

# The Impact of Establishing the Ethiopian Dam Renaissance on Egypt

Nagwa El Agroudy, Fatima Ahmed Shafiq, Soheir Mokhtar

Department of Agriculture Economic, National Research Centre, Cairo

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## ABSTRACT

Water of the Nile River has a great importance for Egypt as it provides about 95% of its water needs. Egypt's share of water of Nile River is about 55.5 billion m<sup>3</sup>. Agriculture occupies most of it as it uses about 85.6% of the used water. Declaration of Ethiopia the establishment of Renaissance Dam with a storage capacity of 74 billion m<sup>3</sup> after it had a capacity of 14.5 billion m<sup>3</sup> and without the necessary technical and economic studies will have bad effects on the downstream countries, especially Egypt. The economic effects of the establishment of the Ethiopian Dam Renaissance on agricultural lands, the Egyptian food security, electricity, fisheries and the river navigation line project have been studied with the necessary recommendations.

**KEY WORDS:** Renaissance Dam- Economic Impacts- Food Security.

## INTRODUCTION

Water of the Nile River has a great importance for Egypt as it provides about 95% of its water needs. Egypt's share of water of Nile River is about 55.5 billion m<sup>3</sup>. Agriculture occupies most of it as it uses about 85.6% of the used water. This proves the saying "Egypt is the Nile's Gift" as Egypt does not have a large share of rain so we find that life in Egypt is concentrated on the banks of the Nile and any deficiency in the amount of water happen in the river inevitably causes a disaster.

### Research Problem:

Ethiopia's announcement of establishment of the Renaissance Dam with a storage capacity of 74 billion m<sup>3</sup> after it had a capacity of 14.5 billion m<sup>3</sup>, without taking into consideration the impact on the downstream states of Egypt and Sudan and without conducting necessary technical and economic studies which will have its bad effects on the downstream countries especially Egypt.

### Research Objective:

Studying the economic impacts of establishing the Ethiopian Dam Renaissance on cultivated lands, Egyptian food security, electricity, fish resources and the project of river navigation line.

## STUDY RESULTS

The Nile River stems from two springs the upper lands in Ethiopia and the lakes that cover parts of Uganda, Kenya, Tanzania and Congo. Then the Nile flows till North Cairo and it has two main branches, Damietta branch and Rashid branch that end in the Mediterranean Sea. The Nile water flows from its springs till the Mediterranean Sea about 6680 Kilo meters.

The river revenue is characterized by two periods, flood period during the months of August, September and October in which the river increases, and Althariq period in the rest of months of the year in which the river revenue is declining a lot. As the river revenue varies during the year, it also varies from year to year. It is clear from Table (1) that the annual revenue of the three major tributaries of the Nile is about 84 billion m<sup>3</sup>, of which about 48.7 billion m<sup>3</sup> for the Blue Nile, 24.4 billion m<sup>3</sup> of for the White Nile and 10.9 billion m<sup>3</sup> for the branch of Atbara.

Table (1) the average annual revenue of the three major tributaries of the Nile and its percentage

Tributaries	Average Annual Revenue (billion cubic meters)	Percentage
Blue Nile	48.7	58%
White Nile	24.4	29%
Atbara Branch	10.9	13%

Source: Land Center for Human Rights - a series of land and the farmer - No. (57)

### Water Use in Egypt:

There are many uses for water in Egypt and agriculture occupies most of it as it uses about 85.6% of the used water that is estimated by about 69.30 billion m<sup>3</sup>. There is the industrial use of water, which amounts to about 1.15 billion m<sup>3</sup>, which is expected to rise to about 6.50 billion m<sup>3</sup> in 2024/2025 (Table 2). There is also home use of water and the water distribution network is characterized by low efficiency and the amount of drink water is about 6.50 billion m<sup>3</sup>, representing about 9.40% of the total used water and it is expected to rise to about 9.50 billion m<sup>3</sup> in 2024/2025. It is worth mentioning that a large proportion of this water is groundwater used directly, or after it is mixed with fresh water from the Nile, and then treated to make it fit for use. As for navigational use of water, it has been shown that the amount of water in the Nile does not allow guided navigation easily, especially during the period from October to January that represents the peak of tourism season in Egypt and it may be due to irrigation requirements. At the level of consumption of the agricultural sector, it is one of the main consuming sectors of water as the water used for agriculture has reached about 59.30 billion m<sup>3</sup> in 2009/2010 and under conditions of climate change necessary water requirements to irrigate various crops are expected to increase as a direct result of the high temperature and are expected to reach about 61.8 billion m<sup>3</sup> in 2024/2025 and will be accompanied by high efficiency of using water for some crops in response to the increasing concentration of carbon dioxide.

**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 m<sup>3</sup> during the same year, and the average share of individual from water in Egypt is about 625 m<sup>3</sup> for the individual per year, which is expected to drop to about 350 m<sup>3</sup> by 2050, while the global water poverty is about 1,000 m<sup>3</sup> 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.

### The Ethiopian Dam Border or Renaissance Dam:

Thinking about the construction of dams for power generation on the Blue Nile began since the sixties. The U.S. Office of Land Reclamation in 1964, has studied for the establishment of about 11 dams, most importantly the four large dams on the Blue Nile with a total capacity of 80 billion cubic meters and these dams have been included in the Nile Basin Initiative, but suddenly, in 2011, the establishment of the Renaissance Dam was announced ( at the same place of the old borders dam with a capacity of 14.5 billion m<sup>3</sup>) with total capacity of 74 billion m<sup>3</sup>, which means five times the size and capacity of the total of the four old dams in the American Studies.

### The implications of the Renaissance Dam on Egypt:

#### First: 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:

- If flood is higher than the average, decline will be of about 10-13 meters in the dam lake and loss will be about 43-53 billion m<sup>3</sup> of storage leading to lower electricity generation by about 16-21%.
- If flood is average, decline will be of about 16-22 meters in the dam lake and loss will be about 63-78 billion m<sup>3</sup> of storage leading to lower electricity generation by about 25-40% .
- In case of drought and dumping Dam Lake, there will be full deficit within the limits of 86-96 billion m<sup>3</sup> with reducing electricity generation in the range of 60-80% and stopping the turbines for a long time.

#### Second: Cultivated Lands:

A - lack of incoming water to Nasser lake as a result of water storage in front of the Renaissance Dam by about 25-33 billion m<sup>3</sup> 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 m<sup>3</sup> of water.

It is shown in Table No. (3) that the minimum of wasting lands will lead to a shortage of cultivated area by about 46.9% and about 67.6% in the case of the maximum limit of wasting lands.

**Table (3) the negative effects of the lack of water in Nasser Lake on agricultural lands**

land affected by water shortages (Million feddan)	Remaining Cultivated Lands (Million feddan)	Lack of Cultivated Area %
3	3,5	46,9
4	2,5	61,3
5	1,5	67,6

Source: www.capmas.gov.eg

B - Lack of irrigation water will lead to expansion in the use of agricultural drainage water for irrigation reaching currently about 7 billion m<sup>3</sup> per year, which doubles the salinity 3 times after each irrigation then the water reaches the banks again with higher concentrations in each irrigation, leading to increased water salinity of agricultural lands in the Delta.

3 - Lack of water flow means stopping all land reclamation projects, agricultural expansion and the end of Toshka project, Al-Salam Canal and El Hamam Canal in the North western coast.

4 - The need to establish many wastewater treatment plants to treat contaminated water to become suitable for irrigation and also treat industrial wastewater and sewage, which costs the state millions of dollars in light of the bad economic situation experienced by the country.

#### Third: the Egyptian Food Security:

It is well known that Egypt suffers from lack of self-sufficiency rate in many food products as it is clear in number (4).

Egypt depends on imports to meet the food deficit of these commodities due to the lack of production of these commodities, for consumption which is a burden on the balance of payments especially the current difficult period Egypt experiences where the food import bill amounted to about 11.10233 billion dollars in 2011 and it is expected to increase after the construction of Renaissance Dam and the lack of irrigation water and wasting agricultural lands.

**Table (4) self-sufficiency percentage % of some food products during the years 2010 and 2011 in comparison with 2008**

Statement	2008	2010	2011
Grain group	73.86	56.47	56.6
Wheat	60.11	42.99	46.46
Corn	64.41	55.23	45.93
Pulses	49.46	71.82	43.38
Refined Sugar	76.42	84.37	70.04
Oil and Grease	23.07	33.11	24.30
Meat	87.98	87.81	87.02

Source: www.aoad.org.

#### Fourth: Fish Resource:

The amount of fish production has reached about 1362.17 thousand tons in 2011, about 375.35 thousand tons of which are of natural fisheries and about 986.82 thousand tons are from aquaculture and

the quantity of imports amounted to about 178.18 thousand tons worth about 384.15 million dollars and self-sufficiency rate amounted to about 89.3 during the same year Table (5). It is clear that the percentage of fish production from aquaculture is about 72.44% of the total production.

**Table (5) production, imports, value and self-sufficiency rate of the fish in Egypt during the period 2009-2011(Quantity in thousand tons – value in million dollars)**

Statement	Production			Imports		Self Sufficiency %
	Total	Natural Fisheries	Aquaculture	Quantity	Value	
<b>2009</b>	1092	387.4	705.49	167.79	460.2	86.5
<b>2010</b>	1304.8	385.21	919.59	182.38	395.69	88.1
<b>2011</b>	1362.17	375.35	986.82	178.18	384.15	89.3

Source: the website of the Central Agency for Public Mobilization and Statistics.

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.

#### **Fifth: Navigation Line Project:**

The Egyptian government agreed with the NEPAD Organization to conduct feasibility studies for the project of establishing navigation line linking the Victoria Lake and the Mediterranean Sea via the Nile River and adopted the idea of integrated transport, which connects the basin countries, but it will be difficult to achieve this if building Renaissance Dam leads to drying the river or declining the water level in the downstream country Egypt and river transport in Egypt will be inevitably affected by the construction of this dam.

#### **Sixth: In case of Dam Collapse:**

Due to the lack of hydraulic and technical studies for Renaissance Dam and the nature of the land on which it is established and because studies conducted by the U.S. Office of Land Reclamation in 1964 was to set up a dam with a storage capacity of 14.5 billion m<sup>3</sup>, not 74 m<sup>3</sup> in the same place of Renaissance Dam, it is likely to collapse, which will lead to catastrophic results in Egypt and Sudan, including the collapse of dams and sinking several major cities and villages and millions of lives are exposed to risk of death and displacement.

#### **Recommendations:**

Negotiate with Ethiopia, that came too late is currently negotiating to minimize the damage and not to prevent it so it must:

- Immediately stop construction until the negotiation and evaluation of effects in a scientific way.
- The minimum of the Egyptian demands must be not to increase storage capacity of the dam about 14 billion cubic meters.
- Ethiopia must undertake not to use the dam water in irrigated agricultures.
- Ethiopia is committed to the principle of prior notification before the establishment of any new projects on the river as it is mentioned in the Framework Convention of the United Nations in 1977 for the shared rivers.
- Careful review of each dam designs by Egyptian experts to make sure of the safety installations.
- Mediation of international organizations (African Union - EU - Arab League).
- The submission of memorandum to the UN.
- To resort to the International Arbitration if these negotiations did not provide the desired results and submission to the Security Council, as the issue of the dam threatens international peace in the Eastern Nile Basin.

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