ELIT
Economic Laboratory Transition
Research Podgorica

Montenegrin Journal of Economics

For citation:

Kenawy E. (2026), "The Ethiopian Renaissance Dam and its economic impacts on Egypt",
Montenegrin Journal of Economics, Vol. 22, No. 2, pp. 141-156.

The Ethiopian Renaissance Dam and its economic impacts on Egypt

EZZAT KENAWY[1]

[1]Associate Professor, Kafr El-Sheikh University, Faculty of Commerce, Department of Economics, Egypt,
email: azza.hassan@com.kfs.edu.eg

ARTICLE INFO

Received April 11, 2025
Revised from May 17, 2025
Accepted May 22, 2025
Available online April 15, 2026

JEL classification: Q2, Q25, Q28, Q34

DOI: 10.14254/1800-5845/2026.22-2.12

Keywords:
Ethiopian Renaissance Dam,
economic impacts,
water security,
Egypt

ABSTRACT

This paper aims to discuss the economic impacts of construction the Ethiopian Renaissance Dam (GERD) on Egypt, by clarifying the nature of the water crisis between the Nile Basin countries, particularly the Nile River water problem between Egypt and Ethiopia. It then identifies the most important economic and legal determinants of the water conflict and dispute between Egypt and the Nile Basin countries, as well as identifying the roles played by Israel, the United States, and the World Bank in the water conflict and dispute between Egypt and the Nile Basin countries. Furthermore, it determines whether this crisis is economic, political or technical? It explains the scenarios and mechanisms for dealing with this crisis in the future to avoid the negatively attributed impacts of the Renaissance Dam on Egypt's annual water share. This paper assumes that the Ethiopian Renaissance Dam construction will reduce Egypt's annual water share, which will have negative impacts on the agricultural, electricity, energy, and other sectors, as well as increasing unemployment in Egypt and negative effects on the country's public budget in the event of resorting to alternative sources such as desalination. To achieve the objectives of this paper, descriptive analysis and the prospective approach has been used. The findings showed that the World Bank's proposal to introduce new concepts such as privatization, water pricing, water exchange, and water markets, which may lead to water conflict and disputes in the Nile Basin countries, because the United States' dominance and other developed countries over the World Bank's policies and approaches. In addition, there is no collective agreement that brings together all countries located in the Nile Basin concerning the regulations and exploitation of water in the Nile River, and there is no international law regulating it. This leads to the continuation and increases of water conflict and disputes between Egypt and the Nile Basin countries. This paper recommends the continuation of diplomatic negotiations to find a formula for consensus between the parties with the aim of achieving joint cooperation between Egypt and the Nile Basin countries to achieve water security.

INTRODUCTION

The Renaissance Dam is technically known as a dam that was built on the Nile River inside Ethiopia and has a clear impact on the Nile Basin countries' share of water, especially Egypt and Sudan. The Grand Ethiopian Renaissance Dam (GERD) is one of the largest water projects in Africa. Located on the Blue Nile in Ethiopia, it has sparked widespread controversy since its construction began due to its direct impact on

the Nile water shares on which Egypt and Sudan, the two downstream countries, depend. The GERD's storage capacity is approximately 74 billion cubic meters. The GERD's primary objective is to support economic development, generate electricity with a capacity of approximately 6,000 megawatts, export energy, and develop the Ethiopian economy in general.

The dilemma of countries located in the Nile Basin has various dimensions including economic, political, technical, and legal ones. It is a dilemma which has global, domestic, and regional dimensions. For Egypt, the cause of the Nile water is counted as one of the causes of dispute that was posed between Egypt and the countries located in Nile Basin on the resources of water over the last thirty years due to the absence of Egypt from Africa over these years, and the intervention of America and Israel to these countries besides the cause manipulation of water security. The cause of water security is currently not as important as that of Egypt's national security. The dispute has been extended since the early 1990s on water resources, particularly in the middle east because of water limited resources. These resources are disputed in the major basins of rivers like the Nile River. Because of the advanced technological development witnessed by the globe, particularly since the 1990s, development rates, which depend on natural resources and one of the most essential natural resources is water, that has turned to be a strategic good because of the shortage of alternatives while there are other increased alternatives are available for energy (Al-Behery,2016).

Accordingly in the national security issues, priority is given to the issue of water resources preserving and benefit maximization from them, especially in Egypt. The Nile River is one of the longest rivers in the world, as it passes and, flows through ten countries: Ethiopia, Sudan, Egypt, Burundi, Rwanda, Tanzania, Eritrea, Kenya, and the Congo. These nations vary in how much they rely on the Nile's waters, with Egypt being the most dependent. As a result, the issue of water security is deeply intertwined with Egypt's national security. Egypt receives an annual share of 55.5 billion cubic meters out of the Nile's total flow of 84 billion cubic meters, based on the 1929 legal agreements that govern water distribution. Notably, around 85% of the Nile's water originates in Ethiopia. Since the late 1990s, Egypt has faced growing challenges due to the involvement of external actors—such as Israel, the United States, and the World Bank—in the Nile Basin. These entities have introduced new ideas like water pricing, privatization, and water trading, which risk escalating tensions among Nile Basin countries. The internationalization of the issue moves it beyond a regional matter and poses additional pressures on Egypt, potentially threatening its national security (Majeed,2022).

Ethiopia's recent unilateral agreements with some Nile Basin countries regarding the diversion of the Blue Nile to construct the "Renaissance Dam" are considered unusual and problematic both legally and regionally. This action raises concerns due to its potential negative impact on Egypt and Sudan. Water allocations among Nile Basin countries are governed by established treaties and agreements, which stipulate that no country can undertake projects or make decisions affecting the Nile's waters without the consent of both Egypt and Sudan. Ethiopia's actions are viewed as a breach of international law and could cause harm to other countries in the region (Qutb & Darwish,2022).

Tensions over the Nile River's waters escalated in 2011 when Burundi joining to some Nile Basin countries and signing a new agreement framework that included Ethiopia, Tanzania, Uganda, Kenya and then Rwanda, which known as the Entebbe Agreement, aimed at redistributing the Nile's waters. Egypt, however, rejected the agreement and refused to recognize its legitimacy (Hany,2015). This is in addition to the official ratification by the State of South Sudan of the (Entebbe Agreement) in July 2024, as a result of regional and international pressures aimed at affecting Egypt's national security, interests, water rights, and water security. The construction of Ethiopia's Renaissance Dam is possibly a political reaction to Egypt and Sudan's refusal to sign the new Nile Basin agreement. The dam is seen as a form of leverage against Egypt, especially in light of Egypt's post–January 25, 2011 revolution foreign policy, which emphasizes greater independence in decision-making. In light of this, Egypt has many important documents to manage this historical issue from Egypt's perspective (Zakaria,2019).

This paper seeks to explore several key questions: What are the economic drawbacks Egypt may face due to the construction of the Ethiopian Renaissance Dam, and what risks does it pose? Is the dispute and

conflict among the countries of Nile Basin primarily economic, political or technical in nature? What are the main factors driving the conflict between Egypt and other Nile Basin states, particularly Ethiopia, and what strategies can be used to address it? Lastly, what roles do Israel, the United States, and the World Bank play in the ongoing water dispute involving Egypt and the Nile Basin countries?

This paper aims to examine the potential risks associated with the construction of the Renaissance Dam and to highlight the possible impacts on Egypt. It also seeks to identify the key factors—whether economic or legal—driving the water dispute and conflict between Egypt and the Nile Basin countries. Additionally, the study explores the roles played by Israel, the United States, and the World Bank in this ongoing dispute.

This paper is based on the following hypotheses: Ethiopian efforts aim to weaken Egypt's position at the regional level and control its share of the Nile River waters, by establishing water projects and dams on the Nile's sources. The construction of the Ethiopian Renaissance Dam will reduce Egypt's annual water share, which will have negative effects on the agricultural sector and increase unemployment in Egypt. Finally, Ethiopia's policy in the Nile Basin region, supported by a foreign agenda, may increase the conflict among the Nile Basin countries in the future, especially between Egypt and Ethiopia.

The paper methodology adopts a descriptive-analytical approach to examine the nature of the water crisis in the Nile Basin region. It analyzes the implications of the Ethiopian Renaissance Dam and its potential negative economic effects on Egypt, while also assessing whether the crisis is rooted in political, economic, or technical factors. In addition, a prospective approach is used to forecast the future consequences of the dam's construction on Egypt.

Key Terminology: The main concepts relevant to this study are defined as follows:

Water Security: The state's capacity to ensure an adequate supply of clean water for drinking and various uses (such as agriculture and industry), both now and in the future, by managing water resources to meet demand (Sabry, 2020).

Water Risk: A condition where per capita annual freshwater availability ranges between 1,000 and 1,500 cubic meters, indicating a state of water vulnerability (Riyad, 2016).

Water Deficit: A more severe condition where freshwater availability drops to between 500 and 1,000 cubic meters per person annually, reflecting a state of water shortage (El-Tayeb, 2015).

Water Policy: The set of internal and external rules and strategies that guide a country's management of water resources (Yosry, 2016).

Water Resources: The total quantity of both conventional and non-conventional water sources available to a country within a given time frame (Nour El-Din, 2019).

This paper is organized into six sections in addition to the introduction: The first section includes a literature review. The second section discusses the potential risks of the Grand Ethiopian Renaissance Dam (GERD). The third section presents the potential negative economic impacts of the construction of the Grand Ethiopian Renaissance Dam (GERD) on Egypt. The fourth section addresses the economic and legal determinants of the water dispute and conflict between the Nile Basin countries specially with Egypt. The fifth section explains the roles of Israel, great powers, major countries, and international institutions (world bank) in the water dispute and conflict between the Nile Basin countries and Egypt. Finally, the sixth section includes the conclusion.

1. LITERATURE REVIEW

There are many studies that have addressed the various effects (economic, political or legal) of the construction of the Ethiopian Renaissance Dam on Egypt. In this paper, the focus will be on the political economy dimension only, considering that this issue is primarily a political economy issue, which include the following studies:

Taye (2011) discussed the economic impact of regional and international powers on water interactions in the Nile Basin. The study showed that extreme poverty and political instability in the countries of the Nile Basin are among the important reasons that make the region an attractive environment for foreign intervention. The study pointed to the role of political factors in influencing water interactions in the Nile Basin region. The results of the study show that the United States, China, and Israel play a major role in stimulating conflict over water, which affects Egyptian water security.

Hammond (2013) explained how the Nile water is managed between the countries of Nile Basin and the most important effects resulting from water management. The development requirements and population growth in the Nile Basin countries are factors of pressure on the available water resources, which makes water management difficult in this region. The results of the study indicated that the development requirements in Ethiopia were the reason for Ethiopia's insistence on building the Renaissance Dam. The study suggested the necessity of working within a cooperative framework in order to achieve the interests of all parties.

Sharaky (2014) discussed the natural challenges facing Ethiopia, which cause the failure of 70% of its water projects for geological and technical reasons. The study showed the geology of the Renaissance Dam area, and the identification of the areas of land suitable for irrigation. The results of the study showed that Egypt and Sudan lost about 14 billion m^3 of water based on the storage capacity announced by Ethiopia for three years. The study suggested the necessity of consulting with Egypt and Sudan in terms of quantity and operating dates in order to take the necessary precautions and avoid the water shortage crisis during the periods of filling the dam reservoir.

Allam (2014) discussed the crisis of Ethiopian Renaissance Dam as a political cause or a technical dilemma, then Egypt's efforts throughout history to secure and develop the Nile River as a basic resource, then discussed the Ethiopian plans for a long time to build dams and control the river's water. In addition, the development of the stages of the dispute over water shares between the Nile Basin countries, especially (Ethiopia, Egypt and Sudan). Then, the provisions of the 2010 Entebbe Agreement were identified and compared to the 1997 United Nations Agreement on Shared Rivers and the negatives of the Entebbe Agreement were evaluated in light of the negotiations with the Nile Basin countries. The study suggested continuing the negotiations to reach a solution to this crisis.

Huiyi & Ashok (2014) believe that the Renaissance Dam will be a major source of sustainable energy production and will relieve Ethiopia of energy shortages, which will help in the economic development of Ethiopia and the countries of the region, in addition to Ethiopia's attempt to involve Egypt and Sudan in joint management of the project, but it did not succeed due to the fixed Egyptian position. The study suggested the need for the Nile Basin countries to deepen the dialogue in order to find ways of partnership that are beneficial to all parties.

Hamdan (2015) explained that the Nile River is a vital artery for Egypt and Sudan, and that water disputes are linked to political problems in the Nile Basin countries. Relations have become strained with Ethiopia's construction of the Renaissance Dam on the Blue Nile River, which affects the water share of Egypt and Sudan. The study discussed the negatively attributed effects to the construction of the Renaissance Dam on Egypt and Sudan, and the positive effects on Ethiopia. The results of the study are that Egypt and Sudan reject any Ethiopian action regarding the construction of dams unilaterally. The study suggested internationalizing the Renaissance Dam issue in light of international law through diplomatic means.

Kottan (2017) discussed the real causes of the water dispute in the Nile River, the role of development needs in increasing demand for water, and the call for its redistribution between the Nile River countries in general, and Ethiopia, Egypt, and Sudan in particular, and the extent of the impact of the Ethiopian Renaissance Dam on Egypt and Sudan's water share of the Nile River. The results of the study showed that the Ethiopian Renaissance Dam is part of a Zionist-American plan aimed at threatening Egyptian national security. The study recommended the necessity of renegotiating by Egypt and Sudan by all means the terms of disagreement in the "Entebbe Agreement" of 2010.

Waterbury (2018) discussed the Egyptian-Ethiopian dispute over the risks of building the Renaissance Dam on Egypt, in addition to the need for Egypt and Ethiopia to agree on the period of filling the reservoir, as well as agreeing on what will happen during drought periods. The results of the study showed that building the dam does not reduce Egypt's share of water if the rules regulating the filling process of the reservoir are agreed upon with Ethiopia. The study suggested that Egypt and Sudan should change their policy in dealing with the water issue and benefit from desalination of seawater as well as purification of wastewater.

Marey (2020) discussed the determinants of the water conflict between Egypt and the Nile Basin countries, with an application to the Ethiopian Renaissance Dam project, which represents a crisis between Egypt and Ethiopia, then the orientations of Egyptian diplomacy in light of the international and regional interaction with the crisis and its effects on Egyptian national security and the succession of tripartite negotiations (Egyptian-Sudanese-Ethiopian) after the June 30, 2013 revolution in Egypt. Findings showed the stability of the Egyptian position regarding the negatively attributed effects to the Renaissance Dam on water security, and the study suggested Egypt's desire to expand areas of cooperation and integration of goals with the Nile Basin countries.

Shafey (2021) addressed the Grand Ethiopian Renaissance Dam crisis through a dynamic framework, then explained the mechanism of Ethiopian hegemony and its challenges, the Ethiopian reasons for building the Renaissance Dam and Egypt's reservations about it, and the Egyptian scenarios to confront it. The results indicated that Ethiopian ambition is not limited to building the Renaissance Dam, but rather aims to bring about a complete change in the hegemony system in the Nile River, so that Ethiopia becomes the dominant party in the future. In this case, Egypt will be forced to submit to Ethiopian conditions within the framework of the possibility of purchasing water from it or resorting to the military option in the event that Egyptian water security is threatened.

Salim (2022) discussed the dispute over the Renaissance Dam, and pointed out that despite the existence of many agreements related to the Nile River that regulate relations between the Nile Basin countries; the current reality confirms Ethiopia's violation of these agreements and the Renaissance Dam was constructed unilaterally with absence of the Arab Republic of Egypt and the Sudan. The study showed the reasons for the dispute between the three countries, and the results of the study showed Ethiopia's violation of all legal principles and rules regulating the use of international rivers. The study suggested the importance of cooperation between the three countries to resolve this dispute peacefully.

Qassem & Hasan (2023) explained that the Ethiopian thinking in establishing huge development projects is due to its good relations with Western countries, as well as the Ethiopian economic growth. It tried to benefit from its water resources and develop its water policy by establishing the Renaissance Dam with the aim of controlling the waters of the Nile River and 145ancelling or reducing the role of the High Dam, which affects the political, economic, security and social conditions in Egypt and limits its regional role. Without Ethiopia's commitment to the principles governing relations between international river partners, especially prior notification and non-harm, this will lead to reducing Egypt's water share from 55.5 billion m^3 to about 40 billion m^3.

The subject of this paper differs from previous studies that dealt with the Renaissance Dam from different aspects, but this paper attempts to study the issue of the Renaissance Dam crisis from a political economy perspective, considering it an issue more important than the oil issue, and that Egypt will face a real war over its water rights unless this crisis is resolved in a fair manner that satisfies all parties benefiting from the river water.

2. THE ETHIOPIAN RENAISSANCE DAM AND ITS POTENTIAL RISKS

The construction of the Renaissance Dam could lead to the loss of nearly half a million acres of agricultural land, about 31,000 people from the area surrounding the dam left their homes and searched for safer alternative places. In addition, both Sudan and Egypt could face significant reductions in their water supplies after their respective water allocations were reduced which—estimated between 16 to 24 billion

m^3 —particularly during this initial phase the dam's operation. This is due to the large volumes of water required to fill the dam's reservoir, which draws heavily from the Blue Nile, ultimately reducing the flow reaching downstream countries, namely Sudan and Egypt (Jajan,2018).

Studies indicate that the soil on which the Grand Ethiopian Renaissance Dam is built is unsuitable due to its inability to store and preserve water for long periods, which leads to the failure and ineffectiveness of dam construction in these areas. The costs of building the dam by Ethiopia become ineffective in light of the weakness of the Ethiopian economy, its low growth rates, and the increasing rates of inflation and unemployment in recent years. If the Grand Ethiopian Renaissance Dam project is financed by other foreign countries such as China, Israel, and some Arab countries, this project is unlikely to succeed economically; rather, its underlying objective appears to be hindering Egypt's development efforts and compromising its water security. Additionally, the Renaissance Dam poses growing risks, including an increased likelihood of volcanic and seismic activity in the area around the reservoir. There is also a heightened risk of structural failure or cracking due to geological conditions and the intense flow of the Blue Nile's waters. Such a collapse could result in severe flooding, potentially submerging Sudanese towns and villages—particularly Khartoum—as well as parts of Egypt located along the Nile (Fouad,2016).

To understand the geostrategic risks of the Grand Ethiopian Renaissance Dam (GERD), there are two factors determine this, the first is the capacity of the dam reservoir relative to the river's flow, this determines the ability of the country constructing the dam to control the outflow to downstream countries. When the capacity coefficient is less than 1, the capacity is weak, but if the capacity coefficient is greater than 1, the capacity is strong. This means that the country which constructing the dam can withhold the dam's discharge for months or more to raise water levels and generate electricity in the country constructing the dam. The second factor is the location of the dam in relation to agricultural lands, this factor determines the purpose of constructing the dam, in this fall Ethiopia does not have an agricultural purpose in constructing the dam, but rather to generate electricity.

A reduction in water storage behind Egypt's High Dam could lead to a significant decline—between 20% and 40% in hydroelectric power generation. Meanwhile, the financial demands of building the Renaissance Dam exceed Ethiopia's economic capacity. According to the United Nations Development Programme's Human Development Report, Ethiopia is among the world's poorest countries. World Bank data from 2011 showed that Ethiopia's GDP was under $30 billion, with an average annual per capita income of only $370—one of the lowest globally. Estimates place the cost of the Renaissance Dam between $5 and $8 billion. Although China pledged $2 billion toward the project, the World Bank declined to fund it due to ongoing disputes among Nile Basin countries regarding dam construction. However, some nations with adversarial positions toward Egypt appear strongly committed to supporting and financing the dam (Kamal,2020).

This indicates that the primary motivation behind building the dam is political rather than economic, driven by external countries outside the Nile Basin that are funding the project to diminish Egypt's water share and exacerbate its economic and social challenges following the revolution in 2011, the goal is to negatively impact Egypt and weaken its ability to achieve development. Furthermore, it is anticipated that an agreement between Israel and Ethiopia may be reached, with Israeli companies potentially managing the electricity generated by the Renaissance Dam, which would have adverse effects on both Egypt and Sudan (Al-Bendary,2018).

3. THE POSSIBLE ECONOMIC IMPACTS OF THE ETHIOPIAN RENAISSANCE DAM ON EGYPT

The Nile River is a central element of Egypt's economy, which is primarily agricultural. According to the 1929 agreement among Nile Basin countries, Egypt is allocated 55.5 billion m^3 of Nile water annually. Based on this share allocated to Egypt from the river water, various projects were developed and

established in various agricultural, industrial and service fields. Any reduction in Egypt's water share is expected to impact Egypt's economy in several ways.

3.1 Impact on water resources and agriculture

It is estimated that if Ethiopia completes the Renaissance Dam and fills the dam quickly without coordination with the Nile Basin countries, Egypt's share of Nile water, which amounts to approximately 55.5 billion m^3 annually, could decrease by approximately 9 to 12 billion m^3. This reduction is likely to halt land reclamation projects in Egypt due to water shortages, potentially halting the irrigation of approximately 8 million acres of agricultural land. Given Egypt's population of approximately 108 million, which is growing at an estimated annual rate of 1.9%, existing agricultural land is already insufficient to meet future needs. The lack of agricultural land expansion, coupled with population growth, will severely impact agricultural and food production. Despite its current water share, Egypt already imports approximately 62% of its food. A further decline in water availability and a halt to agricultural expansion will exacerbate this dependency, especially given that the construction of the Grand Ethiopian Renaissance Dam is likely to halt the cultivation of 2-3 million acres of existing agricultural land in Egypt, particularly in the Delta and Upper Egypt regions. In addition, the rising cost of irrigation: Egypt may be forced to resort to more expensive irrigation methods such as groundwater or desalination. In addition, agricultural production will decline and desertification will increase due to reduced production of staple crops such as wheat, rice, and corn. This will lead to increasing in Egypt's trade balance deficit, which suffers from a persistent deficit because of the increasing bill of food import (Abdel Shafey,2020).

3.2 High Unemployment Rate

The loss of existing agricultural land or the halting of desert reclamation projects in Egypt would result in the loss of many jobs in Agricultural sector, which now employs around 7.1 million people. This would lead to a rise in unemployment within agriculture. It's important to note that even with a high economic growth rate of 7%, Egypt's unemployment rate was about 13%. If agricultural land decreases following the construction of the Ethiopian Renaissance Dam, unemployment is expected to rise sharply, making the agricultural sector less attractive for employment due to difficulties in securing sufficient water for farming (Solieman,2018).

3.3 Impact on water deficit increase

The construction of Ethiopia's Renaissance Dam is expected to worsen Egypt's water challenges. Currently, the per capita water availability in Egypt is about 753 m^3 annually, which is below the global average of around 1,000 m^3 per person. By 2050, this figure is projected to drop to 527 m^3 per person if Egypt's Nile water share remains unchanged. However, if the Renaissance Dam reduces Egypt's water share by 9 to 12 billion m^3 annually, this would further decrease per capita water availability by 17.3% to 22.8%. Such a decline would impose additional economic burdens on Egypt, including the costs of seawater desalination to meet drinking water needs and wastewater treatment for agricultural irrigation. These costly measures could hinder Egypt's development plans amid its ongoing social and economic challenges (Abdel Wahab,2019).

3.4 Impact on electricity and energy

Electricity and Energy conservation has been a significant problem for Egyptian government over the last ten Years. Since 2008, Egypt has pursued a actions and instrument to phase out energy subsidies, which have placed a heavy burden on the national budget—around 120 billion Egyptian pounds (approximately 2.6 billion U.S. dollars) annually. This subsidy removal targeted energy-intensive industries and involved increasing fuel prices for vehicles and households to encourage more efficient energy use. The situation worsened considerably following the January 25 revolution. The construction of Ethiopia's Renaissance Dam is expected to reduce Egypt's water share, leading to a decrease in electricity generated

by the High Dam, which currently accounts for about 10 to 12% of Egypt's total energy production (Fadlallah,2018). The decrease in the water level behind the High Dam may lead to a reduction in the High Dam's ability to generate electricity and store water, which will negatively affect industries and energy and cause economic losses.

The reduction in Egypt's water share puts its economy under significant strain now and in the future. A decline in electricity production from the High Dam means Egypt must rely on alternative energy sources, which are often more costly—something the country may struggle to afford. Among electricity sources, hydropower is comparatively clean, while alternatives like wind, solar, or waste recycling could take considerable time to develop. Turning to nuclear energy carries risks and requires thorough studies and international approval. Relying on fossil fuels such as oil and gas is expensive, especially as Egypt faces a sharp decline in domestic production and currently imports more oil and gas than it exports, a situation worsened by flawed export policies before the January 25 revolution.

3.5 Food and Economic Security

The decline in production of major crops (such as wheat, rice, and corn) leads to poor food security and increased unemployment in the agricultural sector, thus increasing dependence on imports. This leads to a widening trade deficit and declining foreign exchange reserves. The Grand Ethiopian Renaissance Dam also poses a threat to Egyptian national security by controlling the flow of the Nile and undermining Egyptian sovereignty.

3.6 Impacts on Trade and Transport

If the Nile's water level were to fall below its current level, river navigation would likely be negatively impacted, ultimately impacting domestic trade as a whole.

3.7 The economic cost of adaptation measures

Investing in desalination plant projects entails high costs, as do developing modern irrigation systems, constructing water treatment plants, and providing support to affected farmers, which represents an additional burden on Egypt's public budget.

There are some potential positives of the Grand Ethiopian Renaissance Dam if cooperation and coordination among the Nile Basin countries are achieved, including: Regulating the flow of the Blue Nile could help reduce flooding in Sudan and Egypt. There are also opportunities to purchase electricity from Ethiopia, such as, if an agreement is reached, Egypt could benefit from Ethiopia's surplus electricity at lower prices. In addition to regional cooperation, the dam could serve as a project for integration between the three countries rather than conflict, yielding shared economic benefits, including the possibility of trilateral cooperation in water management, coordination in energy production and exchange, and the development of joint agricultural projects that enhance regional food security.

4. THE LEGAL AND ECONOMIC DETERMINANTS OF THE WATER DISPUTE BETWEEN THE ARAB REPUBLIC OF EGYPT AND THE COUNTRIES LOCATED IN THE NILE BASIN

4.1 The legal and economic determinants of the water conflict

Water resources refer to the total water resources available to a country, whether conventional or unconventional, over a specific period of time. They vary depending on the measurement standard, and there are usually multiple indicators and measures that can be relied upon to determine the abundance or scarcity of available water resources, including economic, qualitative, and quantitative indicators. The water

situation in the Nile Basin countries can be examined by applying these previous indicators to determine whether the region faces water scarcity or not, as outlined below (Keshk,2016):

4.1.1 Quantitation indicator of the limited resources of water

Water scarcity is assessed using two main indicators: first, whether the per capita water availability falls below the global water poverty threshold of 1,000 m^3 per year; and second, whether the available water supply is insufficient to meet demand. Based on these quantitative measures, the Nile Basin countries generally do not have any challenge and problems from scarcity of water, as all countries surpass the water poverty line if the river's flow were equally divided among them. However, dependence on Nile water varies across the basin, with northern Sudan and especially Egypt relying heavily on the Nile—Egypt obtains over 95% of its surface water needs from it. Unlike Egypt, most Nile Basin countries have additional water sources within or beyond their borders. Egypt is unique in the basin for fully utilizing its water resources and facing a demand for food and drinking water production that is likely to exceed its renewable the supply of water. Therefore, Egypt is the only Nile Basin country experiencing water scarcity when comparing its needs to available renewable resources (Mustafa,2020). In conclusion, while upstream countries generally have sufficient water resources and use less than their annual renewable supply, downstream countries like Egypt and Sudan face significant water limitations.

4.1.2 Qualitativeness indicator of the limited resources of water

Water quality is assessed by the level of pollution and whether it renders the water unusable despite being abundant. Using this qualitative measure, the Nile River maintains high water purity because of its steep gradient from south to north, which promotes rapid water flow. As a result, the river's water quality is generally good, indicating that there are no significant limitations related to water quality.

4.1.3 Economic Indicator of Limited Water Resources

This is assessed by the lack of essential water infrastructure needed to deliver the water to households and industries, often due to economic poverty. The economic indicator depends on various factors, including poverty levels and population size. According to the World Bank's 2019 Development Report, most Nile Basin countries, except Egypt, are classified as low-income developing nations. Egypt is the only country in the basin categorized as middle-income. The widespread extreme poverty in these countries—excluding Egypt—has negatively impacted their ability to build the necessary water infrastructure. This includes limited systems for water transportation, delivery, and inadequate sewage network coverage in most of these nations, without Egypt. Therefore, we can conclude that many Nile Basin countries suffer from "water poverty" meaning they lack the financial resources required to develop water infrastructure for transport, storage, and distribution across various sectors (Demerew, 2022).

Although the Nile River Basin is abundant in water resources both in quantity and quality, it remains economically underdeveloped and lacks the necessary organizational capacity to manage these resources effectively. As a result, water in the basin is considered limited—not because of physical scarcity, but due to inefficient use and poor planning. This limitation is likely to worsen over time, especially with the added pressure of external factors such as climate change, which may lead to rising temperatures and further strain on the basin's resources, and the impact of environmental pollution, combined to a significant rise in population, creates increased economic pressure, particularly in Agriculture to satisfy the growth demand for food in the future (Bashier).,2021).

The interaction of these elements could trigger international water conflicts between downstream countries like Egypt and Sudan, which face water scarcity, and upstream countries that have abundant water but lack the economic resources to fully utilize it. Egypt relies on over 95% of the Nile's water, whereas Ethiopia uses about 1%, Kenya 2.3%, Tanzania 3.4%, Congo 1.4%, Burundi 5%, and Sudan 15%. Due to higher rainfall in these upstream countries, their dependence on Nile water is lower. This imbalance

in water availability and usage is likely to lead to ongoing disputes over water resources in the future (Al-Shammary,2021).

4.2 The Legal Determinants of Water Conflict

It is important to note that there is no universally accepted legal framework governing the procedural and legal matters concerning the Nile Basin. This lack of a comprehensive, inclusive agreement creates room for international disputes over water resources among the Nile Basin countries. Although various treaties and agreements have been signed, most of them are bilateral rather than multilateral. These include agreements made during the colonial era by imperial powers, as well as those signed after some countries gained their independence like as the 1959 Agreement between Egypt and Sudan (Al-Deeb, 2007).

One of the earliest notable agreements is the Rome Protocol, signed on April 15, 1891, between Britain and Italy. This protocol stipulated that no water-related projects would be developed on the Atbarah River (which flows from Ethiopia into Sudan) without prior consultation with Egypt. Similarly, the 1906 agreement between France, Britain, and Italy included a clause (Article IV) obligating these countries to cooperate in ensuring the continued flow of the Blue Nile and its tributaries into Egypt (Bayoumy, 2019).

Another significant agreement is the 1929 treaty between Egypt and Britain. It prohibits any irrigation or hydropower projects on the Nile or its branches—including lakes feeding the river—without Egypt's prior consent, especially if such projects would reduce Egypt's water share, alter the timing of water delivery, or otherwise harm Egyptian interests. This agreement also affirms Egypt's historical and natural rights to the Nile's waters.

Additionally, the 1959 agreement signed in Cairo between Egypt and Sudan was shaped by new developments, such as plans to construct the High Dam. This treaty confirmed Egypt's existing right to 48 billion m^3 of water annually and allocated 4 billion m^3 to Sudan. Furthermore, it provided for shared use of the High Dam's water, with Egypt receiving 7.5 billion m^3 and Sudan 14.5 billion m^3 annually from the dam's estimated 22 billion cubic meters output—bringing Egypt's total annual share to approximately 55.5 billion m^3 and Sudan's to about 18.5 billion m^3.

The existing agreements highlight the absence of a unified and inclusive treaty among all Nile Basin countries. There is no comprehensive international legal framework governing the use of Nile waters. Instead, the current agreements are mostly outdated, bilateral in nature, and lack broad acceptance across the region. As a result, several Nile Basin countries rejected these agreements upon gaining independence. This underscores the urgent need for a collective, multilateral agreement among all basin states. The lack of such an agreement has led to ongoing disagreement and conflict, particularly over the equitable sharing of the Nile's waters.

There is a strong case for reconsidering and redistributing the Nile River's water shares among all basin countries, given the absence of a comprehensive agreement that outlines clear criteria for water allocation. Currently, only the 1929 agreements and also 1959 both signed exclusively by Egypt and Sudan, the states the downstream address the Nile's waters distribution. These agreements do not include the upstream countries and have been a source of ongoing controversy, particularly regarding their legitimacy and relevance in today's context. Disputes also persist over the legal authority of earlier treaties signed during the late 19th and early 20th centuries, and whether these agreements can serve as a valid legal and procedural framework for managing the Nile's resources. Additionally, there is ongoing disagreement over whether upstream countries are obligated to provide prior notification before undertaking water-related projects in the Nile Basin. These unresolved legal and procedural issues have led to increased tensions and growing instability in the relationships between upstream nations and the downstream countries, Egypt and Sudan (Zakaria, 2019).

5. THE ROLE OF ISRAEL, THE UNITED STATES, AND THE WORLD BANK IN THE WATER CONFLICT BETWEEN EGYPT AND THE NILE BASIN COUNTRIES

5.1 The Israeli role

There is no doubt that Israel's interference in water issues in the region has deep historical dimensions. According to domestic Israeli sources, the country's renewable water resources are limited to approximately 1,850 million m^3 annually. Due to population growth, the amount of renewable freshwater available per person has declined to about 228 m^3 per year, and it is projected to fall further to 265 m^3 per capita by 2025. Recognizing this crisis, Israel officially declared a "drought state" on April 15, 1999, at which time it called on the European Union to provide rapid assistance in addressing the water shortage.

Israel's water scarcity is not solely due to limited renewable resources. It results from a combination of factors including population growth, continuous Jewish immigration, agricultural expansion, industrial development, and environmental degradation. In response, Israeli policy has increasingly leaned toward the "militarization" of water resources—exerting strict control domestically over water sources seized by force, and pursuing influence over regional water resources at the international level. This includes efforts to gain control, either directly or indirectly, over external surface water sources to meet rising domestic demands (Al-Ajjal, 2018).

Regarding the Nile Basin, Israel employs a two-pronged strategy to advance its water security goals. The first approach involves a direct attempt to acquire a portion of Egypt's Nile water allocation—about 1% of the river's total flow—by purchasing it. However, consistent with Egypt's longstanding water policy, such proposals have been firmly rejected. Consequently, Israel has shifted to an indirect strategy aimed at undermining Egypt position in the Nile Basin. This involves a policy of "containment," designed to isolate and pressure Egypt by strengthening relations with upstream Nile countries.

Under the guise of economic cooperation and development assistance, Israel has expanded its presence in the region. It provides loans to newly independent African nations, funds development projects, sends technical experts, and offers training programs to African professionals. Moreover, Israel has engaged with select political groups to bolster their hold on power or create political instability, thereby leveraging these relationships to influence upstream countries against the interests of downstream states like Egypt. As a result of these efforts, Israel has significantly expanded its diplomatic, military, and economic presence in Africa. Once regionally isolated, Israel has now emerged as a key player in African affairs and a formidable competitor in regional influence (Essa, 2014).

It is important to note that Israel, in pursuit of its strategic interests in the Nile Basin's downstream countries, appears to rely on three key mechanisms. First, it supports the rise of a new generation of African leaders, particularly those from minority groups within their own countries, who maintain close ties with the United States and, by extension, with Israel. Second, it seeks to contain Arab national security—especially that of Egypt and Sudan—through a broader strategy often referred to as the "Pacific Alliance," which aims to reshape regional alliances to its advantage.

Israel has sought to establish alliances with various countries and groups that have affiliations with Israel and are known for their hostility toward Arab states, while simultaneously implementing a strategy centered around offering grants and training programs for African professionals. One of Israel's strategic successes has been maintaining a continuous presence in Ethiopia, regardless of changes in political leadership. This presence is reinforced through the supply of arms and military equipment for domestic security purposes.

Israel's influence in the Nile Basin is evident in various sectors, particularly in technical cooperation, trade, labor, and agriculture. Among these, agriculture receives the most attention, given its reliance on

water resources. Israel has shown particular interest in exploiting water from Lake Victoria and supporting agricultural and hydroelectric projects in Ethiopia near the Nile's headwaters.

Trade has become a key indicator of Israel's growing influence in countries such as Ethiopia and the Democratic Republic of Congo. This expansion is supported by the cooperation in forming a joint chamber of commerce, in addition to providing financial grants and various types of economic assistance in various fields. Trade volumes between Israel and African nations now exceed one billion dollars annually (Ramadan, 2018).

5.2 The American role

The American intervention in the water issue of the Nile Basin countries is primarily indirect, centered around limiting the influence of Egypt and Sudan in the region to reinforce its own strategic and political dominance. Part of this approach includes paving the way for Israel's role by reshaping the regional power dynamics within the Nile Basin. Additionally, the U.S. has supported policies aimed at redrawing Sudan's political and geographic landscape to create a new, U.S. aligned state.

Following the end of World War II, American foreign policy towards the Nile Basin countries became completely different compared to before the war, as it became more involved and cooperative in various fields, especially the water issue, with the goal of integrating Africa into the global economy (Taie, 2015). A key objective of American policy is to open up emerging markets, especially in Africa, which is viewed as rich in investment opportunities and as a potential outlet for U.S. products. Military, political, and economic goals are intertwined with promoting democracy, human rights, and regional security.

The U.S. has also used its relations with non-Arab Nile Basin countries as leverage to exert pressure on Egypt and Sudan, both of which are Arab states aligned against Israeli interests. A telling example of American interest in the Nile water issue is its insistence on participating in all relevant water negotiation committees—both multilateral and bilateral—particularly those formed after the 1991 Madrid Peace Conference.

The United States has focused on strengthening ties with Ethiopia, which is critically important as the Ethiopian highlands supply about 80% of the Nile's waters. The U.S.-Ethiopia relationship spans military, political, economic, and commercial dimensions. Furthermore, Washington's engagement with a new generation of African leaders poses challenges for Egypt's regional influence. U.S. support for South Sudan's secession and efforts to redistribute power and resources between northern and southern Sudan have implications for Egypt's water security and could undermine its regional leadership in both the Nile Basin and the broader Arab world (Ramadan, 2018).

5.3 The World Bank role

The World Bank is a major global institution with significant influence, particularly in developing nations. Through its financial tools—such as grants, loans, and development aid—it plays a key role in supporting infrastructure and development projects, including those related to the management and utilization of international rivers. The World Bank can play a dual role in the Nile Basin: it may contribute to tensions and conflict on one hand, while also having the potential to promote cooperation and positive engagement on the other. The international shifts of the 1990s—most notably the rise of globalization—introduced new concepts and mechanisms for managing trans boundary water resources. These developments have significantly influenced how international water governance is approached, including in the Nile Basin (Wheeler,et al, 2016).

The World Bank has introduced several new concepts under what it terms "new water thought," which includes ideas such as pricing of water, privatization of water, water trading, and water markets creation. These ideas are part of a broader push to reform water resource management by promoting privatization, based on the belief that the private sector is more efficient at managing water and ensuring its distribution

across a country. However, this approach has faced opposition from countries like Egypt, which fear that privatization could open the door to foreign interference in national water affairs.

Water pricing relies on market mechanisms to boost economic efficiency, as promoted by the World Bank and reduce political and bureaucratic influence over water distribution. Yet, implementing such models requires extensive study and preparation, especially in developing nations where institutional capacity is limited—particularly in managing pricing systems for irrigation water. Due to these challenges and its alignment with certain countries' perspectives (such as Israel and Turkey), the World Bank cannot be considered a neutral actor in the water disputes. By framing water as an economic commodity, its policies risk undermining historical water rights. This shift could lead upstream countries to demand financial compensation for water flowing to downstream nations. There is a concern that such a model could be extended to the Nile Basin, especially as some countries—like Kenya—have already implemented water pricing systems, collecting up to 20% of the value of irrigation water. These developments are further complicated by external influences that encourage upstream nations to adopt water pricing, thereby increasing tensions in the region (Al-Bendary, 2018).

On the other hand, the World Bank has also important a constructive role to managing and resolving transboundary water disputes, including those involving the Nile River. Since 1998, it has supported efforts to enhance cooperation among Nile Basin countries by funding joint studies and development projects. The Bank allocated around $100 million to facilitate these cooperative efforts, aimed at promoting shared water management. A central part of this initiative is the Nile Basin Initiative (NBI), which was established with the Bank's backing to develop a cooperative legal and institutional framework for the basin.

In conclusion, while the World Bank has contributed to cooperative efforts in the Nile Basin, its policy direction appears to favor of the upstream countries, and this reflects the influence of the great powers and major countries that have special interests in the Nile Basin countries region (Kamal,2020).

5.4 Scenarios for Resolving the Ethiopian Renaissance Dam Crisis

With the escalating security and political tensions in the Nile Basin region, and Ethiopia's determination to complete the Grand Ethiopian Renaissance Dam project, there are several possible scenarios for resolving the crisis. The most prominent of these scenarios are:

First scenario: Strengthening Egyptian hegemony through forming strong alliances with other countries, such as Sudan and South Sudan. Although this scenario does not necessarily mean that Egypt will continue to receive its full share of the Nile's water, it enables it to maintain a relatively large degree of hegemony and achieve consensual solutions regarding its water share.

Second scenario: The emergence of counter-hegemony with multiple centers of hegemony. However, there is a need for external powers capable of mediating a solution to the crisis. China and some Gulf states, which are participating in financing the dam, could intervene and offer solutions or cease funding the dam.

Third Scenario: The success of the counter-hegemonic forces in reaching an alternative system to the Nile Basin Initiative, especially after the South Sudanese Parliament approved the ratification of the Entebbe Agreement in July 2024. Despite the seriousness of this step, as it aims to impact Egypt's water interests and demonstrate Ethiopia's hegemony in the Nile Basin, it is difficult to predict the future balance of power in the Nile Basin countries, especially in light of the increasing population and demand for water resources. This indicates expectations of the possibility of water wars and conflict over this natural resource in the Nile Basin countries.

The Grand Ethiopian Renaissance Dam poses a major strategic economic challenge to Egypt and poses other serious challenges if it is operated without a binding agreement to guarantee Egypt's fair share of water. The economic impacts could be significant, particularly on the agriculture, energy, and food security

sectors. However, with political will and comprehensive agreements, the damage can be minimized and mutual benefits achieved. To mitigate the negative impacts, it is essential to implement the following proposals: accelerate negotiations under international auspices that safeguard everyone's interests, invest in desalination and modern irrigation technology, increase the efficiency of water resource use, and enhance regional cooperation in the energy and water sectors.

CONCLUSION

This paper aims to discuss the economic impacts of construction the Renaissance Dam in Ethiopia on Egypt, by clarifying the nature of the Nile Basin countries' water crisis, especially the Nile River water problem between Egypt and Ethiopia. The study concludes that the ongoing water conflict within the Nile River Basin largely stems from internal factors. These include challenges related to water scarcity, limited economic resources, and most significantly, the absence of a unified and comprehensive legal framework governing water usage in the basin.

The paper highlights several key findings: First, the current water situation in the Nile Basin countries is a major factor of tension and conflict in the region as a whole, particularly when viewed through an economic lens. Many of these countries lack the financial means to build the necessary infrastructure for water delivery, making them more susceptible to external influence. Foreign powers have taken advantage of this by offering financial support for dam construction and other water-related projects, thereby increasing their presence in the region. Second, the lack of a universally accepted legal agreement among Nile Basin nations continues to fuel disputes, especially between Egypt and other basin states. Third, Israel's growing involvement directly strengthened political and economic ties with upstream Countries is part of a broader strategy to encircle Egypt and potentially claim a portion of Nile water. Finally, the United States has expanded its influence in the region through bilateral partnerships and by promoting the formation of alliances or blocs that could undermine cooperation between Egypt and the other countries of Nile Basin.

The World Bank has introduced new water management concepts such as privatization, water pricing policies, water trading, and the establishment of water markets. While intended to improve efficiency, these approaches may inadvertently heighten tensions and contribute to potential water conflicts among Nile Basin countries. Moreover, the influence of major global powers on the World Bank's policies has raised concerns about the institution’s impartiality in addressing transboundary water issues. Despite Egypt’s continuous efforts to resolve the Grand Ethiopian Renaissance Dam crisis, meaningful progress with upstream countries has been difficult to achieve, largely due to the backing these nations receive from external actors opposed to Egypt’s position.

This paper offers several recommendations: Strengthen Strategic Cooperation: Egypt should work on building a framework of strategic cooperation with other countries of Nile Basin to ensure collective the security of water. This includes leveraging the unique resources and capabilities of each country to maximize mutual benefits from the Nile's waters and investing in the development of non-traditional water sources to increase overall water availability. Enhance Economic Ties: Establish stronger trade partnerships with countries of Nile Basin and make use their economic and natural resources to support regional socio-economic development. Establish a Unified Legal Framework: A new, inclusive institutional and legal agreement involving all Nile Basin states is necessary to resolve current disagreements. This framework should recognize and uphold Egypt's historic water rights as outlined in prior treaties. Revise Egypt’s Africa Policy: Egypt should reassess its foreign policy toward Africa, aiming to play a more proactive role in promoting stability through security, economic, and political agreements that limit the influence of external powers in the region. Leverage Regional Alliances: Egypt could apply pressure on Ethiopia by strengthening ties with its neighboring countries such as, Somalia, Djibouti and Eritrea which have existing tensions with Ethiopia. This could serve the challenge Ethiopian desire and interests in the region. Pursue International Legal Channels: Egypt should consider taking the GERD dispute to arbitration at the international level to defend its historical of Nile waters share —similar to the approach taken in the Taba border dispute. Mobilize Global Support: Work on shaping international and regional public opinion in favor of Egypt’s position to build momentum toward an agreement that deters Ethiopia from harming Egypt’s water interests. Avoid

Military Action: At this stage, military intervention should not be considered, as it could have negative consequences for Egypt that outweigh any potential gains.

CONFLICT OF INTEREST STATEMENT

The author declares that the paper was conducted in the absence of any commercial or financial relationships which could be construed as a potential conflict of interest. No potential conflict of interest or any other similar divergence associated with this research article by the author. Additionally, I hereby confirm that there are no potential conflicts of interest relating to this manuscript.

REFERENCES

Abdel Shafey, E.F. (2020), "The Renaissance Dam, the Water Issue, and Egyptian National Security," Political Studies, Egyptian Institute for Studies, April, Cairo, pp.82-84.

Abdel Wahab, A. (2019), "Towards an Integrated Egyptian Strategy in the Nile Basin Countries," International Politics Journal, Al-Ahram Center for Political and Strategic Studies, Issue 178, October, Cairo, pp.161-164.

Al-Ajjal, L. (2018), "The Israeli Role in the Nile Basin Region and Its Implications for the Reality and Future of Water Security in the Nile Basin Countries", published PhD thesis, Faculty of Law and Political Science, University of Batna, Algeria, pp.151-154.

Al-Behery, Z.M. (2016), "Egypt and the Nile Problem, the Ethiopian Renaissance Dam Crisis", Egyptian General Book Authority, Cairo,pp. 106.

Al-Bendary, S. (2018), "The Renaissance Dam Problem and Reformulating the Directions of Egyptian Foreign Policy in Africa", Journal of African Studies and the Nile Basin, Arab Democratic Center, Vol. 1, Issue 1, Berlin, Germany, pp.94-98.

Al-Deeb, E.F. (2007), "The Legal Nature of Treaties Concerning the Use of International River Waters and International Waterways for Non-Navigational Purposes, with an Applied Study of the Agreements Related to the Nile River", unpublished PhD thesis, Faculty of Law, Cairo University, pp.122-125.

Allam, N.M. (2014), "The Renaissance Dam Crisis, a Political Issue or a Technical Problem", Al-Mahrousa Center for Publishing and Services, Cairo University, First Edition, Cairo, pp.214-216.

Al-Shammary, S. (2021), "Egyptian Diplomacy and Its Role in the Renaissance Dam Crisis, Challenges and Solutions", Tikrit University Journal for Humanities, Vol. 28, No. 8, pp.67-71.

Bashier, M. (2021), "Cooperative Operation of the Grand Ethiopian Renaissance Dam Reduces Nile Riverine Floods", River Research and Applications. Vol, 37, No. 6 ,pp.157.

Bayoumy, O.G. (2019), "The Renaissance Dam between National Security and International Law", Dar Al Nahda Al Arabiya, Cairo, pp.161-167.

Demerew, K. (2022), "Realist Perspectives on Nile Politics: Conflict and Cooperation Between Ethiopia and Egypt", African Security. Vol, 15, No. 3, pp. 213-215.

El-Tayeb, A. (2015), "The Economic, Social and Environmental Impacts of the Construction of the Ethiopian Renaissance Dam", unpublished PhD thesis, Omdurman Islamic University, Sudan, pp. 144-147.

Essa, S.S. (2014), "The Coming War: The Water War and the Conflict with Israel", Dar Al-Riyadh for Publishing and Distribution, Saudi Arabia, pp. 224-227.

Fadlallah, S.J. (2018), "The Nile River in Egyptian-Ethiopian Relations", National Library, First Edition, Cairo, pp. 153.

Fouad, K. (2016), "The Ethiopian Renaissance Dam, Egypt and the Crisis of Difficult Choices", Egyptian Institute for Political and Strategic Studies, Istanbul, Turkey, pp. 34-37.

Hamdan, S. (2015), "The Impact of the Ethiopian Renaissance Dam on the Future of Water Resources in Egypt and Sudan", Al-Mustansiriya Journal of Arab and International Studies, Al-Mustansiriya Center for Arab and International Studies, Al-Mustansiriya University, Baghdad, Iraq, Vol. 12, No. 51, pp. 292-295.

Hammond, M.F. (2013), "The Grand Ethiopian Renaissance Dam and the blue Nile: Implications for trans boundary water governance", Global Water Forum, University of Exeter, United Kingdom, February, pp. 64-69.

Hany, S. (2015), "Nile Basin initiative an insight into Egypt position", African Affairs, Vol, 17 ,pp. 27-31.

Huiyi,C., Ashok S.(2014), "The Grand Ethiopian Renaissance Dam: Evaluating Its Sustainability Standard and Geopolitical Significance", Energy Development Frontier, March, Vol. 3, No. 1, pp. 11-19
Jajan, A. (2018), "The Impact of the Ethiopian Renaissance Dam on the Future of Water Resources in Egypt and Sudan", Kirkuk University Journal for Humanities Studies, Vol, 13, No. 2, pp. 66-69.
Kamal, G. (2020), "The Ethiopian Renaissance Dam between Negotiations, Reality and Future Scenarios", Sawt Africa Magazine, Dar Al Bayan for Publishing and Distribution, Vol. 1, No. 3, Benghazi, Libya, pp. 87-81.
Keshk, A.M. (2016), "Egyptian Water Policy towards the Nile Basin Countries", Cairo: Egyptian African Studies Program, Faculty of Economics and Political Science,pp. 62-64.
Kottan, W. (2017), "The Ethiopian Renaissance Dam and its Impact on Water Security in Egypt and Sudan", PhD Thesis, College of Education for Human Sciences, University of Diyaly, Iraq, pp. 141-144.
Majeed, M.R. (2022), "The Impact of Water Variables and the Renaissance Dam Problem on Egyptian-Ethiopian Relations", Dar Amjad for Publishing and Distribution, First Edition, Amman, Jordan, pp. 123-125.
Marey, N.D. (2020), "The Ethiopian Renaissance Dam and the Water Conflict between Egypt and the Nile Basin Countries", Al-Araby for Publishing and Distribution, Cairo, Egypt, pp. 112-115.
Mustafa, M. (2020), "The Renaissance Dam, the Most Complex File in the African Continent and the Most Dangerous to Egypt", Journal of African Studies and the Nile Basin, Arab Democratic Center, Issue 9, Berlin, Germany, pp. 41-43.
Noureldin, N. (2019), "Egypt and the Nile Basin Countries, Water, Dams and Conflict", Dar Al-Nahda, First Edition, Cairo, pp. 72-74.
Qassem,N., Hasan S. (2023), "The Renaissance Dam Crisis between Egypt and Ethiopia", Hammurabi Journal of Studies, Hammurabi Centre for Research and Strategic Studies, Vol. 2 ,No. 45, pp. 141-143.
Qutb, H., Darwish, S. (2022), "The Renaissance Dam Crisis between Egypt and Ethiopia", Journal of African Studies, Vol. 44, No. 2, Cairo, pp. 64-66.
Ramadan, I.S. (2018), "The Responsibility of Ethiopia, Financing Countries and Implementing Companies for the Construction of the Ethiopian Renaissance Dam", Dar Al Nahda Al Arabiya, First Edition, Cairo, pp. 85-87.
Riyad, M. (2016), "Egypt and the Ethiopian Renaissance Dam", International Politics Magazine, Al-Ahram Center for Political and Strategic Studies, Vol. 51, No. 203, pp .66-71.
Sabry, M. (2020), "The Water Conflict, the Renaissance Dam Crisis between Egypt and Ethiopia", Dialogue of Thought Journal, Vol. 15, No. 51, pp. 44-48.
Salim, H. (2022), "The international dispute over the Renaissance Dam between Egypt, Ethiopia and Sudan", Al-Zaytoonah University of Jordan Journal for Legal studies, Vol. 3, No. 2, pp. 127-129.
Shafey, B.M. (2021), "Egypt, Ethiopia, and the Struggle for Hegemony over the Nile Basin, the Renaissance Dam as a Model", Al Jazeera Center for Studies, January, Doha, Qatar, pp.56-59.
Sharaky, A. (2014), "Geology of the Ethiopian Renaissance Dam and its impact on the safety of the dam", Water Issue Conference, Cairo University, March 15, pp. 112-114.
Solieman, A.T. (2018), "The Ethiopian Renaissance Dam and the Future of Egyptian National Security", Al-Azhar University, First Edition, Cairo, pp. 45-48.
Taie, M. (2015), "The International Conflict over Water in the Nile Basin Countries", unpublished PhD thesis, Faculty of Economics and Political Science, Cairo University, pp. 92-97.
Taye, S. (2011), "The Impact of Regional and International Powers on Water Interactions in the Nile Basin, in: Egyptian Water Security: Reality and Future", Cairo, Egyptian Council for Foreign Affairs, Vol. 46, pp. 80.
Waterbury, J. (2018), "The Grand Renaissance Dam and prospects for cooperation", University Of North California at Chapel Hill, USA, pp. 124-126.
Wheeler, K. G. et al. (2016), "Cooperative Filling Approaches for the Grand Ethiopian Renaissance Dam", Water International. Vol, 41, no,4, pp. 611-634.
Yosry, I.R. (2016), "The Nile and the Renaissance Dam, a Journey Through History and Geography", Egyptian Institute for Strategic Studies, Cairo, pp. 55-57.
Zakaria, R.M. (2019), "The Ethiopian Renaissance Dam Crisis in Light of Agreements and Principles of International Law", Arab Center for Research and Policy Studies, Cairo, pp. 86.