Grand Ethiopian Renaissance Dam: Why Mediation Failed?

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Abstract: The Grand Ethiopian Renaissance Dam (GERD) project is a cornerstone of Ethiopia's economic development and energy security ambitions, and Africa's largest hydroelectric project. It aims to generate significant domestic and export electricity, playing a vital role in Ethiopia's growth strategy. However, this initiative has escalated tensions with downstream nations, particularly Egypt and Sudan, which are concerned about the dam's potential impacts on their water supplies and agricultural systems. The conflict is rooted in deep-seated issues related to water rights and the equitable distribution of the Nile's resources, with Egypt perceiving the GERD as a threat to its historical entitlements established by colonial-era agreements.

Efforts to mediate the GERD dispute have involved various regional and international actors, including the African Union, the United States, and the European Union, but have often resulted in limited progress and inconclusive outcomes. Factors contributing to the challenges in mediation include a lack of trust among the involved parties, differing national priorities, and the absence of a comprehensive framework to address the complex interdependencies within the Nile Basin. This paper seeks to analyze the dispute management process surrounding the GERD, exploring the historical context, national interests, and negotiation challenges. By doing so, it aims to provide insights into the dynamics of the conflict and propose recommendations for future mediation efforts that prioritize inclusive dialogue, trust-building, and sustainable water management practices among all stakeholders.

Keywords: Mediation, negotiation, Grand Ethiopian Renaissance Dam, Ethiopia, Egypt, Sudan, African Union, United States, conflict management, dispute resolution.

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I. Background

Ethiopia, with a rapidly growing population and economy, faces significant energy demands. The country experiences frequent power shortages and relies heavily on hydropower for electricity generation. The GERD was conceived as a solution to address these energy needs and reduce dependence on imported electricity.

Ethiopia is the second most populous country in Africa, with a population exceeding 126 million people as of recent estimates (86.76 million in 2009, 21.74 million in 1974, World Bank estimates). The population has been growing rapidly, with a high fertility rate and a large youth demographic. The annual population growth rate is approximately 2.5%, contributing to the country's youthful population profile. Urbanization in Ethiopia has been increasing steadily, driven by rural-urban migration and natural population growth. Major cities like Addis Ababa, Dire Dawa, and regional capitals are experiencing significant growth and transformation.

Ethiopia is also known for its ethnic diversity, with over 80 ethnic groups and languages spoken across the country. The Oromo, Amhara, and Tigrayans are among the largest ethnic groups, each with distinct cultural traditions and languages.

Ethiopia's economy is one of the fastest-growing in Africa, with an average annual GDP growth rate exceeding 8% over the past decade, although coming up from a very low base (925 USD per capita in 2021). The GDP composition is diverse, with agriculture, manufacturing, and services sectors contributing to economic output. Agriculture remains the most significant sector, employing a large portion of the population and contributing to both food security and export earnings. Successive governments have prioritized industrialization and infrastructure development as key pillars of their economic strategy, with modest results, due mainly to poor infrastructure, loss of access to the sea because of the Eritrean secession, and very limited electric power production.

The present government has actively pursued foreign direct investment in sectors such as manufacturing, agriculture, and energy. Investments have been supported by incentives and reforms aimed at improving the business climate and facilitating private sector growth (African Development Bank Country Focus Report, 2024).

But, despite economic progress, Ethiopia faces challenges such as poverty, unemployment, and regional disparities in development. Ethnic conflicts, like the recent war in Tigray and local strife in Oromo and Amhara, are destabilizing the country and raising the stakes for the federal government in its race for development and prosperity. And to prove Sir Paul Collier right, Ethiopian development is severely hampered by being in a bad neighborhood, as with the catastrophic Sudan civil war and the equally disastrous but far more persistent Somali civil war. Paul Collier argued that landlocked countries facing underdeveloped neighboring economies encounter significant barriers to accessing global economic growth. Unlike coastal nations, which can engage directly in international trade, landlocked countries are often reliant on economic exchanges with their neighbors. Consequently, if

these neighbors suffer from poor infrastructure and limited market capacity, landlocked nations face severe constraints in expanding their economic reach and participating in global trade networks. Ethiopia is a good illustration of his arguments (Collier, 2007).

Beyond all these, probably nothing impedes Ethiopia's development more than its lack of infrastructure and access to reliable electric power, a case not quite rare in Africa. Ethiopia's energy sector has historically relied on hydropower, which accounts for the majority of electricity generation. The country has significant hydropower potential, but it remained marginally tapped until recently. Electricity demand has been increasing rapidly due to economic growth, urbanization, and electrification efforts in rural areas. In addition to hydropower, Ethiopia has also undeveloped potential in wind, solar, and geothermal energy. The government investments in renewable energy to diversify the energy mix, enhance energy security, and reduce dependence on imported fuels, have been met with limited success. For the degree of industrial development that Ethiopia needs to overcome poverty, the energy offered by wind or sun is not enough, for obvious reasons.

The Grand Ethiopian Renaissance Dam (GERD) is a flagship project aimed at enhancing Ethiopia's electricity generation capacity and reducing reliance on imported electricity. It is expected to play a crucial role in meeting domestic energy demand and supporting regional energy integration (Akamo, 2022).

Ethiopia's demographic, economic, and energetic backgrounds are shaped by its large and growing population, rapid economic growth, and strategic focus on energy development. While the country faces challenges in poverty alleviation and infrastructure development, its dynamic economic policies and investments in renewable energy underscore its commitment to sustainable development and inclusive growth.

II. The Hydro Project

Construction of the Grand Ethiopian Renaissance Dam (GERD) commenced on April 2, 2011, when Ethiopia's then-Prime Minister Meles Zenawi laid the foundation stone. However, the origins of the project date back to a topographical survey conducted by the US Bureau of Reclamation between 1956 and 1964, during which the current location was identified as suitable for a major hydropower dam. Despite this early recognition, the project was shelved after the 1974 coup d'état in Ethiopia. It was only decades later, in 2009, that the Ethiopian government revived the initiative, reflecting a renewed national commitment to harnessing the Nile's resources for development.

In 2010, the dam's design was finalized by James Kelston, and shortly thereafter, the Ethiopian government awarded the construction contract to the Italian company Salini Impregilo—now known as WeBuild—through a direct procurement process, bypassing a public tender. With an estimated construction cost of $4.8 billion, the GERD is designed to generate 6.245 GW of electricity, making it the largest hydropower project in Africa. Remarkably, the project is entirely financed domestically, with funding primarily sourced

from the Ethiopian government and its citizens through the sale of government bonds and securities. This grassroots financial strategy underscores the dam's significance as a symbol of national pride and a critical component of Ethiopia's broader development strategy.

Feasibility studies for GERD began in the mid-2000s to assess the technical, economic, and environmental viability of constructing a large-scale dam on the Blue Nile River. These studies evaluated various aspects such as hydrology, geology, socio-economic impacts, and potential electricity generation capacity.

The decision to move forward with GERD was driven by strong political commitment from successive Ethiopian governments. Prime Minister Meles Zenawi played a pivotal role in advocating for the dam as a transformative project for national development. The project received strong support in Ethiopia, reflecting broad consensus on the strategic importance of energy independence and infrastructure development.

The technical design of GERD as a roller-compacted concrete (RCC) gravity dam was chosen for its suitability to the local geology and construction requirements. RCC dams offer advantages in terms of speed of construction, durability, and cost-effectiveness compared to conventional concrete dams.

The Ethiopian government officially announced the GERD project on April 2, 2011. The announcement marked a significant milestone in Ethiopia's quest for energy security and economic development. The announcement included details about the dam's location on the Blue Nile River near the Ethiopia-Sudan border and outlined its potential benefits in terms of electricity generation and regional integration.

Construction of GERD commenced shortly after the project's announcement, symbolizing Ethiopia's determination to move forward with its ambitious plans. The primary contractor for the dam construction was the Italian company Salini Impregilo (now part of the Salini Impregilo Group).

The dam is designed as a roller-compacted concrete (RCC) gravity dam, standing at approximately 145 meters tall with a crest length of 1,800 meters. Its reservoir, Lake Nasser, has a total capacity of 74 billion cubic meters. GERD is a roller-compacted concrete (RCC) gravity dam. RCC dams are constructed using a special mix of concrete that is compacted using vibratory rollers, which allows for rapid construction and cost-effectiveness compared to traditional concrete dams.

GERD is designed to have an installed capacity of over 6,000 megawatts (MW) of electricity generation. This capacity is expected to make it one of the largest hydroelectric power stations in Africa and significantly contribute to Ethiopia's energy needs. The dam will house multiple turbine-generator units, likely equipped with Francis turbines. Francis turbines are commonly used in medium to large-scale hydropower projects and are well-suited for the flow characteristics of the Blue Nile. The annual electricity generation potential of GERD is estimated to be around 15,000 gigawatt-hours (GWh) per year, depending on water availability and operational factors.

Technical characteristics of GERD

Height: Approximately 145 meters (475 feet).

Crest Length: 1,800 meters (5,906 feet).

Base Width: The base width is not typically specified in public documents, but it is designed to support the massive structure and the weight of the reservoir behind it.

Capacity: The reservoir has a total capacity of about 74 billion cubic meters (BCM) of water.

Surface Area: The surface area of the reservoir varies based on the water level and covers a large area upstream of the dam.

As we said, construction of GERD began in April 2011, with the primary contractor being the Italian construction company Salini Impregilo (now part of the Salini Impregilo Group). The construction of GERD has involved various phases, including preparatory works, foundation excavation, RCC placement for the dam structure, and ongoing construction of associated infrastructure such as spillways and powerhouse facilities. The timeline for completion and commissioning has been subject to delays and adjustments due to various technical, financial, and geopolitical factors.

The Grand Ethiopian Renaissance Dam (GERD) represents a monumental engineering effort aimed at harnessing the hydropower potential of the Blue Nile River. Its technical design as an RCC gravity dam, coupled with a large reservoir and substantial power generation capacity, positions it as a critical infrastructure project for Ethiopia's energy security and economic development. The initiation of the Grand Ethiopian Renaissance Dam (GERD) represented a strategic decision by Ethiopia to harness its renewable energy potential and drive socio-economic development. The project's inception involved rigorous planning, feasibility studies, political commitment, and international engagement to navigate technical, financial, and diplomatic challenges. While GERD has faced criticism and regional tensions, its initiation underscored Ethiopia's aspirations for energy sovereignty and economic transformation through sustainable development.

However, the dam's construction and operation continue to be a source of regional tensions and complex negotiations with downstream countries, particularly Egypt and Sudan, highlighting the challenges of managing shared water resources in the Nile Basin.

III. The warring factions

The Egyptian position regarding the Grand Ethiopian Renaissance Dam (GERD) is shaped by its historical dependency on the Nile River for water, agriculture, and national development. Egypt is heavily reliant on the Nile River for nearly all of its freshwater needs. The Nile provides over 90% of Egypt's water supply, crucial for irrigation, drinking water, industry, and hydroelectric power generation. Historical agreements, such as the 1929 and 1959 treaties (between Egypt and Great Britain, and later Sudan), allocated a significant

portion of the Nile's water to Egypt, granting it a veto right over upstream projects that could affect its water security.

Egypt views the GERD as a potential threat to its water security. The dam's construction and operation could reduce the downstream flow of the Nile during periods of filling and drought, impacting agriculture, drinking water supply, and electricity generation in Egypt. Egyptian officials and experts have expressed concerns about the amount of water that will reach Egypt during critical times, such as extended droughts or periods of low rainfall.

Egypt has engaged in various rounds of negotiations with Ethiopia and Sudan to address its concerns about GERD. These negotiations have been mediated by international parties, including the African Union and the United States. Key issues in negotiations include the filling and operation of the dam, mechanisms for drought management, and dispute resolution mechanisms in case of disagreements. Egypt argues that it has historical and legal rights to the Nile's waters based on treaties and agreements signed in the colonial and post-colonial periods. These agreements have traditionally given Egypt a dominant position in Nile water allocation.

There are also concerns in Egypt about the potential environmental and economic impacts of GERD. Changes in water flow and sediment transport downstream could affect agricultural productivity, biodiversity, and the economy dependent on the Nile's ecosystem services.

Egypt has pursued diplomatic efforts to address its concerns diplomatically and legally. This includes participating in negotiations, proposing technical solutions, and seeking international support for its position. While Egypt has primarily pursued diplomatic and legal avenues, there have been occasional references to the potential for using force should the GERD issue escalate.

Sudan's position regarding the Grand Ethiopian Renaissance Dam (GERD) is influenced by its geographical location between Ethiopia and Egypt, as well as its interests in water resources, agriculture, and hydroelectric power. Like Egypt, Sudan has historically benefited from agreements that allocated a significant portion of the Nile's waters to downstream countries, particularly through the 1959 Nile Waters Agreement between Egypt and Sudan. This agreement established specific allocations for each country, based on historical usage and anticipated future needs, and has influenced Sudan's perspective on water rights and allocations. Sudan recognizes the potential benefits of GERD in terms of electricity generation and regional energy cooperation. The dam's location upstream could provide opportunities for Sudan to enhance its own hydroelectric capacity and potentially benefit from stabilized water flows.

Sudan is concerned about the potential impacts of GERD on the flow of the Blue Nile downstream into Sudanese territory. Changes in water flow patterns could affect irrigation practices, agricultural productivity, and the management of existing dams and water infrastructure in Sudan. Sudan seeks assurances regarding the filling and operation of the

GERD reservoir. The timing and volume of water releases during the filling stages could affect Sudan's water supply, especially during periods of drought or low rainfall. Sudan is also concerned about the environmental and social impacts of GERD, particularly downstream effects on sediment transport, riverine ecosystems, and communities reliant on the Blue Nile for livelihoods and water resources.

Despite concerns, Sudan recognizes the potential benefits of GERD, including increased regional energy integration and potential opportunities for water management and flood control through coordinated reservoir operations. Sudan has actively participated in negotiations mediated by international parties, including the African Union, the United States, and the European Union. These negotiations aim to address Sudan's concerns while promoting cooperation and mutual benefit among riparian states.

Sudan's position on the Grand Ethiopian Renaissance Dam (GERD) reflects its dual role as a downstream country concerned about water security and as a potential beneficiary of increased hydroelectric capacity and regional energy cooperation. While Sudan acknowledges the challenges and uncertainties posed by GERD, it also seeks to leverage the opportunities for enhanced regional cooperation and sustainable development in the Nile Basin. Finding a balanced and mutually beneficial agreement remains a critical objective for Sudan in ongoing negotiations with Ethiopia and Egypt.

Ethiopia's position on the Grand Ethiopian Renaissance Dam (GERD) is shaped by its strategic goals for economic development, energy security, and sovereignty over its water resources. Ethiopia views the construction of GERD as a sovereign right to utilize its natural resources for national development. It argues that it has the right to develop the Blue Nile for hydroelectric power generation, similar to how downstream countries have developed their resources. Ethiopia asserts that GERD will not significantly impact downstream water flow or violate international water law principles, including the principle of equitable and reasonable utilization.

Ethiopia's legal justification for constructing the Grand Ethiopian Renaissance Dam (GERD) rests upon the principles established in international law and its historical context. Central to Ethiopia's argument is the assertion that the 1902, 1929, and 1959 Nile water agreements, which Egypt and Sudan regard as binding legal frameworks, do not apply to Ethiopia. These treaties were signed during the colonial era without Ethiopian consent or participation and were, therefore, not in its national interest. This exclusion represents a historical imbalance that undermines the principles of equitable and reasonable utilization of shared water resources.

Ethiopia further invokes Article 34 of the Vienna Convention on the Law of Treaties, which clearly states that a treaty does not impose obligations or confer rights upon third parties without their consent. As Ethiopia was never a signatory to these colonial-era agreements, nor a colonial subject, it is not legally bound by their provisions. Additionally, the Nyerere Doctrine on state succession to colonial treaties reinforces this position, asserting that newly independent states are not automatically subject to agreements imposed during

colonial rule (Makonnen, 1984). Thus, from Ethiopia's perspective, the 2010 Nile Basin Cooperative Framework Agreement (CFA), signed by six of the ten Nile Basin countries, provides a more equitable and contemporary legal foundation for governing the shared use of the Nile's resources, effectively superseding outdated colonial-era treaties (Caruso, 2022).

Ethiopia has engaged in negotiations with downstream countries, particularly Egypt and Sudan, to address concerns about GERD's potential impacts on water flow and downstream water security.

Ethiopia views GERD as a catalyst for regional energy integration and cooperation. It has proposed frameworks for sharing electricity generated from GERD with neighboring countries, promoting energy trade, and fostering regional stability and development. Ethiopia emphasized its commitment to resolving disputes over GERD through peaceful negotiation and dialogue. It has welcomed international mediation and facilitation efforts to reach a mutually acceptable agreement with Egypt and Sudan, but it sought to keep the resolution of the contending issues a matter of tri-lateral negotiations rather than a subject of international meddling.

IV. Key Points of Conflict

As we already pointed out, the longstanding dam dispute in the Nile Basin is intricately linked to the enduring consequences of British colonialism, which has left a detrimental legacy not only in Egypt but also across numerous regions that once comprised the British Empire. This legacy is evident in various contexts, including Palestine, Nigeria, and the India-Pakistan-Bangladesh dynamic, reflecting a pattern of governance and resource allocation that favored colonial interests at the expense of local populations (Miles, 2014).

In 1929, the British government, representing its colonies—Uganda, Kenya, Tanganyika (present-day Tanzania), and Sudan—entered into a treaty with the Egyptian government that granted Egypt veto power over any upstream projects that could potentially impact the flow of the Nile River. This arrangement effectively marginalized the interests of the other Nile riparian states, sidelining their voices and needs.

The treaty was subsequently renewed in 1959 between Egypt and Sudan following their respective independence. In this revised agreement, Egypt was allocated 55.5 billion cubic meters of Nile water annually, accounting for approximately 75% of the total, while Sudan received 18.5 billion cubic meters, or 25%. Crucially, this treaty reaffirmed Egypt's veto power over upstream projects, perpetuating a framework of exclusion for the other Nile Basin countries.

This 1959 treaty now underpins Egypt's official stance in the Grand Ethiopian Renaissance Dam (GERD) dispute with Ethiopia. Egyptian negotiators frequently cite this historical agreement, asserting that Ethiopia's dam project violates established international norms.

Furthermore, there exists a prevailing belief among many Egyptians that they possess an inherent right to the Nile's waters, grounded in a historical monopoly recognized since antiquity. This perception has been reinforced by a long-standing cultural narrative that positions Egypt as the rightful custodian of the river, complicating negotiations and fostering tensions in the contemporary discourse surrounding Nile water rights. The current impasse in the trilateral negotiations regarding the Nile River exemplifies the unrealistic and untenable vision that has led Egypt's authoritarian government to adopt an extreme position, which is increasingly unacceptable to Ethiopia and other riparian countries. This rigidity undermines efforts to establish a cooperative framework for the equitable use of the Nile's waters. The repeated threats by Egypt's dictator, Abdel Fatah el-Sisi to use force to stop the building of the dam weren't helpful, too.

In response to the urgent need for a fair and sustainable resolution to the Nile dispute, Ethiopia and the other riparian states initiated the development of the Cooperative Framework Agreement (CFA) between 1997 and 2010. This agreement represented a significant step toward multilateral negotiations involving all nine Nile Basin countries—Uganda, the Democratic Republic of Congo, Kenya, Tanzania, Rwanda, Burundi, as well as Egypt, Ethiopia, and Sudan. While the CFA was ultimately signed by all nine nations, Egypt and Sudan refused to ratify the agreement, citing fundamental disagreements regarding specific provisions (Caruso, 2022).

The contentious article at the heart of this dispute stipulates that riparian countries must refrain from significantly affecting the security of the waters of any other signatory state. In contrast, Egypt and Sudan sought to modify this language to emphasize a commitment not to adversely affect the security of the waters, the use, and the existing rights of any signatory state. This proposed alteration effectively sought to replicate the provisions of the 1959 treaty within the CFA framework, thereby reinforcing the status quo that has historically favored Egypt and Sudan while effectively blocking any upstream projects initiated by Ethiopia and other nations.

In this context, Egypt and Sudan have positioned themselves as the exclusive users of the Nile's waters, a stance that inherently disregards the legitimate rights and interests of other riparian states. Their insistence on altering the CFA's provisions reflects a desire not only to maintain their historical dominance but also to seek formal recognition of their unilateral claims over the river's resources. Such an approach poses significant challenges to the establishment of a cooperative and equitable framework for Nile water management, ultimately jeopardizing the prospects for sustainable peace and development in the region.

Thus, the failure to ratify the CFA and the insistence on preserving the status quo are indicative of a broader power struggle that continues to shape the dynamics of the Nile Basin negotiations. Without a paradigm shift towards genuine cooperation and recognition of the shared rights of all riparian states, the path to a fair resolution remains fraught with tension and conflict.

The roots of the Nile dispute are deeply intertwined with colonial histories that have shaped the political and social landscapes of the involved nations. The lack of inclusivity in historical treaties continues to influence present-day conflicts, highlighting the critical need for a comprehensive approach that considers the rights and needs of all Nile Basin states.

V. Major dispute areas and official positions of the contending countries

Water Rights and Allocation

Egypt relies heavily on the Nile River for its water supply, with over 90% of its freshwater needs being met by the Nile. Historically, Egypt has had a dominant position over the Nile waters, supported by colonial-era treaties (1929 and 1959 agreements) that granted it the lion's share of the river's flow. Egypt fears that the filling and operation of the GERD will significantly reduce the downstream flow of the Nile, affecting its water security, agriculture, and overall economy.

Sudan, located between Ethiopia and Egypt, also relies on the Nile for irrigation and hydroelectric power. While Sudan stands to benefit from the regulated flow and potential electricity from the GERD, it also worries about the effects on its own dams and water infrastructure. Sudan's position has been somewhat ambivalent, at times aligning with Egypt and at other times showing support for the GERD.

Ethiopia's Development Goals

Ethiopia views the GERD as a vital project for its economic development and energy security. The dam is expected to generate over 6,000 megawatts of electricity, which would significantly boost Ethiopia's power supply and support its aspirations for industrialization and economic growth. Ethiopia argues that the dam will not only benefit its economy but also provide electricity to neighboring countries, fostering regional cooperation.

Regional Power Dynamics

The construction and operation of the Grand Ethiopian Renaissance Dam (GERD) have significantly reshaped regional power dynamics within the Nile Basin, particularly challenging Egypt's historical dominance over the river's resources. For decades, Egypt's geopolitical influence was anchored in its control over the Nile, enshrined in colonial-era treaties that allocated the majority of the river's waters to Egypt and Sudan. Ethiopia's ambitious project marks a strategic shift, asserting its right to harness the Blue Nile for economic development and energy generation. This reflects a broader realignment in regional influence, where upstream countries, led by Ethiopia, are seeking equitable access

to the Nile's resources. Consequently, the GERD symbolizes not only Ethiopia's national aspirations but also a growing movement among African nations to challenge historically imbalanced agreements and assert sovereignty over their natural resources.

The evolving power dynamics around the GERD also resonate beyond the Nile Basin, drawing the attention of regional and global powers. Countries such as Saudi Arabia, Turkey, and the United Arab Emirates have expressed varying degrees of support or concern, reflecting their strategic interests in the region. This international dimension adds complexity to the negotiations, as the Nile dispute intersects with broader geopolitical rivalries in the Horn of Africa and the Middle East. The GERD, therefore, stands as a microcosm of the shifting balance of power in Africa, where long-standing assumptions about control and access to vital resources are being fundamentally reassessed in light of emerging economic and political realities.

Environmental and Technical Concerns

The construction and operation of the Grand Ethiopian Renaissance Dam (GERD) have raised significant environmental and technical concerns, particularly regarding its potential impact on the Nile's natural flow and sediment transport. The Nile River, which supports over 280 million people across 11 countries, is a vital resource for agriculture, fisheries, and livelihoods. Any disruption to its flow could have cascading ecological and socio-economic effects downstream, especially in Egypt and Sudan, which depend heavily on the river for irrigation and drinking water. Sediment transport, in particular, is crucial for maintaining soil fertility in the Nile Delta, where nutrient-rich silt deposits replenish agricultural lands. However, the GERD's reservoir, with a capacity of approximately 74 billion cubic meters, is expected to trap a significant portion of this sediment, potentially reducing its downstream flow by up to 50% and impacting the delta's long-term productivity.

The filling process of the dam's reservoir has been a focal point of contention, as it directly affects water availability in downstream countries. Ethiopia has pursued a phased filling strategy, which began in 2020 and continued with the fourth filling completed in 2023. This process, conducted during the rainy season to maximize inflow, has been criticized by Egypt and Sudan for its perceived lack of coordination and transparency. They argue that an unregulated filling process could exacerbate drought conditions and disrupt water supplies. According to Egyptian authorities, a rapid or uncoordinated filling could reduce the water reaching Egypt by up to 25% during drought years, severely impacting its agricultural sector, which accounts for 11.3% of the country's GDP and employs around 24% of its workforce.

Moreover, technical concerns extend beyond water flow and sediment transport. The potential for seismic activity in the region, which could compromise the dam's structural integrity, is also a point of debate. The Blue Nile basin is located in a seismically active zone, and some experts have warned that a large reservoir could induce seismic activity

or exacerbate existing vulnerabilities. These environmental and technical challenges underscore the importance of comprehensive impact assessments and coordinated management strategies. While Ethiopia maintains that the dam will have minimal adverse effects and emphasizes its potential to mitigate flood risks and enhance regional power supply, the lack of a binding trilateral agreement on environmental management remains a critical issue. This highlights the urgent need for a cooperative framework to ensure that the GERD's operation benefits all riparian states without causing significant ecological or socio-economic harm.

VI. Negotiations and Mediation

Efforts to resolve the conflict have involved various rounds of negotiations, often mediated by international actors such as the African Union, the United States, and the European Union.

Key points of negotiation

Filling schedule: determining a mutually acceptable timeline for filling the dam's reservoir to balance Ethiopia's need for electricity generation with downstream water needs.

Operation and management: establishing guidelines for the dam's operation to ensure it does not significantly harm downstream countries, especially during periods of drought.

Dispute resolution mechanisms: creating a framework for ongoing dialogue and conflict resolution to address future disputes and ensure cooperation.

Despite these efforts, reaching a comprehensive agreement has been challenging due to deep-seated mistrust, differing national interests, and the technical complexity of managing shared water resources. The GERD conflict remains a critical issue for regional stability in the Nile Basin, with the potential for both cooperation and continued tension.

Egypt seeks a comprehensive agreement that addresses its concerns about GERD's potential impacts on water flow and downstream water security. This includes mechanisms for managing the dam's filling and operation to minimize adverse effects on Egypt's water supply.

Egypt desires guarantees and assurances from Ethiopia regarding the filling and operation of GERD. This includes commitments to maintain minimum downstream flows during periods of filling and drought, ensuring consistent water supply to Egypt (Cascão, 2009, Mbaku, 2020), which is a major sticking point for Ethiopia, which doesn't agree with any interference in the use of the GERD.

Egypt advocates for legally binding agreements that uphold its water rights and ensure equitable and reasonable utilization of the Nile's waters among riparian states. These agreements would provide a framework for dispute resolution and ensure compliance with agreed-upon rules and procedures.

Egypt emphasizes the importance of regional cooperation and coordination in managing shared water resources. It seeks to work collaboratively with Ethiopia and Sudan, as well as engage with international mediators and stakeholders, to achieve sustainable solutions that benefit all parties involved.

Egypt has engaged in negotiations mediated by international parties, including the African Union, the United States, and the European Union, to address GERD-related issues. These negotiations aim to find mutually acceptable solutions while respecting the rights and interests of all riparian states.

Egypt advocates for increased technical cooperation and exchange of scientific data to assess the potential impacts of GERD on downstream countries. This includes hydrological modeling, environmental impact assessments, and joint studies to inform decision-making and ensure informed negotiations.

Egypt's view on finding a solution to the GERD conflict centers on protecting its water security, ensuring compliance with historical agreements, and fostering regional cooperation. While acknowledging Ethiopia's development aspirations, Egypt seeks comprehensive agreements that address its concerns through legally binding commitments, guarantees of minimum downstream flows, and mechanisms for effective water management.

Sudan desires a comprehensive agreement that addresses its concerns about GERD's impact on water flow, agricultural productivity, and infrastructure. This includes mechanisms for managing the dam's filling and operation in a manner that mitigates adverse effects on Sudan's water resources.

Sudan advocates for equitable benefit-sharing from GERD's electricity generation and regional energy integration. It seeks assurances that Sudan will benefit economically from the dam's operations and potential electricity exports.

Sudan emphasizes the importance of technical cooperation and data-sharing to assess the impacts of GERD accurately. This includes joint studies, hydrological modeling, and environmental assessments to inform decision-making and ensure sustainable water management practices.

Sudan underscores the importance of regional stability and cooperation in managing shared water resources like the Nile River. It seeks to foster dialogue, confidence-building measures, and cooperative frameworks with Ethiopia and Egypt to prevent conflicts and promote mutual understanding.

Sudan has actively participated in negotiations mediated by international parties, including the African Union, the United States, and the European Union. These negotiations aimed to address Sudan's concerns while promoting cooperation and mutual benefit among riparian states.

Sudan engaged diplomatically with Ethiopia and Egypt to find common ground and negotiate solutions that accommodate each country's interests and rights. It advocates for inclusive dialogue and transparent negotiations to achieve sustainable outcomes.

Sudan's desired solution to the GERD conflict revolves around achieving a balanced agreement that ensures its water security, harnesses the benefits of GERD's electricity generation, and mitigates potential environmental and social impacts. Through comprehensive agreements, benefit-sharing mechanisms, and technical cooperation, Sudan aims to manage shared water resources effectively while promoting regional stability and cooperation in the Nile Basin (Cascão, 2009).

Ethiopia's position regarding the Grand Ethiopian Renaissance Dam (GERD) is rooted in its aspirations for national development, energy security, and sovereignty over its water resources (Akamo, 2022).

Ethiopia views GERD as a critical infrastructure project aimed at harnessing the hydroelectric potential of the Blue Nile River. With a planned capacity of over 6,000 megawatts (MW), GERD is expected to significantly boost Ethiopia's electricity production, meeting domestic demand and potentially enabling electricity exports to neighboring countries.

GERD is seen as a cornerstone of Ethiopia's economic development strategy, contributing to industrialization, urbanization, and poverty reduction efforts. The dam's construction is expected to create jobs, stimulate local economies, and attract foreign investment in the energy sector.

Ethiopia asserts its sovereign right to develop its water resources for national development purposes, including hydropower generation. It argues that GERD is essential for addressing energy shortages, reducing dependency on fossil fuels, and achieving sustainable economic growth.

Ethiopia advocates for equitable and reasonable utilization of the Nile's waters among riparian states. It contends that GERD will not cause significant harm to downstream countries like Egypt and Sudan while ensuring that Ethiopia can utilize its water resources for the benefit of its population.

Ethiopia has undertaken environmental impact assessments (EIAs) and implemented measures to mitigate the ecological impacts of GERD. These include sediment management strategies, biodiversity conservation efforts, and sustainable land use practices to minimize environmental degradation.

Ethiopia aims to maximize the social benefits of GERD for local communities, including improved access to electricity, enhanced irrigation potential, and increased agricultural productivity in downstream areas. It emphasizes inclusive development and community participation in the project's planning and implementation.

Ethiopia seeks to foster regional cooperation and dialogue with Egypt and Sudan to address mutual concerns and promote shared benefits from GERD. It advocates for joint management mechanisms, data sharing, and collaborative efforts to optimize water resources management in the Nile Basin.

Ethiopia engaged diplomatically with Egypt, Sudan, and international mediators to negotiate agreements that uphold its rights to develop GERD while addressing

downstream concerns. It supported negotiations, mutual trust-building measures, and peaceful resolution of disputes through diplomatic channels. But it didn't give an inch on the question of its sovereign right to independently make decisions on how the GERD will be used.

VII. The Mediators

The African Union (AU) has played a significant role in facilitating negotiations and promoting cooperation among Ethiopia, Egypt, and Sudan regarding the GERD. The AU has served as a mediator and facilitator in the GERD negotiations since 2011. It has convened multiple rounds of talks and high-level meetings among the riparian states to address concerns, find common ground, and seek solutions that promote regional cooperation. The AU's involvement underscores its commitment to African-led conflict resolution and its role as a neutral party trusted by all stakeholders involved. The AU has established a negotiation framework aimed at guiding discussions on key issues related to GERD, including the filling and operation of the dam, water flow management, environmental impacts, and dispute resolution mechanisms. This framework provided a structured approach to address technical, legal, and political aspects of the GERD issue, ensuring that negotiations are comprehensive and inclusive.

The AU upholds principles of equitable and reasonable utilization of transboundary water resources. It emphasizes the need for all parties to consider each other's interests and rights in managing shared waterways like the Nile River. The AU advocates for dialogue and cooperation based on international water law principles to achieve sustainable development and peaceful resolution of disputes. Stability in the Nile Basin region is crucial for the AU's broader objective of promoting peace and security in Africa. By facilitating dialogue and cooperation among riparian states, the AU seeks to prevent conflicts that could arise from water-related disputes. The AU encourages confidence-building measures and trust-building initiatives among Ethiopia, Egypt, and Sudan to foster long-term stability and cooperation.

The GERD negotiations are complex due to the competing interests and concerns of Ethiopia, Egypt, and Sudan. Issues such as water allocation, environmental impacts, and national sovereignty require careful consideration and negotiation. The AU tried to navigate these complexities by promoting transparency, technical cooperation, and compromise among the parties involved. The AU has collaborated with international partners, including the United Nations, the European Union, and other regional organizations, to support GERD negotiations. International support provided technical expertise, mediation assistance, and financial resources to facilitate the resolution process.

The United States has been actively involved in facilitating negotiations among Ethiopia, Egypt, and Sudan regarding the Grand Ethiopian Renaissance Dam (GERD). The US has acted as a mediator and facilitator in the GERD negotiations since 2020. This involvement

reflects its commitment to promoting peaceful resolution of disputes and supporting stability in the Nile Basin region, but also deep concern about the conflict involving two of its pivotal allies in the region. The US government, through its diplomatic channels and technical expertise, has sought to bridge differences, build trust, and facilitate constructive dialogue among the riparian states. The primary objective of US engagement in the GERD negotiations was to help the parties reach a fair and equitable agreement that addresses the concerns of Ethiopia, Egypt, and Sudan and prevent its vital allies in the region, Egypt and Ethiopia, from coming to blows and increase the explosive volatility of a region already much troubled. The US emphasizes the importance of adherence to international water law principles, including equitable and reasonable utilization of transboundary water resources, in managing the Nile River and its tributaries.

The US has also supported African-led efforts, including mediation by the African Union (AU), to resolve the GERD issue. It recognizes the AU as a key regional organization with the mandate and capacity to facilitate dialogue and promote consensus among African nations. The US provides technical assistance and expertise to support GERD negotiations. This includes hydrological modeling, environmental impact assessments, and engineering analyses to inform discussions on the dam's filling and operation. US technical support aims to ensure that negotiations are based on scientific data and analysis, helping the parties make informed decisions about water management and infrastructure development.

The US has engaged at high levels, including through the Secretary of State and other senior officials, to support GERD negotiations. This diplomatic engagement underscores the US commitment to regional stability and conflict prevention in Africa. US diplomats have participated in multilateral meetings and bilateral discussions with Ethiopian, Egyptian, and Sudanese officials to advance dialogue and explore potential solutions to contentious issues.

The United States' position on the Grand Ethiopian Renaissance Dam reflects its commitment to promoting peaceful resolution of disputes, supporting regional stability, and advancing sustainable development in Africa. Through facilitation, mediation, and technical assistance, the US aims to assist Ethiopia, Egypt, and Sudan in reaching a mutually beneficial agreement that addresses their respective concerns while fostering cooperation and shared prosperity in the Nile Basin. Ongoing diplomatic efforts underscore US commitment to constructive engagement and partnership with African nations to address complex transboundary water issues like GERD.

The European Union (EU) has played a multifaceted role in mediating the Grand Ethiopian Renaissance Dam (GERD) dispute, primarily focusing on facilitating dialogue between Ethiopia, Egypt, and Sudan to foster a peaceful and equitable resolution. The EU's involvement is part of its broader strategy to support regional stability in the Horn of Africa and ensure the sustainable management of transboundary water resources.

The EU's engagement in the GERD dispute began informally in the early 2010s, recognizing the dam's potential to alter the geopolitical landscape of the Nile Basin. As tensions escalated,

the EU sought to provide technical support and diplomatic engagement. In 2013, the EU supported the International Panel of Experts (IPoE), a group comprising representatives from the three countries and international experts, to assess the potential impacts of the dam. The panel's findings emphasized the need for cooperation and highlighted areas of concern, particularly regarding downstream water flow and environmental impacts.

The EU's formal role as a mediator intensified in 2020, as negotiations facilitated by the African Union (AU) faced significant obstacles. Recognizing the impasse, the EU offered to contribute its expertise and resources to support the AU-led process. In July 2020, EU Special Representative for the Horn of Africa, Alexander Rondos, emphasized the EU's commitment to a balanced resolution, advocating for a legally binding agreement that would address the concerns of all parties involved.

In 2021, the EU participated as an observer in AU-brokered talks, alongside the United States and the World Bank, further demonstrating its active diplomatic role. Despite these efforts, negotiations repeatedly stalled due to fundamental disagreements over the dam's filling and operation. The EU has consistently urged all parties to adopt a cooperative approach, emphasizing that unilateral actions could exacerbate regional tensions.

Beyond diplomatic mediation, the EU has provided technical assistance to the Nile Basin Initiative (NBI), a regional partnership aimed at fostering cooperation among Nile riparian states. Through its financial contributions to the NBI, the EU supports capacity-building programs, data sharing, and sustainable water management projects. These efforts aim to build trust and promote transparency in the region, addressing some of the underlying issues fueling the GERD dispute.

In 2023, the EU renewed its commitment to the mediation process, with European Commission officials calling for intensified diplomatic efforts to reach a comprehensive agreement. The EU also expressed concern over Ethiopia's unilateral decision to complete the fourth filling of the GERD reservoir, urging all parties to return to the negotiation table under the auspices of the AU.

The EU's involvement in the GERD dispute reflects its broader strategic interests in regional stability and sustainable development in the Horn of Africa. Through a combination of diplomatic engagement, technical support, and advocacy for cooperative solutions, the EU continues to play a crucial role in facilitating dialogue among the Nile Basin countries. However, the path to a lasting resolution remains complex, requiring sustained international mediation and a genuine commitment to collaboration from all parties involved.

VIII. Obstacles to a mediated solution

Mediation efforts in the Grand Ethiopian Renaissance Dam (GERD) conflict have faced significant obstacles due to the intricate nature of the issues involved and the divergent interests of the key stakeholders—Ethiopia, Egypt, and Sudan. At the core of the dispute are deeply entrenched concerns about water rights, regional power dynamics, and national economic development. Ethiopia views the GERD as a vital project for its economic future, aiming to generate 6.45 GW of electricity and provide power to millions. Conversely, Egypt perceives the dam as a direct threat to its water security, given its reliance on the Nile for 97% of its freshwater supply. Sudan finds itself in a precarious position, recognizing both the potential benefits, such as flood control, and the risks associated with uncoordinated dam operations. These multifaceted concerns make it challenging to find common ground, as each nation's priorities and perceived stakes differ substantially.

The complexity of the GERD dispute is further heightened by differing perspectives on the dam's technical and environmental impacts. Downstream countries, particularly Egypt, fear that the dam could reduce water flow during critical periods, disrupt sediment transport, and harm the fragile ecosystem of the Nile Delta, which supports a significant portion of their agriculture. Meanwhile, Ethiopia argues that the GERD will regulate the Blue Nile's flow, potentially reducing downstream flooding and ensuring a more predictable water supply. These conflicting narratives are compounded by a lack of transparency and trust, making technical negotiations contentious. Future mediation efforts require addressing these issues with detailed, impartial hydrological analyses and fostering a cooperative spirit—a task that remains elusive amid ongoing political tensions and historical grievances.

The historical context of water allocation in the Nile Basin has played a crucial role in shaping the deep-seated mistrust and suspicion among Ethiopia, Egypt, and Sudan. Central to this issue are the 1929 and 1959 treaties, which heavily favored Egypt's water rights. The 1929 Anglo–Egyptian Agreement, brokered under British colonial rule, allocated 48 billion cubic meters of the Nile's annual flow to Egypt and just 4 billion to Sudan, granting Egypt a veto over upstream projects that could impact its share. This agreement effectively marginalized other riparian states, including Ethiopia, which contributes approximately 85% of the Nile's water through the Blue Nile but was excluded from the negotiations entirely. The 1959 agreement between Egypt and Sudan further entrenched this imbalance, increasing their combined allocation to 55.5 billion cubic meters for Egypt and 18.5 billion cubic meters for Sudan, without any consideration for Ethiopia or other upstream countries.

For Ethiopia, these historical agreements symbolize decades of inequity and exclusion, fueling its determination to assert its rights over the Nile through the construction of the Grand Ethiopian Renaissance Dam (GERD). Ethiopia argues that these colonial-era treaties are obsolete and do not reflect the modern realities of water needs and contributions. The country sees the GERD as a critical step toward redressing this

historical imbalance, promoting economic development, and lifting millions of its citizens out of poverty through hydropower generation. With a capacity to generate 6.45 GW of electricity, the GERD is expected to double Ethiopia's current electricity output, which could significantly boost its economy and provide electricity to over 60% of its population that still lacks access to reliable power.

In contrast, Egypt and Sudan view the GERD through a lens of existential threat, rooted in their historical dependence on the Nile's waters. Egypt, in particular, relies on the Nile for 97% of its freshwater needs, supporting a population of over 105 million people and sustaining its vital agricultural sector, which employs about 24% of the workforce. The prospect of reduced water flow or uncoordinated dam operations poses a significant risk to Egypt's national security. The 1959 agreement, which established Egypt's annual share at 55.5 billion cubic meters, has become a cornerstone of its water policy. Any perceived challenge to this allocation is viewed with deep suspicion, exacerbating the trust deficit with Ethiopia.

This legacy of unequal agreements has made negotiations fraught with mistrust and has hindered efforts to reach a cooperative framework for the GERD's operation. The historical context has created a zero-sum perception among the parties, where gains for one country are seen as losses for another. Bridging this trust deficit requires acknowledging historical grievances while fostering a new spirit of cooperation. This could involve revisiting the outdated treaties and creating an inclusive, equitable water-sharing framework based on current hydrological data and the needs of all Nile Basin states. Without addressing these deep-rooted historical inequities, building the mutual trust necessary for a sustainable resolution to the GERD dispute remains a significant challenge.

Technical and operational disputes surrounding the Grand Ethiopian Renaissance Dam (GERD) are at the heart of the tensions between Ethiopia, Egypt, and Sudan. Central to these disagreements are the timelines and protocols for filling the dam's reservoir, operational schedules, and mitigation measures during drought periods. Ethiopia aims to fill the reservoir, which has a capacity of approximately 74 billion cubic meters, in stages to align with the annual rainy seasons. By 2023, the fourth phase of filling was completed, reportedly adding about 20 billion cubic meters of water to the reservoir. However, downstream countries, particularly Egypt, argue that Ethiopia's approach lacks transparency and poses significant risks to their water security, especially during dry periods.

Egypt's concerns are grounded in its heavy reliance on the Nile, which provides around 97% of its freshwater. Any significant reduction in flow could threaten its agricultural sector, which consumes about 85% of the country's water resources. According to the Food and Agriculture Organization (FAO), the Nile supports approximately 4.4 million hectares of irrigated farmland in Egypt. If the GERD's filling process reduces downstream flow, it could exacerbate water scarcity, impacting food production and livelihoods. For example, during drought years, Egypt fears that a rapid filling process could reduce its annual water

share by up to 25%, which would have severe consequences for agricultural productivity and food security. This has led to demands for a clear, legally binding agreement on coordinated reservoir management to ensure consistent water flow during dry spells.

Sudan shares similar concerns, particularly regarding the regulation of the dam's releases. While Sudan initially supported the GERD, citing potential benefits such as reduced flooding and improved hydropower potential, it has grown increasingly wary of Ethiopia's unilateral actions. Sudan depends on the Nile for nearly 70% of its water supply, and disruptions in flow could adversely affect its agricultural systems and the operation of its dams, such as the Roseires Dam. In 2021, Sudan experienced unexpected water shortages, which it attributed to a lack of information from Ethiopia about the GERD's filling schedule. This highlighted the critical need for transparent, real-time data sharing to manage downstream impacts effectively.

The technical aspects of the dispute also extend to the broader hydrological impact assessments. Detailed studies are needed to model how the dam will affect seasonal water flows, sediment transport, and ecological systems. Ethiopia maintains that the GERD will regulate the flow of the Blue Nile, reduce flooding risks, and potentially improve water availability during dry seasons by storing excess water. However, Egypt and Sudan argue that without a comprehensive, independently verified hydrological analysis, these claims cannot be fully validated. Discrepancies in data and the absence of an agreed-upon framework for joint technical assessments exacerbate mistrust among the parties.

Ultimately, the resolution of these technical and operational disputes hinges on establishing a transparent, science-based mechanism for managing the GERD. This would require robust data-sharing protocols, independent monitoring, and an agreement on adaptive management strategies to respond to varying hydrological conditions. Until such a framework is established, the technical complexities of the GERD will continue to fuel broader geopolitical tensions, complicating efforts to reach a sustainable and equitable resolution.

Mediators' limitations have played a significant part in the failure of bringing the disputing parties to a mutually acceptable solution. The mediation efforts surrounding the Grand Ethiopian Renaissance Dam (GERD) dispute have been marked by significant challenges, particularly concerning the perceived lack of neutrality and impartiality among international mediators. The African Union (AU), the United States, and the European Union (EU) have all played roles in facilitating dialogue between Ethiopia, Egypt, and Sudan. However, each mediator has faced criticism for either favoring certain parties or being influenced by external geopolitical considerations, complicating rather than resolving the conflict.

The African Union, as the primary regional mediator, has sought to emphasize "African solutions to African problems." Yet, its effectiveness has been questioned due to the internal dynamics of its member states. Egypt and Sudan have often expressed skepticism

about the AU's ability to remain neutral, citing Ethiopia's significant influence within the organization. For instance, Ethiopia hosts the AU's headquarters in Addis Ababa, and some critics argue that this proximity has led to implicit biases. Despite the AU's efforts, including multiple rounds of negotiations and summits since 2020, it has struggled to broker a binding agreement, with talks frequently stalling. This perceived partiality has undermined trust among the parties, particularly Egypt, which has called for more robust international involvement beyond regional actors.

The United States has also played a prominent role in mediating the GERD dispute, but its involvement has been similarly controversial. In 2020, the Trump administration, in collaboration with the World Bank, attempted to facilitate an agreement. However, Ethiopia accused the U.S. of favoring Egypt, particularly after former President Trump suggested that Egypt might "blow up" the dam if no agreement was reached—a remark that fueled Ethiopian suspicions of bias. Ethiopia subsequently withdrew from the U.S.—brokered talks, viewing them as an attempt to impose an unfavorable settlement. This episode highlighted how geopolitical interests and external pressures—such as the U.S.'s strategic alliance with Egypt—can undermine the perceived impartiality of mediators and erode their credibility.

The European Union, while generally perceived as more balanced, has also faced challenges in maintaining neutrality. Although the EU has provided technical support and financial aid to the Nile Basin Initiative (NBI) and emphasized a multilateral approach, its broader political and economic interests in the region have occasionally complicated its role. For example, EU member states such as Italy have significant economic ties to Ethiopia, including infrastructure projects like the GERD itself, which was constructed by the Italian firm Salini Impregilo (now WeBuild). This economic involvement has led some stakeholders to question the EU's impartiality, suggesting that its positions may be influenced by commercial interests.

These limitations in neutrality and impartiality among mediators underscore the complexities of the GERD dispute. The differing approaches and perceived biases of international actors have often deepened mistrust rather than fostered consensus. For a durable resolution, there is a pressing need for a genuinely neutral mediator or a more collaborative, multi-mediator framework that can balance the interests of all parties without being swayed by external geopolitical dynamics. Such an approach would require a clear commitment to transparency and equitable engagement, ensuring that the mediation process is seen as fair and credible by all stakeholders involved.

Domestically, leaders in Ethiopia, Egypt, and Sudan faced pressures from their populations and political constituencies, which limited their flexibility in negotiations and compromise. We will allocate considerably more space to these issues.

The Tigray war in Ethiopia, which erupted in November 2020 and lasted until the signing of a peace agreement in November 2022, has significantly influenced the dynamics of the

Grand Ethiopian Renaissance Dam (GERD) dispute. Allegations of Egyptian interference during this conflict have further complicated the mediation process, adding layers of geopolitical complexity to an already intricate situation (Sorour, 2021).

The Tigray conflict severely disrupted Ethiopia's internal political landscape, diverting government attention and resources away from external diplomatic engagements, including the GERD negotiations. The Ethiopian government's focus on the conflict hindered its capacity to address the concerns of downstream countries like Egypt and Sudan regarding the dam's construction and operation. This internal strife created a perception of instability within Ethiopia, leading to increased anxiety among its neighbors, particularly Egypt, about the reliability of Ethiopia as a partner in managing Nile waters.

Allegations of Egyptian support for Tigray rebels have further strained relations between Ethiopia and Egypt. Ethiopian officials have accused Egypt of exploiting the Tigray conflict to destabilize Ethiopia and undermine its government. These claims suggest that Egypt may have sought to capitalize on the chaos in Ethiopia to gain leverage in the GERD dispute, potentially viewing the Tigray conflict as an opportunity to weaken Ethiopian control over the Nile. This alleged interference has exacerbated distrust between the two nations, complicating efforts to mediate the GERD dispute.

The Tigray war has also led to a surge in Ethiopian nationalism, which may affect the government's negotiating stance on the GERD. The conflict united many Ethiopians against perceived foreign interference, particularly from Egypt. As a result, the Ethiopian government may feel compelled to adopt a more assertive posture in negotiations, emphasizing its sovereignty and rights over the Nile River. This shift could lead to a harder line in negotiations, making it more challenging to achieve a collaborative solution.

The Tigray war raised broader regional security concerns, particularly for Egypt and Sudan. The potential for instability in Ethiopia, fueled by the Tigray conflict, has prompted these countries to consider their security strategies more carefully. The fear of an increasingly volatile Ethiopia, coupled with allegations of Egyptian interference, has led to heightened military posturing and a reevaluation of alliances within the Nile Basin. This situation has complicated diplomatic initiatives aimed at mediating the GERD dispute, as regional players grapple with the implications of ongoing instability.

The Tigray conflict drew significant international attention, influencing the involvement of external actors in the GERD dispute. Countries and organizations that sought to mediate the Tigray war, such as the African Union, have had to navigate the dual challenges of addressing the humanitarian crisis in Tigray and the geopolitical complexities of the GERD negotiations. The potential for perceived bias or favoritism toward one party can complicate the role of mediators, making it more difficult to achieve a balanced and sustainable resolution to the GERD issue.

The Tigray war in Ethiopia and the allegations of Egyptian interference have profoundly impacted the mediation of the GERD dispute. The internal disruption in Ethiopia,

allegations of external meddling, shifts in nationalism, regional security concerns, and the complexities of international involvement all contribute to a more challenging negotiation environment. To effectively address these issues, stakeholders must engage in open dialogue, prioritize trust-building measures, and consider the broader geopolitical implications of their actions. Sustainable solutions to the GERD dispute will require careful navigation of these intertwined challenges, emphasizing collaboration and mutual understanding among all parties involved.

The outbreak of civil war in Sudan in 2023 has significantly impacted the mediation efforts surrounding the Grand Ethiopian Renaissance Dam (GERD) dispute, adding complexity and urgency to an already fraught geopolitical landscape in the Nile Basin. The civil conflict in Sudan has not only created a power vacuum but also exacerbated existing tensions between Egypt, Ethiopia, and Sudan, which are crucial stakeholders in the GERD negotiations.

The civil war has rendered Sudan's government largely incapacitated, thereby undermining its role as a key mediator in the GERD negotiations. Before the conflict, Sudan had been positioned as a potential bridge between Egypt and Ethiopia, seeking to balance its interests with those of both nations. However, the absence of a stable and cohesive Sudanese government has disrupted the trilateral talks and weakened the possibility of reaching a consensus.

The internal conflict has shifted power dynamics within Sudan, as various factions vie for control. This fragmentation makes it difficult to ascertain a unified Sudanese stance on the GERD issue, complicating negotiations further. Different factions may have divergent views on the dam, which could lead to unpredictable outcomes. In this context, Ethiopia may perceive an opportunity to advance its position, while Egypt may become more apprehensive, fearing that a weakened Sudan could lead to greater Ethiopian control over Nile waters.

The civil war has heightened regional tensions, with Egypt and Ethiopia both potentially seeking to exploit the instability in Sudan to bolster their respective positions in the GERD negotiations. For instance, Egypt may feel compelled to strengthen its military posture or enhance its diplomatic outreach to other Nile Basin countries, while Ethiopia might seek to solidify its leverage over the dam's operations amidst Sudan's turmoil. This could lead to a more adversarial approach rather than a collaborative one, further complicating the mediation process.

The humanitarian crisis resulting from the conflict in Sudan could divert attention and resources away from diplomatic efforts concerning the GERD. As the international community focuses on addressing the urgent needs of displaced populations and humanitarian assistance, the urgency of resolving the GERD dispute may diminish. This shift in priorities can slow down mediation processes and allow tensions to escalate unchecked.

The civil war may also alter the dynamics of international involvement in the GERD dispute. As Sudan becomes increasingly unstable, external actors such as the African Union, the United Nations, and regional powers may need to reassess their roles. New alliances may form, and previously established diplomatic frameworks could be challenged. This may lead to a shift in mediation strategies, with external mediators facing difficulties in engaging with a fragmented Sudanese landscape.

Even more impactful on GERD dispute management and outcomes might be the ongoing conflict between Israel and Hamas in Gaza and its implications for Egypt's position regarding the Grand Ethiopian Renaissance Dam (GERD) dispute. As a key player in both regional and Nile Basin politics, Egypt's response to the conflict reflects its strategic interests, concerns over national security, and the complexities of managing its relations with Ethiopia and Sudan.

The war in Gaza has diverted Egypt's attention and resources away from the GERD negotiations. As a neighboring country to both Israel and Gaza, Egypt has been compelled to focus on managing the humanitarian crisis resulting from the conflict, as well as addressing security concerns along its borders. This shift in priorities may hinder Egypt's capacity to engage actively in the GERD negotiations and could delay efforts to mediate disputes over water rights with Ethiopia and Sudan.

The escalation of violence in Gaza could also increase domestic pressure on the Egyptian government to assert its regional leadership. Egyptian President Abdel Fattah el-Sisi may feel compelled to adopt a more assertive stance regarding the GERD, leveraging the situation in Gaza to rally national sentiment and project strength in the face of external challenges. In this context, the Egyptian government might emphasize the importance of securing Nile water rights as a matter of national sovereignty and security, potentially leading to a hardening of its negotiating position with Ethiopia.

The conflict in Gaza has implications for Egypt's geopolitical alliances and its relationships with other regional players. For example, the Egyptian government may seek to enhance its standing within the Arab world by taking a more vocal position on Palestinian issues. This could translate into a greater willingness to assert its interests in the GERD negotiations, framing the Nile dispute as an issue of regional importance. At the same time, Egypt must navigate its relationship with Ethiopia, balancing its support for Palestinian rights with the need for cooperation on Nile water management.

The war between Israel and Hamas has heightened concerns over regional stability, which could influence Egypt's approach to the GERD dispute. Egypt may view the conflict as a reminder of the fragility of security in the region and the potential for escalations that could spill over into neighboring countries. This awareness could prompt Egypt to seek a diplomatic resolution to the GERD dispute, emphasizing the importance of cooperation among Nile Basin countries to avoid further tensions and instability.

The international community's response to the conflict in Gaza may also impact Egypt's position regarding the GERD. Increased global attention on the humanitarian situation

could lead to greater pressure on Egypt to engage constructively in regional diplomacy. As a major Arab state, Egypt's actions and decisions will likely be scrutinized in the context of its relations with Ethiopia and Sudan. This external pressure could encourage Egypt to adopt a more conciliatory approach to the GERD negotiations, seeking to balance its national interests with the need for broader regional stability.

The war between Israel and Hamas in Gaza significantly affects Egypt's position regarding the GERD dispute. The diversion of attention and resources, increased domestic pressure, shifting geopolitical alliances, concerns over regional stability, and international involvement all contribute to a complex and evolving diplomatic landscape. As Egypt navigates these intertwined challenges, its approach to the GERD negotiations will likely reflect a careful balancing of national interests, regional dynamics, and the pressing need for stability in both the Nile Basin and the broader Middle East. Effective mediation and conflict resolution will require Egypt to engage in dialogue and cooperation, acknowledging the intricate relationships between regional conflicts and the vital issue of water rights.

Despite multiple rounds of negotiations and mediation efforts over the years, these factors have collectively contributed to the ongoing deadlock in achieving a comprehensive agreement on the GERD. The complexity of the issues, combined with historical grievances and national interests, continues to challenge the prospects for successful mediation and resolution of the conflict.

IX. Prospects of Cooperation

Cooperation among Ethiopia, Egypt, and Sudan is crucial for resolving the Grand Ethiopian Renaissance Dam (GERD) conflict. Several elements align in favor of an agreement. First, as the Egyptians half-heartedly admit, the Guda dam would regularize the flow of the Nile and significantly reduce sediment deposition downstream. Properly coordinated, Ethiopia's dam activities would improve the performance of both Sudan's dams, the aforementioned Roseires and Marawi dams for power generation, plus Sinnar for irrigation, and the large Aswan dam in Egypt.

Secondly, GERD would ensure better conservation of the Nile's waters, as the evaporation rate of water in its reservoir is much lower than that at Aswan. Experts calculate that the Ethiopian reservoir would evaporate about 1.8 cubic km of water per year, compared with 7-10 cubic km lost at Aswan, which represents between 12.6 and 18% of the total volume of water allocated to Egypt under the 1959 treaty, due to the much higher temperatures in the desert than in the higher, mountainous parts of Ethiopia.

Thirdly, beyond some outbursts by some of the more bellicose ministers, the Egyptians are aware of the limited military means at their disposal to effectively stop the Ethiopian project—not least because the two countries share no common border and Ethiopia is landlocked. An Egyptian military incursion into Ethiopia would inevitably require tacit approval from either Sudan or Eritrea, a scenario that appears fraught with challenges and

is unlikely to yield favorable outcomes. Additionally, the Egyptian government, already accused by Ethiopia of engaging in less conventional tactics, possesses alternative means of exerting influence, such as sabotage and the encouragement of opposition movements within Ethiopia. These movements, which are numerous and pose a significant threat to the stability of the Ethiopian government, represent a costly strategy that lacks guaranteed success and is relatively easy to detect.

Moreover, the pursuit of such covert actions, particularly the fostering of opposition groups in Ethiopia, risks provoking reciprocal actions from the Ethiopian government. Given the widespread dissatisfaction in Egypt with the authoritarian regime of Abdel Fattah el-Sisi, who has ruled since the 2013 coup, there exists a potential for reciprocal destabilization. Ethiopian authorities could capitalize on this internal unrest by supporting opposition movements within Egypt, thus creating a cycle of reciprocal interference that further complicates regional stability.

In summary, while the Egyptian government may contemplate various strategies to assert its influence over Ethiopia, the implications of military action or subversive activities carry significant risks and uncertainties. The historical context of regional relations, combined with the current domestic challenges facing both governments, underscores the necessity for a more diplomatic approach to resolving tensions surrounding Nile water rights and broader geopolitical interests.

X. Conclusions

It is a tragic irony that three impoverished nations, beset by internal strife and weakened by governmental instability, find themselves embroiled in a conflict over a resource they are increasingly losing. The waters of the Nile, influenced by the complex dynamics of global climate change, are diminishing. Historically, the Nile has never been abundant in flow—despite being the world's longest river, its discharge is relatively low when compared to that of the Amazon or the Congo. Factors such as desertification, deforestation in the uplands, and exponential population growth in riparian countries—rising from 83 million in 1950 to over 550 million today—coupled with economic development, exert immense pressure on the river's water supply. The prospect of the Guba reservoir filling within the five years projected by Ethiopian authorities, or the eleven to twenty-one years suggested by the Egyptians, appears increasingly uncertain, especially in light of the climate change phenomena affecting the region. Ethiopia's reliance on the GERD for its developmental aspirations may ultimately prove futile, not due to Egyptian opposition, but rather as a result of nature's diminishing capacity to support such ambitions.

Conversely, Egypt continues to utilize the 55.5 billion cubic meters of water allocated under the 1959 treaty, despite an annual water consumption of approximately 80 billion cubic meters, of which roughly one-third is wasted or polluted. This waste equates to the maximum shortfall that the GERD could impose, underscoring Egypt's precarious

water management practices. While Egypt's dependence on the Nile is often framed as an emotional connection, it is essential to recognize that the country, along with Libya, Sudan, and Chad, lies atop the Nubian Sandstone aquifer system—an extensive underground freshwater reserve covering two million square kilometers, with an estimated volume equivalent to 500 years of Nile flow. Thus, Egypt's acute dependence on the Nile can be seen less as a natural necessity and more as a consequence of governmental inertia, which has historically neglected the imperative to mitigate waste and pollution and to systematically exploit this vast underground water resource. The GERD may serve as a crucial catalyst for the Egyptian government to reassess its historical entitlement mindset, rooted in the era of the pharaohs, and to develop a sustainable strategy ensuring that, in the face of climate change, the average Egyptian will have access to clean water in the coming years—regardless of the fate of the GERD.

The failed mediation efforts surrounding the Grand Ethiopian Renaissance Dam (GERD) dispute can be attributed to several interrelated factors, chief among them being the perceived lack of neutrality and impartiality of the mediators involved. Many of the regional and international actors that attempted to facilitate dialogue between Ethiopia, Egypt, and Sudan have been viewed as biased, either favoring one party's interests over the others or lacking a comprehensive understanding of the intricate dynamics at play. This perception of partiality undermined the credibility of the mediators and fostered distrust among the negotiating parties.

Moreover, the historical context of colonial agreements and entrenched national identities exacerbated tensions, making it difficult for mediators to navigate the deeply rooted sensitivities surrounding water rights and resource allocation. The failure to create a balanced and inclusive mediation framework that acknowledged the legitimate concerns of all stakeholders further complicated the process. As a result, parties approached mediation with skepticism, often perceiving it as a means for one side to assert dominance rather than a genuine attempt to reach a fair and sustainable resolution. Ultimately, these challenges stymied efforts to build consensus and foster cooperation, illustrating the necessity of establishing a neutral mediation environment grounded in mutual respect and an equitable approach to resource management.

To enhance the prospects of successful mediation in the Grand Ethiopian Renaissance Dam (GERD) dispute and similar conflicts, it is essential to select neutral and impartial mediators. Such mediators should be perceived as unbiased facilitators with no vested interests in the outcome of the negotiations. Involving reputable international organizations, governmental and non-governmental, can significantly bolster the credibility of the mediation process and foster trust among the parties involved. This trust is foundational for any productive dialogue, as it allows the negotiating entities to engage more openly in discussions about their concerns and interests.

Fostering inclusive dialogue is also critical for effective mediation. Engaging a broad range of stakeholders—including representatives from affected communities, civil society, and

technical experts—provides a comprehensive understanding of the multifaceted issues at play. This inclusive approach helps identify shared interests among the parties, which can facilitate a collaborative atmosphere conducive to finding mutually acceptable solutions. Emphasizing common goals such as regional stability, economic development, and environmental sustainability further enhances the mediation efforts by creating a sense of partnership rather than confrontation.

Additionally, developing a robust mediation framework that addresses historical contexts, current challenges, and future needs is essential. This framework should outline clear protocols for water allocation and management, as well as dispute resolution mechanisms. Implementing confidence-building measures, leveraging international support, and encouraging flexibility and compromise among the negotiating parties can further strengthen the mediation process. By addressing environmental and socioeconomic impacts through comprehensive assessments, mediators can alleviate concerns and foster goodwill. Overall, these strategies emphasize the importance of neutrality, inclusivity, and shared interests, providing a solid foundation for constructive engagement and sustainable resolutions in managing shared resources.

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