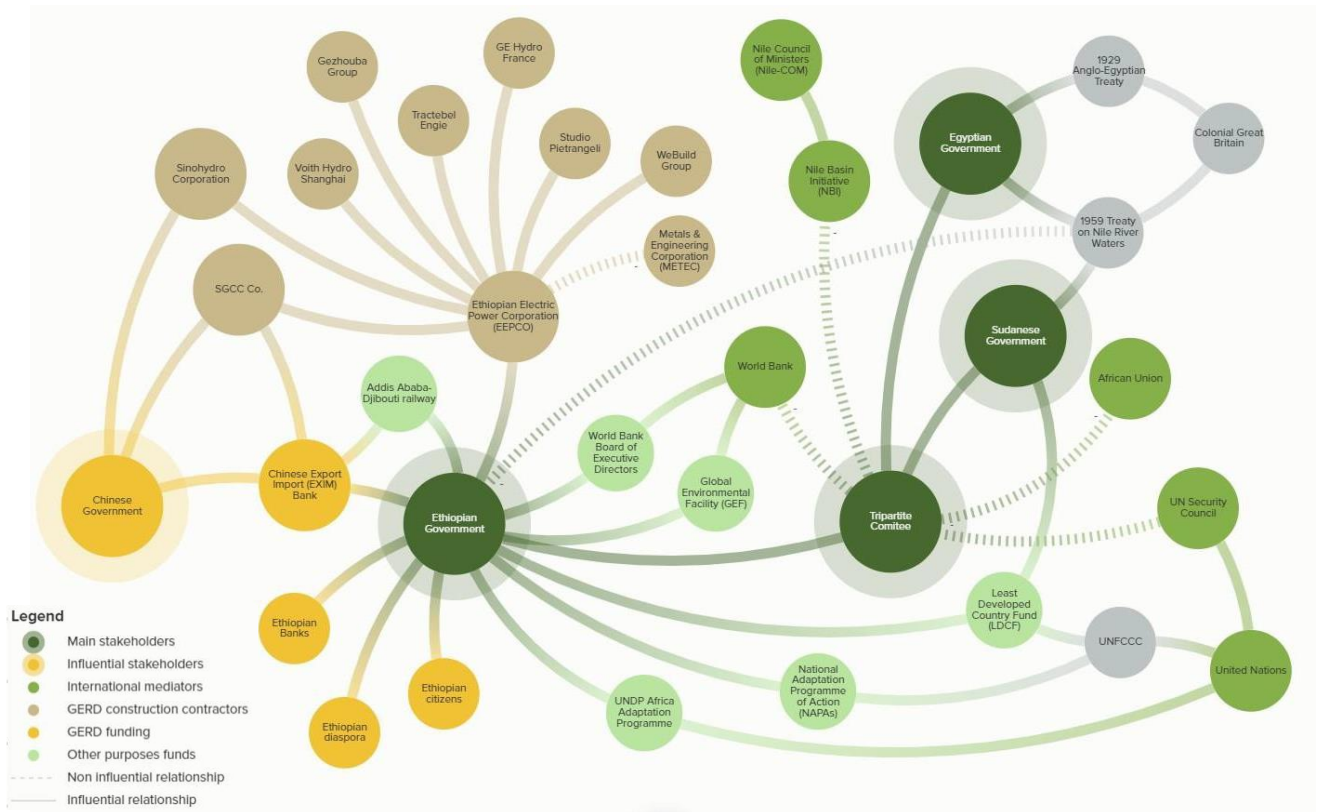


Figure 3: Stakeholders’ map of the Nile River dispute regarding the Grand Ethiopian Renaissance Dam. (Note: Own work, based on bibliographical sources of this research. Interactive version available at Kumu.io)

Causal Loop Diagrams

Following previous insights, we have started mapping the main dynamics of the system by using a connected circles diagram, as follows (Figure 4). The main findings here are:

- Ethiopian narrative is fully deployed on energy production and how GERD represents an opportunity highly valued by her population. Unlike the downstream countries, Ethiopia has plentiful access to water from mountains and rainfalls.
- Ethiopia has created a “mystique” amongst her citizens, who have financed part of the GERD project through government bonds.
- However, the main sources of funding come from abroad, specifically from China, according to the stakeholders’ map previously shown.
- Downstream countries have a tradition in the use of the Nile River, especially for industries and agricultural production, which might be affected by the GERD project.
- Nonetheless, downstream countries face a major threat: the impact of global warming, population growth, and inefficient irrigation practices, which already have shown their impact on the level of freshwater available.
- Both sides are connected by the attempts of coordination regarding the time to fill the dam, the level of water available downstream, and the previously set actions in case of events of water

scarcity downstream.

- The level of freshwater downstream can be even more affected by the impact of climate change rather than Ethiopian control of her own dam, so an agreement on this would not be enough if there are no sustainable policies aimed to tackle this problem.
- Ethiopian development can bring prosperity to the region by exporting energy to neighboring countries. However, Ethiopia still needs to develop infrastructure and a better-integrated grid to provide energy for domestic use as well as to export.

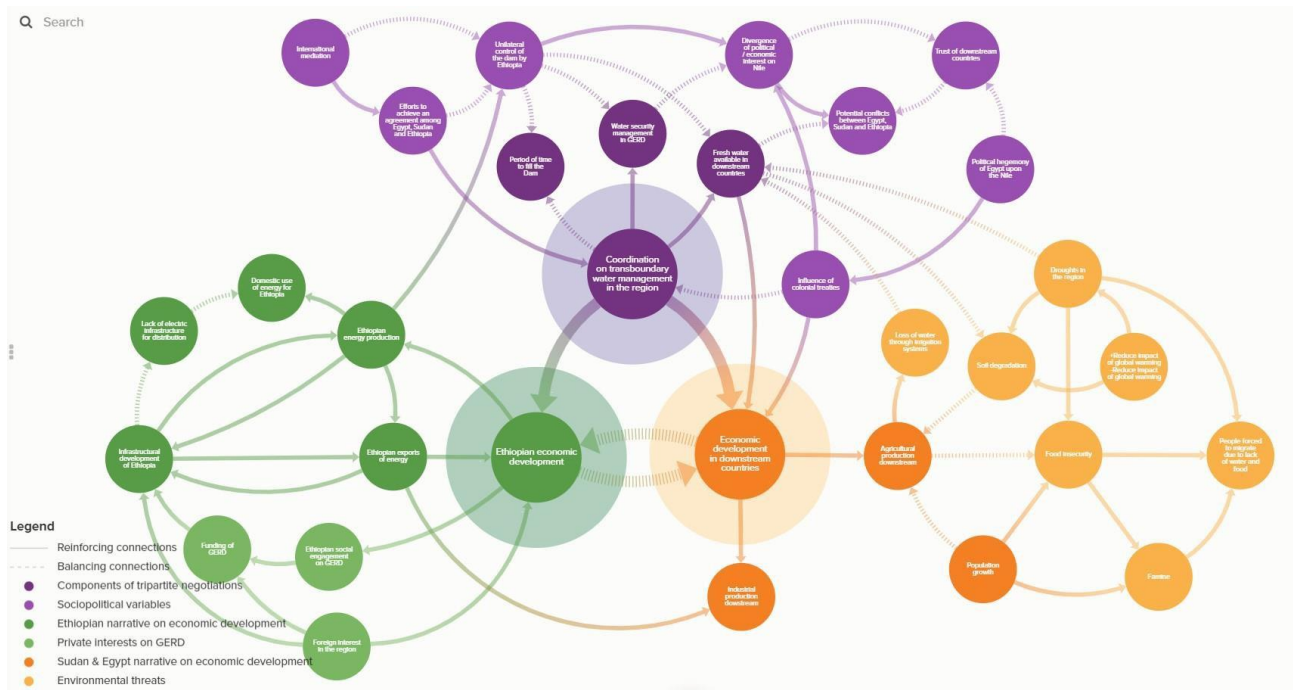


Figure 4: System mapping of the Nile River dispute regarding the Grand Ethiopian Renaissance Dam. (Note: Own work, based on bibliographical sources of this research. Interactive version available at Kumu.io)

The connected circles tool was the source to create the causal loops diagram as shown in the figure 5. Our analysis shows that the challenge is far more complex than achieving an agreement regarding the GERD and the use of water. The main findings are:

- (B1) Narratives and power dynamics. The current narratives and treaties only contribute to creating more division between the three countries.
- (B2) Weakened African International institutions. The lack of independence, funding, and legitimacy of their own international collaboration institutions have been keeping Africa from a better internal understanding.
- (B3) Climate change. The lack of sustainable policies to prevent or reduce the impact of global warming can lead the region to serious humanitarian crises characterized by water scarcity,

starvation, and forced migration, thus severe armed conflicts in the region.

- (B4) Water scarcity. High rates of population growth in downstream countries represent another relevant threat since the Nile River might not be enough to cover basic needs in the upcoming years.
- (B5) Current productive policies downstream. Some of the most important crops in downstream countries are highly water-demanding. Egyptian cotton, for instance, is having a severe impact on the level of freshwater. Egypt basically sells water by exporting cotton.
- (B6) Impact of intensive agriculture and inefficient irrigation systems have a relevant impact on the level of freshwater.

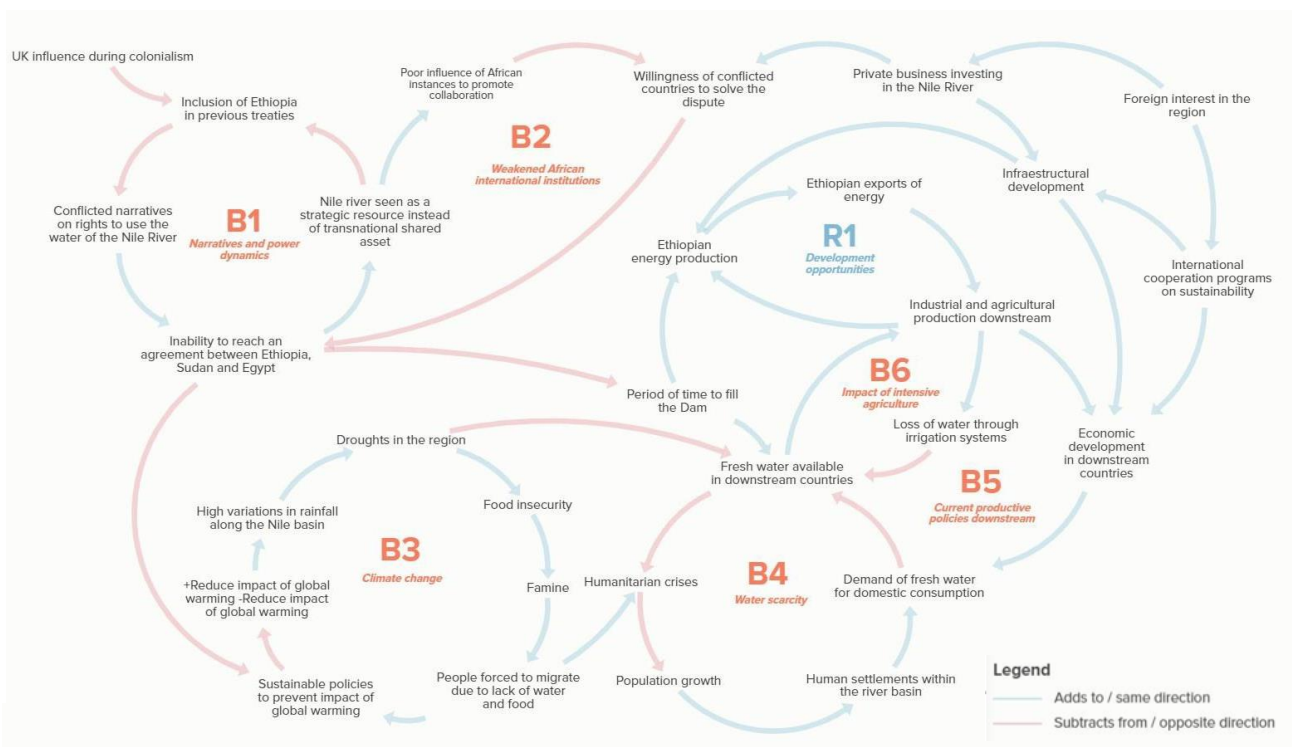


Figure 5: Causal loops diagram on the Nile River dispute regarding the Grand Ethiopian Renaissance Dam. (Note: Own work, based on bibliographical sources of this research. Interactive version available at Kumu.io)

Gaps and Lever Models

According to Meadows (1999), there are different leverage points as well as different results. So, during this journey, looking to find the causes of these disputes over the Nile, we have also kept asking ourselves how to promote harmony in this system, how to consider our neighbours as our brothers and not our enemies, and how to consider the nature also part of us? Therefore, we propose a turning point on how the main players have seen the problem to promote system change.

Table 1. Gaps and levers on the Nile River dispute regarding the Grand Ethiopian Renaissance Dam.

Feedback Loop / Gap	Lever	Intervention
B2: Weakened African international institutions	The power to add, change, evolve or self-organize system structure	Strengthen African collaboration through a new mission-oriented instance aimed to collective development (Mazzucato, 2015)
B1: Narratives and power dynamics	The mindset or paradigm out of which the system arises	<p>Adopt a "shared natural good" approach, as in Senegal River (United Nations, 2013), and/or a "river as a person" approach, as in New Zealand (Evans, 2020).</p> <p>Due so, instead of each one of these countries talking about their individual rights based on the importance of the Nile for them, they should start to consider the rights of the Nile, treating him as a person, and prioritising his rights.</p>
B1: Narratives and power dynamics	The mindset or paradigm out of which the system arises	<p>Create a new Nile River Basin narrative among eleven riparian countries.</p> <p>The change in the way how each country sees the problem could lead them to give priority to the Nile rights and take care of him as a person, including all its extension from its sources to the Mediterranean Sea.</p> <p>Through this, they would promote discourses leading to union among society. It could increase the importance of the NBI in the region, promoting studies and funding for the benefit of all countries. It also could lead to change in finance with more directionality to green policies being fostered.</p>
B1: Narratives and power dynamics	The rules of the system	Sign a new treaty among Nile riparian countries based on new narrative on collaborative development.
B3: Climate change	The goals of the system the rules of the system	Promote sustainable policies to prevent impact of global warming. Better policies on food insecurity and water management.
B4: Water scarcity B6: Impact of intensive agriculture	The power to add, change, evolve or self-organize system structure	Develop innovation to optimize the agricultural and industrial production, reducing the waste of fresh water.
B5: Current productive policies downstream	The rules of the system	Create a new set of industrial policies to achieve sustainable goals prioritizing the value of water for human life.

(Note: Own work, based on Meadows (1999), other bibliographical sources of this research and analysis through systems thinking methodologies.)

By proposing the evolution and self-organization of African institutions, stronger regional collaboration is needed to address systemic challenges. Strengthening these institutions could lead to more effective collective action, policy coordination, and resource allocation to tackle issues such as water scarcity and climate change. Moreover, the need for a shift in mindset regarding natural

resources, especially rivers, implies that current narratives centered on national interests may be inadequate for sustainable management. Recognizing rivers as entities with rights could transform the way countries interact with each other and manage shared resources, leading to more equitable and long-term stewardship.

The repeated emphasis on collaborative narratives and the signing of new treaties implies that existing governance structures might be too rigid or fragmented. A move towards adaptive governance that includes various stakeholders and can respond to environmental changes is needed. The call to promote sustainable policies acknowledges the significant threat posed by climate change. The implication is that without proactive measures, the impacts on food security, water availability, and overall social stability could be severe. The focus on optimizing agricultural and industrial practices to reduce fresh water waste implies that current methods are unsustainable. Innovation here is seen as crucial for securing water resources for future generations.

The suggestion to create new sets of industrial policies highlights the current gap in sustainable practices downstream. This implies an urgent need to redefine industrial strategies to value water not just as a commodity but as a vital resource for life and ecosystem health. These interventions, if implemented, could create a positive feedback loop, where improvements in governance, collaboration, and innovation reinforce each other. This could lead to a more resilient and sustainable management of natural resources, benefiting societies and ecosystems alike.

Conclusion

The analysis of dynamics within the Nile River basin could serve as guidance to better understand the challenge and eventually, learning or gaining key insights from specific conditions of other regions, might provide a comprehensive approach to other basin's realities. Other countries sharing river basins like the Ganges-Brahmaputra, the Jordan, or the Euphrates are facing similar major geopolitical challenges today that involve a series of variables and urge for agreements that can satisfy the needs of each state involved

We hope to contribute to raising leverage points that could be explored to change this system into a new one that could nurture a more cooperative framework. Hence, increasing the pathways toward peace, collaboration, and sustainability, reducing the risks of armed conflicts and humanitarian crises.

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