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Renaissance Dam and Development in Ethiopia: National Gains and Regional Losses

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Abstract

This article examines the Grand Ethiopian Renaissance Dam (GERD) project and its impact on the development of Ethiopia on the one hand, and the downstream countries, Egypt and Sudan, on the other. It highlights the economic, political, and social gains Ethiopia has achieved through the construction of the dam, as opposed to the losses incurred by Egypt and Sudan in these areas. The article also discusses regional challenges related to water management and presents models of successful co-operation, such as the Mekong River experience and the 1995 agreement that established a joint committee to manage the basin. The article proposes a set of solutions to achieve joint development among the three countries, based on regional cooperation, the establishment of a tripartite committee to manage the river's resources, and the adoption of water and non-water projects that benefit all parties. The article concludes by emphasising the importance of establishing a common institutional framework that ensures the fair and sustainable use of the Nile's waters, thereby promoting regional stability and development.

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Keywords: Renaissance Dam, Nile River, Egypt, Sudan, Ethiopia, Water Diplomacy, Regional Cooperation

Introduction

One of the most important transboundary basins is the Nile River, which is of great importance to the eleven countries that make up the Nile Basin countries. The Nile is one of the longest rivers in the world, with a length of about 6,650 kilometres, stretching from East and Central Africa until it flows into the Mediterranean Sea. Depending on the population size and climate of the Nile Basin countries, the importance of the Nile River varies from country to country. The Nile River spans over three million square kilometres, with approximately 73% of the drainage basin area located in Egypt and Sudan, and 12% in Ethiopia. Despite the large area of the drainage basin in both Egypt and Sudan, the proportion of the watershed produced is much lower than the proportion of the watershed consumed. Ethiopia produces 86 per cent of the Nile's flow, and the White Nile, which has a larger drainage basin, produces the remaining 14 %. Although 86 % of the Nile's flow comes from the Blue Nile, it is a seasonal river, while the White Nile has a sustained flow throughout the year, due to a rainfall pattern with less temporal variation. This poor contribution to the Nile is due to its large basin, which results in the loss of about half of the water generated by tropical lakes and watersheds in the dam's swamps (Melesse, A. M., et al., 2011).

The Nile is of great historical importance to Egypt, as Egypt is considered to be the gift of the Nile. Egypt is the country most affected by the Nile River, except for a small area along the Mediterranean coast and the Nile Valley. Egypt relies on the Nile Valley for agriculture, where beans, cotton, wheat, and flax are cultivated, which are crops that require a large amount of water. The Nile River is also used for fishing, industry, and drinking water, so about 95 percent of Egyptians live along the Nile River. Therefore, Egypt has legalised its right to the Nile River through the legal agreements it has signed with the Nile Basin countries since the colonial period and has continued its policy of water hegemony using the Nile River as a political tool (Turhan, Y. 2020: 5).

Sudan is of great importance to the Nile River, and the Nile River is of even greater importance to Sudan, as Sudan is considered the source, course, and drainage basin of the Nile River. About 70 per cent of Sudan's land area is covered by the Nile River, and 43 per cent of the Nile River's area lies within Sudan's territory. This has led to the control of the climate, economy, and social life of the Sudanese people. About 85 per cent of Sudan's population depends on the rivers that make up the main Nile, with the highest population density concentrated on the Blue Nile, followed by the White Nile, the Main Nile, and the Atbara River (Hamad, W.E.T., & Batahani, A., 2005).

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Due to the large contribution of the Blue Nile, which originates from Ethiopia, to the Nile River, any fluctuations in runoff affect sustainable development in the downstream countries of Sudan and Egypt (Kim, U., & Kaluarachchi, J.J., 2009). Although Ethiopia receives about 85% of the Nile River through the Blue Nile and the Atbara River, it uses less than 1% of the Nile Basin's water resources, due to economic, political, and geostrategic reasons (Abebe, D., 2014). Ethiopia's huge population increase and fluctuating rainfall due to climate change make rainfed agriculture unstable and unsustainable. Therefore, the Ethiopian government has resorted to utilising the Nile River, which accounts for about 68% of Ethiopia's available water resources, by constructing small and large dams on the Blue Nile (Bugi, R. B. N. et al., 2019).

One of the most important projects constructed by the Ethiopian government on the Blue Nile is the Renaissance Dam project. The location of the GERD was determined in 1956-1964 by a survey carried out by the US Bureau of Reclamation (USBR). The project was not implemented until October 2009, when the Ethiopian government conducted a new survey of the site. In August 2010, the survey was renewed again. The dam design was submitted in November 2010, the project was announced on 31 March 2011, and the foundation stone was laid on 2 April 2011 by Prime Minister Meles Zenawi. The project was called Project X, then turned into the Millennium Dam and finally the Grand Renaissance Dam or Renaissance Dam (Yehdego, Y. et al., 2017).

The main question answered by the article is: Do Ethiopia's developmental gains pose a threat to the stability and development of countries in the region, particularly Sudan and Egypt? Ethiopia's gains from the Renaissance Dam are very significant in terms of economic and developmental gains in terms of electricity generation, which in turn represents increased opportunities for industrialisation, rural development, and increased exports. Politically, owning a project of the magnitude of the GERD will strengthen the country's sovereignty and independence in the exploitation of its natural resources. As for the Nile estuary countries that see the Renaissance Dam as a threat to their water security due to its location in the most important source of the Nile River, the Blue Nile, and thus Ethiopia can control the flow of Nile water to Egypt and Sudan. This will affect Egypt and Sudan in terms of agricultural production and electricity production from Sudanese and Egyptian dams and disrupt the planned development programmes.

The study aims to analyse the Ethiopian gains from the Renaissance Dam and to analyse the main reasons for the dam, whether it is to develop Ethiopia economically and politically or to control the flow of water to Sudan and Egypt. Does Ethiopia want to end Egypt's historical control over the Nile

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River by doing so? The study also aims to assess the potential threats to Sudan and Egypt due to the dam, whether in terms of water security, threatening the geopolitical balance, or the environment. The study also aims to assess the potential for GERD to change the balance of power in the region and to polarise international powers. Finally, the paper discusses the attempt to balance the interests of the three countries under the principle of 'mutual benefit and no harm'.

To achieve the study's objectives, a comparative, descriptive-analytical approach was used. This involved describing the political and economic dimensions of Ethiopia, Sudan, and Egypt after the construction of the Renaissance Dam and analysing the gains and losses for each party. These gains and losses were linked to the theory of water hegemony, and solutions satisfactory to all parties were proposed using a comparison between the Renaissance Dam issue and the Mekong River model.

The research problem is that the Grand Ethiopian Renaissance Dam project represents a crisis between Egypt, Sudan, and Ethiopia, given its significant impact on all three countries, whether positive or negative. The problem also stems from the difficult negotiations that accompanied the construction of the dam since its announcement in 2011 until its completion, and the failure to reach a binding and satisfactory agreement between the parties. This may pose a threat to regional security.

The article consists of a theoretical section that explains water hegemony in the Nile Basin and illustrates Egypt's control over the Nile River. Water hegemony shifted from Egypt to Ethiopia after the construction of the Grand Ethiopian Renaissance Dam. It then discusses Ethiopia's economic and political gains from the dam, including increased electricity generation and improved infrastructure. The article then addresses the regional losses and repercussions of the dam's construction on Egypt and Sudan, including its impact on environmental and water security, threats to geopolitical balance, and economic effects. The article proposes solutions that would benefit Ethiopia, Sudan, and Egypt equally, using the Renaissance Dam. It concludes by citing the Mekong River as a comparative model for solving transboundary water problems.

Literature Review

There have been numerous studies on the Renaissance Dam and the extent of the gains and losses that Ethiopia will reap from it, as well as the extent of the gains and losses for countries in the region, especially those in the Eastern Nile. One such study (Mohamed Mahmoud et al., 2024) is entitled 'The Impact of the Renaissance Dam on Nile River Reservoirs in the Downstream Region.' The study addressed the positive impact of the Renaissance Dam in terms of development and improving living standards in

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Ethiopia, as well as its impact on water resources in downstream countries (Sudan and Egypt). It used remote sensing data and products to assess the impact of filling the Renaissance Dam reservoirs on surface water resources in Ethiopia, Sudan, and Egypt during the period 2018-2022. The study found that filling the dam led to increased evaporation in the dam lake, and that if the dam is filled for a period of six years in the same way during drought periods, Egypt's share of water may decrease. There is also a study entitled Watching the Grand Ethiopian Renaissance Dam from a distance: Implications for sustainable water management of the Nile water (Abdelmohsen, K. et al., 2024). The study addressed leaks in the Renaissance Dam reservoir using an integrated approach that included remote sensing, hydrological modelling, and field observations. The most important findings of the study are that studying and addressing leakage from the Renaissance Dam will ensure sustainable development and enhance regional cooperation. Ignoring this leakage will damage the hydrology of the Nile Basin, which will mislead negotiations between the three countries. (Matthews, R., & Vivoda, V., 2023) also wrote an article entitled 'Water Wars': strategic implications of the grand Ethiopian Renaissance Dam. The study focused on the failure of negotiations and diplomatic efforts to resolve the Renaissance Dam crisis between Ethiopia, Sudan, and Egypt. This is considering Egypt and Sudan's adherence to historical treaties (1902 and 1929) and Ethiopia's rejection of them. With diplomatic efforts proving futile, will Egypt resort to military action? In a study entitled Reply to Comment on 'Egypt's water budget deficit and suggested mitigation policies for the Grand Ethiopian Renaissance Dam filling scenarios' by Kevin Wheeler et al. Essam Hakki (2022). The paper addressed the criticisms levelled at Wilder et al. in their assessment of the average total water deficit in Egypt resulting from the Renaissance Dam. Consequently, the evaluation of the social and economic impacts of the Renaissance Dam in Egypt was considered inaccurate. There is also a study entitled 'Environmental and Economic Impacts of the Grand Ethiopian Renaissance Dam in Africa' by Kamara, A., Ahmed, M., & Benavides, A. (2022). The study addressed the economic and environmental impact of the Renaissance Dam in Africa, focusing on Egypt. The study developed several scenarios for filling the dam over 3, 7, and 10 years to estimate Egypt's losses from the Blue Nile in each scenario. It also calculated the annual losses in real gross domestic product. In another study entitled The Grand Ethiopian Renaissance Dam and the Ethiopian challenge of hydropolitical hegemony on the Nile Basin by Tayie, M. S. (2018). The study addressed Ethiopia's stated development goal for the Renaissance Dam, in addition to its unstated political and strategic goals. These include imposing hydroelectric hegemony over the Nile Basin to politically and strategically isolate Egypt within its African neighbourhood. In a study entitled 'Examining the accuracy of using a single

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short-term historical flow period to assess the Nile's downstream water deficit from GERD filling: A technical note' by Heggy, E., Ramah, M., & Abotalib, A. Z. (2023). The effects of filling the GERD on water storage in the Aswan High Dam were examined for twenty different flow periods. This was done in anticipation of significant fluctuations in river flows between years, ranging from average to near average.

"Previous literature has diverged between emphasizing the positive economic impacts of the Grand Ethiopian Renaissance Dam (GERD) on Ethiopia and the adverse effects on downstream states regarding water deficits. These studies have extensively utilized remote sensing data, hydrological modeling, field observations, and various filling scenarios based on duration and river inflow variability.

However, a significant research gap remains in elucidating the multifaceted economic, political, and strategic gains for Ethiopia in direct comparison to the regional losses incurred by Sudan and Egypt. This encompasses critical dimensions of water and environmental security, geopolitical threats, and the pursuit of 'win-win' cooperative frameworks. Furthermore, there is a necessity for a comparative analysis between the socio-economic externalities of the GERD and those observed in the Mekong River Basin. This research proposes the Mekong River Agreement as a potential institutional model to facilitate collective benefit-sharing and integrated water resource management among Ethiopia, Sudan, and Egypt." Although China, as a full member, has criticised the Mekong River Agreement, this model demonstrates the effectiveness of institutional models in the absence of political consensus.

Theoretical Framework

Hydro-hegemony

Interactions between countries sharing transboundary waters range from cooperation to competition over water resources. In the event of water scarcity, there is competition to control the largest amount of water, and in the event of water abundance, countries seek to utilise water for electricity production, which is what is happening in the Ethiopian Renaissance Dam project. The motives for controlling water vary, as control can be shared, which is the positive situation of water hegemony and takes the form of cooperation. Or control may be in favour of the strongest country, through unilateral measures, which is the negative aspect of water hegemony, leading to instability in water relations between riparian countries. Or control may be disputed, which is when riparian countries are equal in power, and the dispute becomes more competitive (Zeitoun, M., & Warner, J., 2006, 444).

The process of sharing transboundary water resources is very difficult, especially in a region suffering from water scarcity, such as the Middle East

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and North Africa. Therefore, the Nile River, which is shared by eleven countries, has gained great importance as the water demand exceeds the available supply. Due to the great importance of the Nile River to the Nile Basin countries, especially Ethiopia, Sudan, and Egypt, the Nile River has historically been dominated by Egypt and Sudan. Egypt's dominance over the Nile Basin has been achieved through a set of mechanisms and tactics based on politics, law, and force. Recently, there has been an awakening among the upstream countries, especially Ethiopia, which rebelled against Egyptian hegemony by launching initiatives such as the Nile Basin Initiative, the Cooperative Framework, and finally the construction of the Renaissance Dam. Egypt has long used force to dominate the Nile River, and in the 21st century, it has worked to keep Ethiopia in a state of chaos and preoccupied with its internal issues. 'In addition, Egypt, being the most advanced in hydraulic expertise, has long manipulated the "prevailing belief among donors and competitors on the banks of rivers" to strengthen its control over water resources.' This has been done by preventing Ethiopia from borrowing from international institutions to finance water projects on the Blue Nile (Tekuya, M., 2020, 11-12).

There has been a shift in water hegemony in the Nile Basin, moving from a historically Egypt-dominated 'unipolar' system to a "contested" or multipolar system in which Ethiopia plays the role of 'rising power'. After Egypt relied on its control of physical power, represented by military and economic strength and infrastructure, in addition to legal power based on colonial-era agreements of 1929 and 1959, and soft power represented by diplomatic rhetoric based on the Nile being the lifeline, Ethiopia emerged as a counter-hegemon. This was achieved through the completion of the Renaissance Dam, which transformed Egypt's role from prevention to attempting to minimize losses by demanding a binding agreement on its operation.

After the completion and commissioning of the Renaissance Dam, Ethiopia reaped significant political, economic, and social gains. However, at the same time, there were regional losses for both Egypt and Sudan.

The Renaissance Dam in the Ethiopian Context

The Renaissance Dam represents a watershed for Ethiopia and is considered by Ethiopians to be a stepping stone to a new world away from the poverty and deprivation in which Ethiopia lives. This importance can be divided into economic, developmental, political and national dimensions.

Economic and development dimensions

One of the most important inputs that lead to economic development and increase productive activities, and the well-being of societies is fresh

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water and electrical energy. There is a direct correlation between energy consumption and economic development as it is linked to the agricultural, industrial and service sectors. Hydropower is one of the most important areas of energy production, contributing about 16 per cent of electricity production and 70 per cent of the world's renewable electricity production. There is also an inverse relationship between water and energy, as energy is used in water treatment, pumping, and desalination, and in turn, water is used to cool power plants.

Generate electricity

Ethiopia has great potential, such as waterways and highlands that enable it to produce hydroelectricity, and it ranks second after the Democratic Republic of Congo in Africa in terms of potential. Theoretically, based on this potential, Ethiopia could produce about 650 terawatt-hours per year. Ethiopia has started to develop industrial, agricultural irrigation and advanced railway projects, which have increased the energy demand. Energy demand in the past period was about 10.7 TWh/year and is expected to increase more than sixfold to 40.5 TWh/year by 2023 (Solomon, G. et al., 2016).

Ethiopia suffers from a major electricity shortage, with about 83 per cent of its population suffering from a lack of electricity. The Renaissance Dam project has received significant public and governmental support and is part of its development strategy, as it is the largest dam in Africa. The dam's electricity production will cover the Ethiopian countryside and will become a major source of electricity in East Africa in the future. Most African countries suffer from electricity scarcity, such as Rwanda, Djibouti, Tanzania, Kenya, Burundi, Uganda, Sudan and Egypt, which can benefit from the energy produced by the project. In addition to East Asian and Pacific countries and regional stakeholders such as Saudi Arabia, Kuwait, and the United Arab Emirates, who can import agricultural products from Sudan with the future regulation of the flow of the Nile River through GERD operations (El Dardiri, H., & Hussein, F., 2021).

Due to new development projects in Ethiopia and the need for more energy, the GERD is a positive signal for the development of the economy and the expansion of the power sector in Ethiopia, as well as the increase in external demand for electricity, which will enable Ethiopia to become one of the leading exporters of electricity in Africa. In addition, the increase in external demand for electricity will enable Ethiopia to become one of the leading energy exporters in Africa, increasing hard currency and strongly accelerating the country's economic growth. Regionally, the GERD will lead to the development of the East African Power Pool (EAPP), a consortium of seven East African countries (Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, and Sudan). The aim is to promote regional

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integration among countries in the region, optimise the use of existing energy resources in the region, increase energy supply, reduce the cost of electricity production, and create an attractive investment environment. This will be achieved by pooling electric power sources to provide an increase in the region's electricity rate and provide a sustainable source of affordable electricity to the region (Tesfa, B. 2013).

Ethiopia has signed a series of power export agreements with Kenya, Djibouti, South Sudan, and Sudan, as well as the construction and connection of transmission lines to transmit electricity by a Chinese company. In addition to hydropower, alternative energy projects such as solar, wind, and geothermal have been developed (Veilleux, J. C. 2013).

Improving İnfrastructure and Creating Jobs

The Grand Ethiopian Renaissance Dam (GERD) is a project that is expected to radically change the Ethiopian economy and increase job opportunities for Ethiopians, in addition to the fact that the magnitude of the project will draw the attention of the world and attract investors. With the completion of this project, Ethiopians are looking forward to a significant improvement in the standard of living and the start of a sustainable development process (Kamara, A. et al., 2022). A project such as the GERD is expected to lead to an increase in capital stock and domestic savings, as well as a significant increase in hydroelectric power supply and an increase in foreign capital due to the export of electricity to other countries in the region. As an agricultural country, Ethiopia, like most of the Nile Basin countries, relies on agriculture for its economy, and the dam will increase agricultural production due to the sustainability of agricultural seasons. Originally, Ethiopia relied on seasonal agriculture, but with the availability of water throughout the year, Ethiopia can tend to increase agricultural seasons and introduce irrigated agriculture. This will lead to an increase in agricultural products, which will lead to lower prices in the market, which will improve the living conditions of Ethiopians. This will increase the income of small households and improve the real return of unskilled labour, reducing poverty (Kahsay, T. N., et al, 2019).

The dam increases employment opportunities for Ethiopians, as a project of this magnitude needs a very large group of workers, including engineers, labourers, accountants and others. The dam opens up employment opportunities for all specialities, increasing the income of small jobs, such as women selling food to employees who work at the dam. This increases the value of local products, and women are always active in these jobs, thus increasing women's access to income-generating work. Electrification of rural areas leads to the revitalisation of rural industries and increased services in these areas, which leads to the stabilisation of citizens in these areas and the

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possibility of developing the region economically. In addition to reducing migration from rural to urban areas in search of services, this has great benefits for the implementation of balanced development programmes and the creation of job opportunities for youth at lower costs to national economies (Ahmed, A. T., & Elsanabary, M. H., 2015).

Attracting foreign investment

Ethiopia's electricity sufficiency leads to the expansion of industrial and service sectors, creating an attractive environment for investment and investors. The process of exporting electricity to other countries and adopting energy exchange in times of scarcity and transferring energy to countries suffering from power scarcity will increase economic investments between countries (Ahmed, A.T., Alsanbari, M.H., 2015: 343). It would promote economic integration in the region, which would greatly benefit Ethiopia by increasing the country's foreign exchange. According to the World Bank's 2010 report, the development of the hydropower sector leads to rapid economic growth. It can be a solution to the issue of global climate change as the energy system can adapt to these changes, and the presence of reservoirs and dams can protect against regional droughts (Tesfa, B., 2013).

The process of investing in electricity between African neighbouring countries and Ethiopia continues despite the obstacles between Ethiopia and the downstream countries of Egypt and Sudan. With the Sudanese-Egyptian electricity interconnection project, which currently stands at 80 megawatts only, the two countries aspire to reach 300 megawatts and then 1000 megawatts by developing the connection through a grid connection in the Sudanese city of Dongola. Sudan and Ethiopia are also linked to the 'Sudan-Ethiopia Electricity Interconnection Project' with about 300 megawatts. This project was made by a reciprocal agreement between Sudan and Ethiopia, with Ethiopia supplying Sudan with surplus electricity and Sudan supplying Ethiopia with surplus petrol.

Ethiopia has also achieved a grid connection between Ethiopia and Kenya in July 2024, and Charles Keter, Kenya's Cabinet Secretary for Energy, told PAMPS-Africa media that 'the new connection will be ready for operation within three months.' The Ethiopian Electricity Company (EEC) says the export to Kenya is via a $500 million line with a capacity to transmit 2,000 megawatts of electricity. According to the Ethiopian Electricity Company, the export to Kenya is via a $500 million line with a capacity to transmit 2,000 megawatts of electricity, from which Ethiopia earns about $100 million a year. The line is the longest interconnection in East Africa. One of the countries that has invested in electricity with Ethiopia is Djibouti, which started exporting electricity to Ethiopia in May 2021. The Ethiopia-Djibouti

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e-ISSN 1857-7431 (Online)

railway is an important infrastructure project in East Africa. It stretches for about 750 kilometres and connects landlocked Ethiopia to the port of Djibouti.

Cooperation between Ethiopia and Tanzania has led to agreements in multiple fields, including agriculture, culture, arts, and power trade. In 2016, the Ethiopian Electric Power Authority announced the signing of a deal with Tanzania to purchase 400 megawatts of power. The export of power from Ethiopia will increase opportunities for economic integration between Tanzania and Kenya, given Kenya's location between the two countries. Electricity sales in the first quarter of Ethiopia's fiscal year 2024 totalled $21.4 million from Djibouti, Kenya, and Sudan (Kadi, A, 2024)

Table 1: The shift from energy deficit to energy export and industrial growth

Indicator	Pre-GERD Baseline (approx. 2019-2020)	Post-GERD Status (2024-2025 Estimates)	Source-Reference
Installed Generation Capacity	~4,500 MW	~5,200 MW - 6,000 MW (Rising with ongoing GERD unit activation)	USAID(2021); Ethiopian Electric Power (EEP) Reports (2024).
GERD Contribution to Grid	0%	~17% (Based on early partial operation of two turbines: ~750 MW)	EEP Data; Al Jazeera & Reuters Reporting on Turbine Operations (2022-2024).
Industrial GDP Growth	Volatile (impacted by outages)	6.8% - 8.1% (Projected resilience due to reliable power)	IMF World Economic Outlook (Oct 2024); Ministry of Planning and Development (Ethiopia).
Electricity Exports	Negligible / Informal	Formal Agreements: Kenya (200MW), Djibouti, Sudan. Target Rev: $400M/year.	World Bank Economic Update; Kenya Power (KPLC) Official Statements.

Political and national dimension

The Renaissance Dam project is a political project to build national identity and strengthen the country's sovereignty and independence in the use of its internal resources. In 1991, the Ethiopian People's Revolutionary Democratic Front (EPRDF) took power in Ethiopia under the leadership of Meles Zenawi. It set itself the goal of creating a ‘national consensus’, i.e. ‘enabling the entire society to develop a common vision on national issues related to growth and development’. One of the projects it developed was the GERD project, which was called the Millennium Project because it was part of the larger Millennium Project. This included building a democratic system after the tribal and ethnic wars that prevailed in Ethiopia. Ethiopia has up to 80 ethnic groups with different languages, cultures and lifestyles. The Millennium Project was able to make a shift from the ‘politics of difference’

ISSN: 1857-7881 (Print)
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associated with ethnic federalism, which meant dividing the country along ethnic lines, to a focus on 'unity in diversity'. The Renaissance Dam became a symbol of Ethiopian nationalism or 'renaissance' for the Ethiopian people (Abdelhady et al., 2015).

The government was founded on the principle of a 'developmental state' after the 'Asian Tigers' of South Korea, China and Vietnam. The party saw development as its only weapon to save the country from poverty, and that it was the only thing that would keep the party in power and enable it to reshape Ethiopia. The government has initiated a range of projects against its war on poverty, building roads and railways, constructing dozens of airports and road transport terminals, and launching a programme of more than twenty large dams to provide irrigation and power to transform productivity. Simgenyo Bekele, project manager of the Grand Ethiopian Renaissance Dam (GERD), said: 'We are fighting a war on poverty, and the dam is our weapon.' The purpose of the dam is not only to provide domestic electricity but also to pave the way for Ethiopia's integration into the region, protection from instability, and recognition of Ethiopia's 'benign' hegemony in the region. This hegemony is realised by Ethiopia's access to global markets and its ability to establish good and lasting relations with the countries of the world. It is also working to link its economy with that of its neighbours in developing energy investments in exchange for hard currency. The existence of the dam could solve food, water and energy issues in Ethiopia and the region, but for former President Meles Zenawi, the ultimate reward for the dam is the realisation of his political goals (Verhoeven, H., 2021). The Renaissance Dam is a symbol of Ethiopian unity. It strengthens solidarity and reshapes Ethiopians' economic, political, and cultural dimensions, leading them to realise their obligation to cooperate in using the Blue Nile waters.

Regional Losses and Repercussions

Dams affect rivers and their water flow, and this effect extends beyond the country where the dam is located to other countries in the case of shared or transboundary rivers. The impact extends from the amount of water flowing to the environmental changes that accompany the hydrological change resulting from the reservoirs' control of water release. (Wheeler, K. 2020) In the case of the GERD, because Sudan and Egypt are clearly affected by the dam as downstream countries, Ethiopia is supposed to share transparent information regarding the filling and operation of the dam with Egypt and Sudan. This is a legal and binding obligation under international rules and laws governing shared and transboundary rivers, such as the 1997 UN Convention and the 2015 Declaration of Principles signed between Ethiopia, Sudan, and Egypt (Elnour, M, 2019).

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Impact on water and environmental security in Sudan and Egypt

Egypt and the northern part of Sudan are characterised by an arid climate, which is more vulnerable to the effects of climate change than the temperate climate. Egypt and Sudan are linked in terms of irrigation, drinking and energy production on the Nile River, which is more affected by droughts and floods. GERD has both positive and negative impacts on Sudan and Egypt in terms of water supply, floods and droughts. On the positive side, the GERD allows the downstream countries to regularise the water flow even during dry periods. Some studies conducted on Blue Nile flow trends, for example, 'The minimum and maximum flow rates of the Blue Nile are currently measured at around 200 cubic metres per second and 6,500 cubic metres per second at the Rosiers Dam in Sudan. After the Renaissance Dam is operational, the new water flow rate is calculated based on available information (total power = 6000 MW, dam height = 145 metres, number of turbines with 350 MW capacity is 15, assuming Ethiopia will only use the dam for electricity, each turbine will be shut down for 25 days for maintenance). When the dam is fully operational, the flow of water in the Blue Nile will be between 3600 and 3800 cubic metres per second throughout the year.' (Tesfa, B. 2013).

One of the negative impacts of the GERD on Egypt and Sudan in terms of water supply is that the period of filling the dam leads to a decrease in the flow of water to the two countries. Egypt is the most affected country due to its complete dependence on the Nile River, where water will decrease by between 12 per cent and 25 per cent. This will affect the reduction of water in Lake Nasser and consequently affect the High Dam, and the power produced from it. The impact also extends to industrial pumping stations, irrigation and navigation, in addition to the slow discharge that leads to increased sedimentation, which affects the land surface, the quality of drinking water and the efficiency of pumps (Abdel Halim, F. S., & Hilal, A. Y., 2015).

Due to the reservoir filling policy, net evaporation and global fluctuations in the climate, in addition to filling the reservoir by 25 per cent, it will have a significant impact on the water flow to Egypt and Sudan, especially in the initial filling period until the dam reaches a safe storage level. Therefore, Egypt and Sudan demanded that the dam be filled by 5 per cent to minimise the reduction of water flow to downstream countries. In the future, if rainfall stabilises at a constant rate, the water flowing into Lake Nasser will decrease (Zhang, Wei et al., 2015).

According to the 1959 Nile Water Agreement, the dam will affect Sudan's and Egypt's shares of Nile water. The GERD has a storage capacity of about 74 billion cubic metres, which is equivalent to the combined share of Egypt and Sudan. If the reservoir is filled at a rate of 15 billion cubic metres per year for five years, which is equivalent to 9 billion cubic metres less than Sudan and Egypt's share. This is about 16.2% of Egypt's total share, and about

ISSN: 1857-7881 (Print)
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6 billion cubic metres, equivalent to 32.4% of Sudan's total share of the Blue Nile. As a result of the GERD, water quality in canals and drains will deteriorate, and soil fertility will be affected due to sediment retention, leading to widespread drought, desertification, and reduced fish abundance by about 20-30% (Hassan, H.B., & Mohamed, A.S.A., 2018: 841-842). Egypt will face a water deficit due to the decrease in the per capita water consumption rate, due to population inflation in Egypt. This percentage will decrease to between 16.3% and 21.8% after the Renaissance Dam, forcing Egypt to resort to other solutions such as desalination of drinking water and re-purification of wastewater for irrigation, which will cost Egypt a lot (Kenawy, A.M., 2013).

Threatening the Geopolitical balance

The GERD region is a geopolitical hotspot because it is rich in natural resources such as oil, natural gas, hydropower and precious metals. Therefore, it has become the focus of attention of all major countries and has become an area of strong competition between external parties. It is also considered an area of internal instability, which is why peacekeepers and external forces of about twelve countries, including the United States of America, China and France, have been deployed there. Therefore, it is a region where political and economic alliances with major countries and between countries in the region have greatly influenced the GERD crisis. Because of Egypt's alliance with the West, in 2021, Ethiopia rejected Egypt's request to involve the United Nations, the United States, and the European Union as mediators in the crisis (Attia, H., & Saleh, M., 2021).

The period from 2011 was marked by political and economic instability across the region, and Ethiopia chose to announce its large-scale project while Egypt and Sudan were preoccupied with internal matters. On 25 January 2011, the Egyptian revolution broke out, and Egypt was in turmoil until 2014 when Abdel Fattah al-Sisi was elected president of Egypt. Due to the changes in decision-makers in Egypt, which changed more than four times during this period, the views on the GERD changed according to the internal and external policies of the decision-makers. In Sudan, it was a period of preparation for the secession of a large part of Sudan, namely South Sudan, after it was granted the right to self-determination under the Comprehensive Peace Agreement (CPA) of 2005. On 9 July 2011, South Sudan officially seceded, and this period was a period of great political and economic changes for Sudan. Sudan lost about 48 per cent of its total oil revenues, on which Sudan was economically dependent, prompting it to look for quick alternatives. Sudan sought to compensate for its oil losses by focusing on investing in agricultural projects in the Blue Nile region. Due to its need for large quantities of water, Sudan supported the construction of hydroelectric dam projects in the Ethiopian highlands, hoping to obtain additional water

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

from these dams that could be used for agricultural projects. During this period, Ethiopia stabilised politically and economically and became one of the fastest growing countries in terms of GDP, and according to the World Bank is the twelfth fastest growing economy in the world (Aljefri, Y.M. et al., 2019).

The Renaissance Dam could change the political map of the region by transforming Ethiopia's political and economic life. By bridging the energy gap and facilitating GDP growth, attracting foreign direct investment, and developing infrastructure. It will position Ethiopia as one of the economically important countries and thus increase its political value in the region. It could rival Egypt in its historical leadership roles in dominating the region. At the international political level, natural resources, especially water resources, have become a subject of interest to rich countries in terms of exploiting land to grow crops that require large quantities of water. China, India, Saudi Arabia, Qatar, and the United States have extensive agricultural projects in the region (Attia, H., & Saleh, M., 2021).

The Renaissance Dam will negatively affect Egyptian politics due to the significant economic downturn it will cause for Egypt. The lack of water leads to increased unemployment, reduced electricity generation and agricultural production, and inflation in food prices. Egypt is an agricultural country, and water shortages will lead to a decrease in agricultural production, which in turn will negatively affect the Egyptian economy and threaten internal security. This threat affects most jobs as the decline in agricultural production, crops, and grains affects secondary industries such as textiles, cotton, and others, in addition to the low per capita income derived from water (Khairi, F. 2022).

Economic environmental impact

Egypt and Sudan are both agricultural countries. The Egyptian economy heavily depends on the Nile River, and the farming and tourism sectors, such as large companies, hotels and restaurants, depend on it. These sectors provide very large employment opportunities for many Egyptians, contributing about 14.5 per cent to the gross domestic product (GDP). According to some Egyptian officials, even a 2% shortage of water would cause the country to lose nearly 200,000 acres of agricultural land that feeds 200,000 families and provides employment opportunities for about one million Egyptians (Khairy, F. 2022).

Egypt's economic development plans are based on its water quota of 55.5 billion cubic metres as set out in the 1959 agreement. Any decrease in the quota will lead to major losses, including a decrease in agricultural land by about 9 to 12 billion cubic metres. As Egypt suffers from a shortage of agricultural land, it started desert reclamation programmes to cope with the large population increase. The agricultural sector is one of the most labour-

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

intensive sectors, with about 6.5 million workers, so any decrease in water will lead to high unemployment rates. Egypt suffers from a water deficit as its per capita share is lower than the average per capita share globally, and with water shortage, Egypt will have to desalinate or reprocess water, which will increase its expenditure (Kenawy, A.M., 2013).

Due to Egypt's large population increase, Egypt imports about 60 per cent of its food needs. From 2013 onwards, food imports began to increase. In 2013, about 49% of food needs were imported, and in 2017, about 65%-75% were imported (Hassan, H.B., and Mohamed, A.S.A. 2018: 844). As for Sudan, agriculture will be affected by the lack of water and the dam's detention of silt, which is the reason for the fertility of agricultural land in Sudan, and the lack of sediment reduces the fertility of the soil, forcing farmers to use fertilisers (Al-Nour, M, 2019).

The Renaissance Dam affects electricity production in both Egypt and Sudan. For Egypt, the GERD will hurt electricity production and will cost it a lot to cover this deficit and will economically deplete it. In 2008, Egypt lifted energy subsidies, a burden on the state budget of about £120 billion, equivalent to $17.2 billion, and cancelled subsidies for energy-consuming industries. The High Dam produces approximately 10 to 12 per cent of the energy produced in Egypt, and the construction of the Renaissance Dam will significantly affect the High Dam, so Egypt must find alternatives to cover this deficit. Alternatives to hydroelectricity include wind, solar, waste recycling, nuclear energy, or resorting to fossil fuels through oil or gas, which is very expensive for the Egyptian economy (Kenawy, E.M. 2013: 6-7). As a result of the low water level reaching the High Dam, the reduction in electricity production at the High Dam ranges between 25 and 40 per cent (Hassan, H.B., & Mohamed, A.S.A., 2018).

As for Sudan, the impact of the dam on Sudanese dams is very clear. In the Merowe Dam in northern Sudan, the average annual production before GERD ranged from about 6465 GWh, and after the dam will decrease to 6333 - 5668 GWh, with an average monthly production ranging from 539 - 474 GWh if the reservoir is filled for the first time for 6 years. In addition to a 5% reduction in the deficit in the summer period (January-June), there will be a 2-12% reduction in electricity generation compared to the initial level, and the deficit will increase by 2-22% in July and 33% in October (Elnour, M, 2019).

A positive impact of the GERD is that it can enhance regional co-operation by allowing Sudan to import electricity from Ethiopia. Sudan suffers from electricity instability, and GERD can cover this deficit, in addition to the fact that hydropower is considered a clean energy that reduces air, water, and waste pollution when compared to thermal energy. A transmission line from Ethiopia to Sudan was constructed in 2011 with a total capacity of 200 MW, and by 2021, the transmission line will be completed to reach 500 kW. The

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

energy trade between Sudan and Ethiopia is expected to generate revenues of US$400-500 million per year (Elnour, M. 2019).

Balance of Benefits

Theories of international relations have mapped out the type of relations between countries that share a common water resource. Realists believe that a state should acquire water resources outside its territory because it fears that other states will use these resources against it, which is known as the security dilemma. Neo-realists, on the other hand, promote co-operation between countries sharing water resources, but are linked to the theory of hegemonic balance, which sees the dominant state in the basin determining the terms of co-operation. Liberalism, on the other hand, recognises mutual gains and cooperation for the benefit of all, and believes that regulating the management of transboundary water resources is the greatest encouragement for cooperation, but it must be done legally. Marxist theory speaks of resource scarcity leading to global and local inequalities, and that this is one of the causes of conflict between countries; however, basin management varies from country to country and depends on the issues they face (Maden, T.E. 2013).

The Nile Basin is one of the poorest and least developed regions in the world. Because of the significant challenges faced by the Nile River, the Nile Basin countries can be a catalyst and an opportunity to promote regional and international economic cooperation and interdependence that can enable them to become regional and international trading partners. Through effective water management, the overall benefit of all Nile Basin countries can be realised. The unilateral development of each country in the basin is considered an unbalanced development process with its consequences of promoting conflicts between the basin countries and poverty, which leads to a loss for all.

Co-operation on the Nile River has been taking place since ancient times in the form of bilateral agreements or the form of regional integration and co-operation. Bilateral agreements began in the colonial period in 1891 with a protocol between Italy and Britain on behalf of their colonies in the Nile Basin, followed by agreements between Ethiopia and Egypt, Sudan and Egypt in 1929, 1959 and others. Regional cooperation in the Nile Basin began with the formation of the Hydrometeorological Survey of Lake Victoria, Kyoga, and Albert Watersheds (Hydromet Project) in 1967. One of the most important co-operations between the Nile Basin countries was the establishment of the Permanent Joint Technical Commission (PJTC) by Egypt and Sudan after they signed the Nile Water Partition Agreement in 1959. The PJTC played a key role in the establishment of the Hydrological Survey Project (HYDROMET) in 1967. The United Nations Development Programme (UNDP) funded the project and implemented by the World Meteorological Organisation (WMO), based in Entebbe, Uganda. In 1992, an agreement was signed to establish the

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Technical Committee for Co-operation for the Integrated Development and Environmental Protection of the Nile Waters (TECCONILE).

The TECCONILE Initiative started with six countries and included joint action plans of interest to most basin countries, such as the D3 project, which deals with a collaborative framework. The initiative consisted of an expert committee composed of technical and legal specialists, three from each country, funded by the United Nations Development Programme (UNDP). In 1999, the Technical Advisory Committee (TAC) was formed, replacing the TECCONILE Initiative, as a transitional body to advise and oversee co-operation between riparian states. In February 1999, the Nile Basin Initiative (NBI) was signed, which aims to achieve sustainable development in the socio-political sphere through the equal exploitation of the common potential offered by the Nile Basin. The NBI is funded by the World Bank, the Canadian International Development Agency (CIDA), the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), and others (Metawie*, A., 2004).

To work towards the convergence of interests between Egypt, Sudan, and Ethiopia, diplomatic methods can be used to work towards mutually satisfactory solutions. Traditional diplomacy should not be used, but water diplomacy should be used because it specialises in the crisis. While there are different definitions of water diplomacy depending on the context, they are characterised by certain elements, namely that water diplomacy is a part or branch of traditional diplomacy, but specialised in water. The core element of water diplomacy does not rely on traditional diplomatic interactions only, but involves most state and non-state actors. This participation varies from one level to another and is referred to as 'multi-track water diplomacy'. One of the distinctive elements of water diplomacy is that some scholars associate water diplomacy with positive solutions and 'win-win solutions'. Finally, it is argued that the use of water diplomacy can contribute to regional development, stability, and peace (Sehring, J. et al., 2022).

Africa is known as a poor continent, and due to inherited problems such as wars, poverty, diseases, and migration of human resources, it is at a crossroads between rising and sinking. One of the most volatile areas is the Nile River Basin, which is characterised by great opportunities for development and renaissance. This is through cooperation and joint development, working to increase the flow of the Nile and the possibility of cooperating to tackle poverty and resolve conflicts between and within countries. One of the most important reasons that supports the idea of cooperation to save and benefit from the Nile River region is: The quality of the Nile water is decreasing due to the degradation of the ecosystem through pollution from industrialisation and the use of pesticides and fertilisers. Soil degradation is increasing due to desert encroachment caused by deforestation.

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Basin countries must adopt a comprehensive and integrated approach that includes resource development, environmental management, and environmental protection at both local and regional levels.

One of the reasons for the inevitable co-operation is famine and drought in the Nile Basin countries. There is a severe food shortage because most of the basin countries rely on rain-fed agriculture and due to erratic rainfall and climate change, most agricultural crops fail. Therefore, the Nile Basin countries must take advantage of the Nile River for irrigation. Also, the population of the Nile Basin countries has increased dramatically, as the population of the Nile Basin countries in 2000 reached about 300 million people and is expected to reach 812 million people in 2040. As the population increases, so does the demand for food, water, and services, so if each country in the basin unilaterally exploits the shared water resource, it will inevitably lead to conflict.

There is the issue of silt deposition that affects Sudanese and Egyptian dams, as it leads to a decrease in the water level in the Aswan Dam. Floods also significantly affect irrigation projects and dams in Sudan. Water evaporation, where up to 25 billion cubic metres are lost annually in the dam area in Sudan. About 30 billion cubic metres are lost annually in the Bahr el Ghazal basin and in the swamps that block the Sobat River. One way to minimise evaporation is to build dams in non-arid climatic zones. Building dams in the cooler highlands of Ethiopia could save water for Sudan and Egypt by conserving water that would otherwise evaporate. The absence of a legal framework for the management of the Nile River and the failure of the Nile Basin countries to agree on historical agreements can lead to countries acting unilaterally on Nile waters, which increases conflict between countries. Although the Nile's water availability is sufficient to meet all the needs of the basin countries, less than half of it is currently utilised due to the lack of proper and joint management of the river (Walilegne, Y. T. 2004).

The areas of cooperation between the countries of the Eastern Nile region, represented by the three countries (Egypt, Sudan, and Ethiopia), can be summarised in the areas of water, energy and food resources. For example, Egypt is highly efficient in the field of agricultural development, as it has relatively good irrigation systems. On the other hand, Sudan suffers from poor irrigation systems, such as inefficient water use, poor maintenance of canals, and water shortages, which have led to stagnation in irrigated agriculture, as 1 per cent of Sudan's arable land is irrigated through irrigation. Some of the regional projects that could be jointly undertaken by the three countries are technical cooperation, agricultural mechanisation, food trade and ecotourism, and water resources protection. These projects are low-cost, politically feasible, and well-suited to address global climate change. There are also issues of electric power and rainwater harvesting, which is an important

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

process due to the appropriate amount of rainfall in the region, but the unbalanced distribution of rainfall and low rainfall towards the north, while it rises in the runoff areas in the Ethiopian highlands and southwestern Sudan, is characterised by climate variability.

The lack of trust, political will, and a sense of injustice due to the historical Nile agreements, especially the 1929 and 1959 agreements between Egypt and Sudan, are among the most important challenges that can face co-operation and joint projects between countries. Ethiopia and Sudan have started a joint project to develop early warning systems for floods, with the partial participation of Egypt, which allows for transparent information sharing that enhances trust between the three countries (Al-Saidi, M., & Hefny, A., 2018).

The Mekong River as a Comparative Model

The Mekong River is one of the rivers shared by several countries, including China, Myanmar, Cambodia, Thailand, Laos, and Vietnam. The river is about 4909 kilometres long, has a high biodiversity, and is one of the most important freshwater systems in the world. About 65 million people live in the river basin and depend on the river for their livelihoods, food, and trade. The diversity of environmental conditions and habitats in the river's aquatic life comes from the variation of annual rainfall between low and high levels. A range of hydroelectric dams have been constructed in the Mekong basin and branches in the Sesan, Sekong, and Srepok regions in northeastern Cambodia; the Central Highlands of Vietnam and southern Laos; the Khouni Falls in southern Laos; the Lower Mon River Basin in northeastern Thailand; and the Upper Mekong River in Yunnan Province, China, northeastern Myanmar, northern Laos, and northern Thailand (Soukhaphon, A. et al., 2021).

Since the 1980s, the Mekong River has changed due to the construction of dams that have altered the nature of the river. As of 2010, three hydroelectric dams were in operation, two dams were under construction, completed in 2012 and 2017, and by 2030, in China's Greece region, there will be a series of seven dams. With only five dams in operation, China will be able to regulate water flow, reduce flood risk, and raise water levels during droughts (Osborne, M., 2010).

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Map showing dams on the Mekong River

The map was designed by the researcher using Python software.

As the Mekong basin countries competed to build dams, conflict began to emerge between the countries of the river. In the 1960s, the Mekong River countries began planning to build dams on the river, and in the 1990s, the Mekong River countries established a committee to organise and cooperate between them, but China and Myanmar were left out of this committee, which included the four downstream countries (Laos, Thailand, Cambodia, and Vietnam). Tensions escalated in the 2000s when China and Laos began building large dams without coordinating with the rest of the basin. Initially, the effects of the dams on the river were not visible, but since the early 2010s, negative environmental and economic impacts have become apparent, especially in Cambodia and the Mekong Delta in Vietnam.

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

"Hydropower infrastructure has profoundly reshaped the Mekong River Basin states (China, Laos, Thailand, Cambodia, and Vietnam), triggering a fundamental structural transformation from river-dependent agrarian economies to industrializing states focused on energy exportation. However, this transition has incurred substantial environmental and socio-economic costs. These shifts, particularly the trajectory of the Lao PDR, offer a significant comparative framework for assessing the projected economic transformations in Ethiopia following the completion of the Grand Ethiopian Renaissance Dam (GERD). The following table provides a rigorous comparative analysis of the evolution within the energy and industrial sectors of both nations."

According to economic reports and data released by the World Bank, the International Hydropower Association, and national energy budget reports in Ethiopia and Laos for 2024-2025, a comparison was made between the energy sector and industry before and after the dams.

Table 2: Energy and industry sector in Ethiopia and Laos

Indicator	**Ethiopia (Post-GERD Completion)**	**Lao PDR (Post-Mekong Boom 2024/25)**
Total Installed Capacity	10,000 - 11,000 MW	12,500 MW
Hydraulic Dominance	GERD (5,150 MW) accounts for ~50% of national grid.	Mekong Mainstream Dams (11 projects) account for ~80%.
Export-to-Consumption Ratio	15-20% (Regional integration: Sudan, Kenya, Djibouti).	80% (Export-oriented model: Thailand, Vietnam, Singapore).
Industrial Growth Rate (YoY)	10% - 15% (Focus: Light Manufacturing, Textile, & Agro-processing).	4% - 6% (Focus: Extractive Industries & Mineral Processing).
Electricity Access Rate	Increased from 45% to 60% (Universal Access Target 2030).	Reached 95% (High domestic tariffs despite surplus).
Financing Mechanism	Sovereign Domestic Funding (National bonds & public contributions).	Foreign Direct Investment (FDI) (Canton-led BOT & Concession models).
Debt-to-GDP Ratio	50% (Strategic management despite macro-pressures).	120% (Critical levels due to power-sector external debt).
Strategic Paradigm	Inward-looking Industrialization: Energy as an input for domestic value-addition.	Outward-looking Resource Frontier: Energy as a commodity for rent-seeking & debt servicing.

"A comparative assessment of the hydropower trajectories in Ethiopia and the Lao PDR reveals two distinct models of the Developmental State. Ethiopia's strategy, centered on the Grand Ethiopian Renaissance Dam (GERD), epitomizes an inward-looking industrialization paradigm. By utilizing sovereign financing, Ethiopia aims to leverage its massive energy surplus as a primary input for domestic value-addition, particularly in the

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

manufacturing and textile sectors, thereby seeking to transition from an agrarian economy to a regional industrial hub.

Conversely, the Lao PDR has adopted an outward-looking resource frontier model, often described as becoming the 'Battery of Southeast Asia.' While this has resulted in a rapid increase in total installed capacity, the reliance on Foreign Direct Investment (FDI) and the Build-Operate-Transfer (BOT) mechanism has led to a high degree of external debt and a primary focus on energy as an export commodity rather than a driver for local manufacturing. Consequently, while both nations have achieved significant milestones in energy generation, Ethiopia's model prioritizes economic sovereignty and internal industrial transformation, whereas Laos remains vulnerable to the fluctuations of regional energy markets and external debt servicing."

In April 1995, the Cooperative Agreement for Sustainable Development in the Mekong River Basin and the Protocol on the Establishment and Operation of the Mekong River Commission were signed. The agreement brought together four of the six lower river riparian countries: the governments of the Kingdom of Cambodia, the Lao People's Democratic Republic, the Kingdom of Thailand, and the Socialist Republic of Vietnam. The agreement includes 'a set of mutually acceptable and equitable cooperative objectives and principles to achieve sustainable development and optimise the use of water and related resources and the environment in the Mekong River Basin'. It also establishes an institutional mechanism to implement the substantive provisions of the Agreement, which is an intergovernmental organisation with three main bodies and functions to make decisions and carry out activities (1995 Agreement & Procedural, 19_Nov_2020).

China's situation with the other Mekong countries is similar to Ethiopia's situation with the downstream countries, Egypt and Sudan. China is not a member of the 1995 agreement, but it participates as an observer in the meetings and case of floods, informs other countries of hydrological data, which in itself is a step towards building trust between the basin countries. The experience of the Mekong River reflects the importance of a permanent institutional mechanism for consultation, negotiation and transparent information exchange regarding the river and the impact of major projects on the flow of water. It also reflects the importance of a permanent institutionalised mechanism for consultation, negotiation, and the transparent exchange of information regarding the river and the impact of large-scale projects on water flow.

In this sense, the Mekong experience can be utilised in the case of the Renaissance Dam by enhancing technical cooperation between the Nile Basin countries and establishing a joint mechanism for benefit-sharing and

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

monitoring water resources, achieving a balance between the right to development and the right to equitable use of water.

Conclusion

The Renaissance Dam project is one of the major projects that will significantly alter the political, economic, and social landscape of Ethiopia from local, regional, and international perspectives. From a financial point of view, the main objective of the dam is to generate electricity to meet internal needs and address electricity shortages. It will increase opportunities for rural development and industrialisation, as well as increase exports through investment and the export of electricity to neighbouring African countries. The dam improves infrastructure and reduces unemployment by creating job opportunities. Politically, the project strengthens national sovereignty by enabling the country to exploit its internal resources positively. Ethiopia is one of the countries with great potential in terms of natural resources, the most important of which is water resources, whether from rivers or the amount of rainfall. It has a large youthful human capacity, but it suffers from poverty and famine due to the lack of proper management of its resources. The dam also serves as a national project that has been able to unite Ethiopians under one banner despite the diversity of society and the fact that Ethiopia is originally a tribal society. The impact on the social aspect is that it affects the living environment of Ethiopians and lifts them out of poverty.

But at the same time, these gains are coupled with losses from a regional perspective, as the dam affects Sudanese and Egyptian water security, leading to a change in the water flow pattern, which in turn affects agriculture because Egypt and Sudan depend on the Nile and also on fresh water used for drinking. Sudan and Egypt are concerned about the dry periods and the filling of the dam, which will greatly affect the flow of water, leading to the failure of agricultural crops and the failure of the dams to generate the usual amount of energy in the two downstream countries. In addition to the changes in the geopolitical balance between the basin countries and Ethiopia's dominance in the political arena in the region. It will also open the way for international powers such as China and Israel to have a presence in the region, which will affect regional security. Sudan and Egypt are also concerned about the damage to the riverine environment of the Blue Nile and the Main Nile, and the damage to the environment surrounding the river.

In an attempt to find convergence and balance the divergent interests of the three countries, the paper examined how to achieve joint development through cooperation in water and non-water projects that achieve a common profit for all. By activating water diplomacy and using the dam to cooperate between countries and reach satisfactory solutions for all parties. Citing some international examples, we find the Mekong River in Asia and the issues

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

between the basin countries that have suffered from the dams built in the river basin. These issues were dealt with by establishing an international committee to manage the affairs of the basin, and an agreement was signed in 1995 to cooperate and develop the sustainability of the river. The Nile Basin countries in general and the East Nile countries in particular (Ethiopia, Sudan, and Egypt) should establish a committee to manage the river, and make a legal commitment through effective agreements, the main objective of which is the common benefit of the countries and the development and sustainability of the river. Work to strengthen regional cooperation by adopting water and non-water projects such as agricultural projects, common markets, energy projects, and others. Despite the use of regional and international mediation during the negotiations, which ended in failure, such mediation must be supported by legally binding obligations on the parties.

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