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GRAND ETHIOPIAN RENAISSANCE DAM (GERD) AND EGYPT WATER SECURITY

Abdelrahman MOHAMED

Graduate Student, Sakarya University Institute of Social Sciences, Department of International Relations, Sakarya/Turkey



ABSTRACT

This paper is addressing the Ethiopian dam impacts on the Egyptian water and human security from water security approach. First, the paper will address the conceptual framework of the water security approach. Second, the case study is Egyptian water security and how the Ethiopian Renaissance dam will impact on it. This paper tries to discuss the conflict between upstream countries and downstream countries in their rights to exploiting the Nile River water. Do the upstream countries have the right to develop the water, which flows in their own land, in a way to enhance their people life, and should the downstream countries defend their rights of the water which naturally flows to their lands. I will address the relationship between variables through exploring Nile basin countries relations and the historical agreements in post-colonization period and then addressing the impacts of the Ethiopian Renaissance Dam on the Egyptian water security. Then, how the water security issue could affect human security, as a result.

Key words: Ethiopian Dam, Water Security, Egyptian water security

1. INTRODUCTION

Water is the most important component of the people's life. Societies were historically founded beside water flows. This paper addresses the danger of Ethiopian renaissance dam (GERD) on Egypt water security which also threaten human security of the Egyptian people. GERD is a new project in which Ethiopian are building recently on the blue Nile in order to produce a huge amount of electricity to enhance people's life there as Ethiopia is considered one of the poorest countries of the world, and this project would make shift to the country's economic situation, but in return this project will have a great implications on the Egyptian side. In this paper I will address Nile basin countries relations between conflict and cooperation and the impacts of the GERD on Egypt water security.

2. WATER SECURITY CONCEPT

Water has always played and continues to play, a central role in human societies (Grey & Sadoff, 2007: p. 546). Water is a source of life, livelihoods and prosperity traditionally security is referring mostly to state safety from external military threats. Recently, other security issues have risen which are not less important than the traditional ones, such as food security, environmental security and energy security.

Unlikely other security issues, water security does not have a definition agreed-upon since it has emerged in 1990s. The Global Water Partnership first defined water security as " at any level from the household to the global, means that every person has access to enough safe water at affordable cost to lead a clean, healthy, and productive life, while ensuring that the natural environment is protected and enhanced" (Beek Van, & Arriens Lincklaen. 2014: p. 11). Water security is not just related to the absence of water, but also to its presence as a threat. Water security has been defined by Grey and Sadoff (2007) as " availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to

people, environments and economies" (Grey & Sadoff, 2007: p. 546). The United Nations have also agreed upon a general definition on water security as " the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability" (Summer, 2016).

Global Water Partnership definition is addressing the right for each person, area or country to access the watersheds. In particular, this definition underlines the importance of easy accessibility of water also in relation to individual consumption. Moreover, water cost should be affordable for people to pay for. The quantity and quality of water should be met for clean, healthy and productive life. Grey and Sadoff definition is also addressing the availability of water as well as the quality; however, they also highlight an acceptable amount of water related risk is not determined only by water absence but also its abundance could cause threats.

Water security definitions are emphasizing on the accessibility, sustainability and availability of watersheds which are very important to secure water security requirements. In relation to the human security, this term meaning is "first safety from such chronic threats as hunger, disease and repression. Second, it means the protection from sudden and hurtful disruption in the patterns of daily life whether in homes, in jobs or in communities" (UNDP, 1994). In line with this, it is obvious that water directly affects human security requirements such as economy, food, health and environment. Thus, access to water in terms of access to water supply for people and communities as well as of sharing management of transboundary water resources is essential to achieve human security. Regarding, the human-centric arguments people are the referent object which is different from state-centric arguments in which considering that the state is the referent object (Collins, 2007: p. 94).

The core themes of water security seem to include water availability, vulnerability, accessibility, and sustainability.

- ✓ *Water availability*: the amount of annually renewable water.
- ✓ *Water sustainability*: defined as the use of water that supports the ability of human society to endure and flourish into the indefinite future without undermining the integrity of hydrological cycle or the ecological systems depends on it.
- ✓ *Water accessibility*: refers to the rights or the ability or individual or households to have an access to adequate quantities of affordable and safe drinking water and basic sanitation
- ✓ *Water vulnerability*: refers to the danger to which a region or water system is susceptible to the physical threats such as hazards or adversarial communities to cope with those threats (He; Zhang; Zhang & Eslamian, 2014)

3. NILE BASIN COUNTRIES BETWEEN CONFLICT AND COOPERATION

The Nile River is a lifeline for many African inhabitants where ten countries are sharing the Nile's water (Egypt, Sudan, Ethiopia, Tanzania, Uganda, Burundi, Rwanda, D.R. Congo and Kenya) and along the modern history there are conflict and co-operations between Nile Basin countries for guaranteeing their water right on the Nile. Nile basin countries are divided into upstream and downstream countries. As a result of the demographic growth and climate changes, Nile countries are seeking to ensure their rights on the water, or developing their use of water in a way which could serve their people's good.

Nile basin countries are covering a space of 301 million KM², and the Nile River is considered as the longest river in the world by 6600 KM length. The main source for the Nile water comes from Ethiopia the East side of Nile and the other sources come from the equatorial lakes.

Egypt, which is downstream country is depending basically on the Nile water where more than 95% of its water stems from Nile (Elagroudy; Shafiq & Mokhtar, 2014). The dependency of Egypt on the Nile water put her in a position of observing opposing any development projects of basin countries on the Nile River which could affect its water share.

Through modern history there were many treaties which drew the water shares and the cooperation form of the Nile basin countries to keep the water security for them, and especially the downstream countries. The main conflict points are;

- ✓ Downstream countries: requiring the safety of their water shares in order to keep their society in save, but
- ✓ Upstream countries: they want to develop and exploit the existed water which comes out from their lands by building some developing projects which would rise their economic situation considering that all basin countries are among the category of the 47 "least developed countries" except Egypt and Kenya.

The treaties are divided into two categories; colonization period treaties and post colonization treaties. In colonization treaties Britain played the role of the main partner in shaping the treaties. Egypt was one of the most important territories for Britain because of its important geographic position and its Suez Cannel which was the main trading road for Britain to and from India. Britain was considering the safety of Egyptian water which somehow will play a role in saving its trading road. One of the most important treaties was 1929 made between Egypt and Britain which granted 48 km³ per year to Egypt and 4 km³ per year to Sudan institutionalizing the belief that Egypt and Sudan had 'natural and historic rights' to the Nile water" (Atlas, 2001). This treaty is one of the most important treaty which Egypt is depending upon in the negotiations to proclaim its historical rights of the water, however the Ethiopian side refusal of this treaty as it happened in the colonization period. The other type of treaties is the post colonization type. Because of the high dam building in Aswan, Egypt and Sudan agreed alone on new agreement in 1959 which considered the new situation of water sharing of the new dam. According to the treaty the Egyptian share of water increased to be 55.5 km³ per year and for Sudan 18.5 km³ per year (Atlas, 2001). Considering also the evaporation of 10 km³ per year over Lake Nasser. This amount is approximately 100% of the Nile water which is not allowing any other basin country to exploit the water. This treaty also had been refused by upstream countries as they were not considered on it.

Because of those treaties the conflict level and tones of statements increase in a level that in 1979, President Anwar Sadat said: "The only matter that could take Egypt to war again is water" (Kameri, 2007). Also, from the Ethiopian side there were a lot of extreme statements in which emphasizing in the Ethiopian tends to exploit the water inside their boundaries. As Haile Selassie was quoted as saying,

"We have already explained the plans under construction to utilize our rivers as an essential step in the development of our agriculture and industry, it is of paramount importance to Ethiopia, a problem of first order that the water of Nile be made to serve the life and the needs of our beloved people, now living and those who will follow us in centuries to come. However, generally Ethiopia may be prepared to share this tremendous God-given wealth of hers with friendly nations neighboring upon her, for life and welfare of their people, it is Ethiopia's sacred duty to develop population and economy" (Kameri, 2007).

After several efforts in order to gather the whole Nile basin countries, for the first time those efforts had succeed. In 1999 for the first time the whole basin countries set together in order to shape the future usage and security of Nile water resources and how to develop those resources in a win-win situation for each country. Nile Basin Initiative (NBI), is one of the most important treaties in the recent history of Nile basin countries. The treaty aimed to solve the unfair treaties of the colonization

period and other treaties between two countries or more without including the others. The initiative had established in order to have an effective mechanism to cooperate and to ensure fair usage of water resources without harming other countries water security. NBI focused on the following;

- ✓ Developing water resources of the Nile in a way which sustainably ensure the secure and peace for all Nile basin people
- ✓ Working on effective management of the water between Nile basin countries, and on the best usage way of water resources
- ✓ Working on the common cooperating mechanisms between Nile basin countries
- ✓ Working on eradication of poverty and economic development for the basin countries
- ✓ Ensuring the cooperation program effectiveness between the countries and moving forward to the executive level.

One of the conclusions of the initiative which we need to mention is *the Nile basin countries have the right to use the water resources within their boundaries, but without causing severe damage to other countries*. After this Initiative it seemed that finally the conflict will move to cooperation, and for almost 10 years there were quit negotiations between the countries until the recent years. In the last few years some requirements have been appeared which asked for the abolition of some points related to the historical rights of Egypt and Sudan on the Nile water. In May, 2009 Kinshasa meeting in Congo reviewed some points in order to change it. Those points summarized as;

- ✓ Cancelling water security article which ensuring the historical right of Egypt and Sudan on their share of the Nile water
- ✓ Asking for amendment for that article with other members
- ✓ Moving this article and reviewing it in the future

To accept the new negotiation, the Egyptian side put three conditions;

- ✓ The necessity of placing a clear text ensuring the Nile water share of Egypt and Sudan
- ✓ Upstream countries should notify downstream countries before making any project on the Nile
- ✓ All decisions related to amending any article should be according to consensus not the majority. If they agreed to apply the majority, Egypt and Sudan should have the Veto right

After several months, new meeting had been held in Egypt 2010. The final declaration summarized that some of the Nile basin countries had decided on a new agreement. In May 2010 the signature process, for the Cooperative Framework Agreement (CFA) by the upstream countries in a meeting which held in Uganda, started. The first signatories of the draft CFA were Ethiopia, Rwanda, Uganda, and Tanzania. Kenya welcomed (CFA) and signed it after days from the meeting. Egypt and Sudan refused to sign the Entebbe treaty. And finally, under the revolution events in Egypt, Burundi signed the treaty to be the sixth country signing the treaty March 2011.

3.1. Ethiopia – Sudan Relations

After the world war two the historical relationships between Ethiopia and Sudan had changed. There are many reason could justify this shift in the relations between the two countries, like the fascist military junta regime in Ethiopia back then which continued from 1973 to 1991. Also, the extremist groups in Sudan that time which Ethiopia meant to be a target for them. Ethiopia built there foreign policy with the “siege mentality” as it was surrounded by her enemies. The treaty of 1959 between Egypt and Sudan which was, as mentioned above, related to the Nile water reallocation between the two countries excluding Ethiopia the main source of the Blue Nile, which meant as insult for Ethiopia.

After establishing the establishment of the Federal Republic of Ethiopia 1991 by the EPRDF coalition¹, in which Sudan was supporting it by providing aid through its borders. The two countries relation, Ethiopia and Sudan, from that time had changed and it was based on peace settlement and strategic relations between its neighbors.

After all the Sudan has agreements for hydropower energy purchase from Ethiopia, supplies oil to Ethiopia, is undertaking activities for Ethiopia's use of its ports, enjoys strong border security and repatriation agreements and even hosts thousands of Ethiopian troops in its territory. Hence, she was with no inclination to spoil it all for Egypt, with no credible plan for triumph, and especially over a dam that is actually in her national interest. That's probably why Sudan moved even closer to Ethiopia as time goes by and its statements on GERD has become softer and softer and even positive up to a point in which Sudanese citizens residing in Ethiopia started to invest in the GERD bonds (Berhane, 2016).

It is clear now that the Sudan foreign policy is moving forward interdependence relations with the Ethiopian side due to the strategic benefits for the two countries and moving forward to accept the dam project and signing the CFA agreement.

4. GRAND ETHIOPIAN RENAISSANCE DAM (GERD)

The Grand Ethiopian Renaissance Dam (GERD), formerly known as the Millennium Dam, is under construction in the Benishangul-Gumuz region of Ethiopia, on the Blue Nile River, which is located about 40km east of Sudan. The project is owned by Ethiopian Electric Power Corporation (EEPCO)². GERD power generation capacity has been upgraded to 6450 MW. Firstly, the Dam designed to generate 5250 MW, but some upgrades happened to the design in order to generate 6000 MW. Finally, other upgrades on the design have been made to produce more 450 MW. At the end of the works, the Grand Ethiopian Renaissance Dam will be the largest dam in Africa: 1,800 m long, 155 m high and with a total volume of 74,000 million m³.

The declaration of building the Dam came after the events which occurred in Egypt. After dismissal of Mubark regime through a peaceful demonstration January 25, 2011, Ethiopia declared on March 30, 2011 that the Dam now is under construction. However, according to the company site the building operations have started on December 2010 3.

There are several reasons behind building dams in the countries like; the need for reliable electricity for economic development; flood control; potential fluctuations due to localized climate change; the large potential of hydropower in under developed river basins; population pressure; and the desire of poor countries to develop through all available means. Ethiopia has some of those reason in which made her planning and executing building Grand Ethiopian Renaissance Dam (GERD) (Veilleux, 2013)

¹ The Ethiopian people's Revolutionary Democratic Front is composed of four regional parties: The TPLF of Tigray, OPDO of Oromia, ANDM of Amhara, SNNDM of the southern Region. There are also nonmember parties affiliated with the EPRDF in all the regions of the country. In 2012, following the death of former prime minister Meles Zenawi, parliament elected Hailemariam Desalegn as his successor. In national parliamentary elections in 2010, the EPRDF and affiliated parties won 545 of 547 seats to remain in power for a fourth consecutive five-year term.

² Grand Ethiopian renaissance dam project, Benishangul-Gumuz, Ethiopia. Water technology. <http://www.water-technology.net/projects/grand-ethiopian-renaissance-dam-africa/>

³ The Grand Ethiopian Renaissance Dam. From the company website, Salini impregilo, <https://www.salini-impregilo.com/en/projects/in-progress/dams-hydroelectric-plants-hydraulic-works/grand-ethiopian-renaissance-dam-project.html>

4.1. The Dam Impacts On Downstream Countries Egypt

Table (2) the development of water resources and their uses and water balance in billion cubic meters In the Arab Republic of Egypt during the period (2002 / 2003-2024/2025)

Source	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2024/2025
Share of Nile Water	55.50	55.50	55.50	55.50	55.50	55.50	55.50	55.50	57.50
Groundwater in the Valley and Delta	6.10	6.10	6.10	6.10	6.10	6.10	6.10	6.20	8.80
Recycling Agricultural Drainage Water	4.40	4.80	5.10	5.40	5.70	5.70	5.90	5.90	7.00
Rain and Floods	0.90	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.40
Seawater Desalination	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Total Water Resources	68.26	68.76	69.16	69.56	69.96	69.96	70.16	70.36	76.86
Use of Water For Agriculture	57.80	58.10	58.50	59.00	59.30	59.30	59.30	59.30	61.80
Evaporative Losses From The Nile And Canals	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Drink and Health Care	5.40	5.60	5.80	6.10	6.50	6.50	6.50	6.50	9.50
Industry	1.10	1.10	1.15	1.15	1.15	1.15	1.15	1.15	6.50
River Navigation and Balances	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total Water Uses	66.60	67.10	67.75	68.55	69.25	69.25	69.25	69.25	80.10
Water Balance	1.66	1.66	1.41	1.01	0.71	0.71	0.91	1.11	3.24

* Estimated data.

Source: Ministry of Water Resources and Irrigation, Water Distribution Sector, unpublished data 2009/2010.

Total water uses will reach about 80.10 billion m³ during the same year, and the average share of individual from water in Egypt is about 625 m³ for the individual per year, which is expected to drop to about 350 m³ by 2050, while the global water poverty is about 1,000 m³ for individual, and it seems clear the current and future difficult water position for Egypt, which makes the lack of revenue as a result of storage dams projects in upstream countries a reason for many negative results in Egypt (Elagroudy; Shafiq & Mokhtar, 2014).

5. THE IMPLICATIONS OF THE RENAISSANCE DAM ON EGYPT:

Electricity: If Ethiopia is committed to fill the dam as it announced during the six years with an average of 16 billion cubic meters per year that are deducted from revenue and implication will be according to flood situation:

Flood	Water decline in the Nasser lack (M)	Total loss of water	The reduction on the electricity generation
higher than the average	10-13 meters	43-53 billion m ³	16-21%
average	16-22 meters	63-78 billion m ³	25-40%
In case of drought and dumping Dam Lake	full deficit	86-96 billion m ³	60-80% and stopping the turbines for a long time

Agriculture: lack of incoming water to Nasser lake as a result of water storage in front of the Renaissance Dam by about 25-33 billion m³ per year and if there is no pulling of shortage from Dam Lake, this means wasting about 3-5 million feddan of Egypt's cultivated area, which is about 6.5 million acres that's where feddan requires about 5 thousand cubic meters of water according to the estimate of the Ministry of Irrigation meaning that each million feddan needs 5 billion m³ of water. Another serious impact is the introduction of salinity to the irrigated scheme

Food: After losing water amounts, and many lands will be out of agriculture Egypt will face more food security problem as it will increase the imports to meet the requirements of the people's need for food.

Fish resources: It is clear that the Renaissance Dam has a negative impact on fisheries as the fish farms will be affected by lack of water in the river, high salinity or high rates of pollution because of the lack of water in addition to that the rest is obtained from lakes that feed the agricultural drainage water which increases its salinity and that is reflected on the decline in production and the increase in consumption due to the increase in population leading to increase in fish imports and leading to increase in the import bill.

Immigration: many farmers will leave their villages because of losing their jobs in their lands and move to big cities which will increase also the loss of lands and cause many social problems in the country.

Continuous threat: as Ethiopia will have its hands on the Nile water, Egypt will feel threatened by it. Any problems could case future punishment on the Egyptian side if Ethiopia allied itself with the historical enemies of Egypt.

6. CONCLUSION

The dam will affect the water availability by reducing the amount of annual renewable water which in return will the people's normal life by reducing the electricity producing capacity reducing agriculture lands. As well as affecting water sustainability and water accessibility which Ethiopia will have its own hands on the water. This control on the water flow will make people unsecure and feeling the threat all the time. The case in which threaten people and society life as the water is a necessary component of stable human systems.

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