

# On the Grand Ethiopian Renaissance Dam (Gerd)



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## Preamble

Of the great rivers of the World, the River Nile has undoubtedly played a most significant role in the development of early human civilizations. In more recent times it has excited the imagination of politicians, historians, poets, adventures and explores. The mystery was the source of its regular annual flood and what controlled its volume. That triggered the era of the 'Discovery of the Sources of the Nile'. Hydrologically, however, the Nile is probably the best-known river in the World. Accurate records on river level extend almost as far back as 660 AD and with gaps to much earlier periods [1-3]. By the turn of the 20<sup>th</sup> century modern scientific studies were carried out with the view of controlling its unpredictable floods.

## Background

Historically the Nile riparian countries have felt free to pursue unilateral water resources initiatives that served their own national interests. These initiatives were often the result of rational decisions. Many such projects made little sense from a basin-wide perspective. Over the years, the riparian countries have often expressed the need for equitable, rational solutions for the development of the basin [4,5]. Since 1999 a multilateral effort has been underway to explore opportunities to maximize the benefits of cooperative development and management of the resources of the Nile Basin. The effort culminated into the Nile Basin Initiative (the NBI) (Figure 1).



Figure 1: The Nile River Basin.

Schemes were laid out as knowledge on the Nile built up. These included [6]:

- a) Equatorial Nile Project (Jonglei Investigation Team),
- b) Bor- White Nile project,
- c) Bor-Zeraf project,
- d) The Zeraf Cuts (the Garstin cuts),
- e) Remodeling Bahr el Jebel,

- f) Veneno-Pibor Project, and finally
- g) The Century Storage Project

It should be noted that the hydrology of the Ethiopian rivers: Atbara (Tekeze), the Sobat (Baro/Akobo) and the Blue Nile (Abbai) were almost completely ignored. This is a serious imperfection in an otherwise brilliant account of the Nile Hydrology, bearing in mind that Ethiopia provides 86% of the waters of the Nile. It should also be pointed out that all those schemes are in the upstream of Egypt (Figure 2).

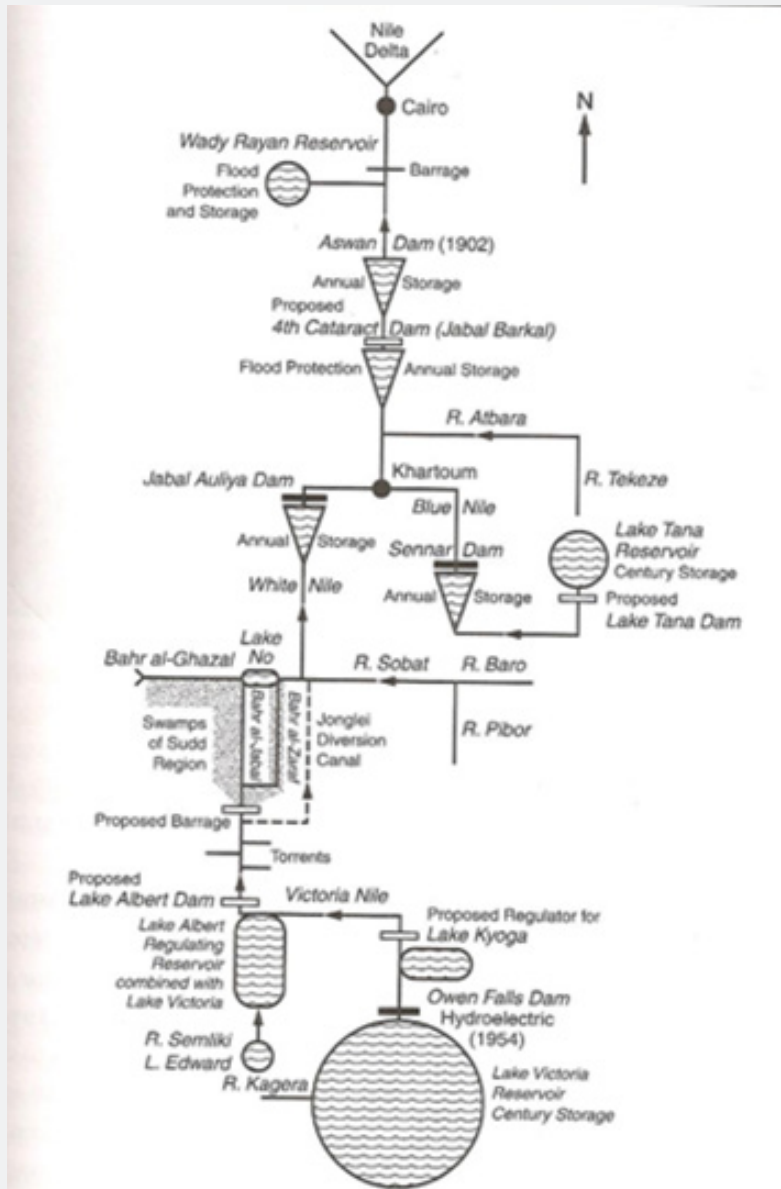


Figure 2: The Century Storage Scheme (Source: Hurst1952).

The Century Storage scheme was abandoned. Instead the Aswan High Dam (AHD) project was adopted i.e. a series of small projects was scrapped in favor of a giant one. The fundamental goals were the same: over-year storage and sufficient summer water for Egypt’s commercial agriculture. The basic difference,

however, is that the dam is within the territorial boundaries of Egypt. “Any thought of Nile control that would embrace the whole of the Basin, as has been conceived by Hurst, Black and Simaika [7] disappeared when the historic rights of the Egyptians were challenged by the new nationalism of the Sudanese” [4].

It must be stressed that the 'Equatorial Nile Project' and the 'Jonglei Investigation Team' report (1954) were probably the first environmental and social impact assessment studies ever carried out on a project in the Developing World. The study was undertaken between 1948 and 1952.

A treaty had to be signed between Egypt and the Sudan in 1959 to legalize the future undertakings. It was signed by the military government that annexed power the year before and it excluded all the other Basin countries. The lake behind the dam (Lake Nassir and Lake Nubia) would be 500km long; 150 km of which are within the borders of the Sudan. This entailed the mass resettlement of the Nubian ethnic groups, on both sides of the borders; leaving a history of 7,000 years behind [8]. The Sudanese Nubians were moved hundreds of kilometers to settle on River Atbara, where yet another dam was built; Kashm el Girba, in 1964. UNESCO and other international agencies made a monumental effort to save the archaeological monuments that would be submerged by the rising waters of the Nile. Nothing of any scale was undertaken on River Atbara; which was the overlapping reach between the two other great ancient civilizations of the Nile; namely, the Sudanese 'Kush' and the Ethiopian 'Axum'. It might be the first case in Africa where some of the negative impacts of building a dam were mitigated by building yet another dam.

The question is: Has the AHD been a successful substitute to the Century Storage project? Did it satisfy Egypt's ever-increasing water demands and provide the water security she has historically aspired to? Apparently not. Without going into much detail, the dam was simply unequal to the problems it was envisaged to solve. No doubt it performed needed services; the most important of all was guaranteeing a steady and predictable water supply. Never the less, Egypt needed more water than the Nile could now provide and must revert to the old 'Equatorial Lakes' project and the partial draining of the 'Sudd' swamps.

### The Bureau of Land Reclamation

The Bureau of Land Reclamation is an agency of the US Department of State. It conducted an in depth five-year study on the whole of the Blue Nile Basin in Ethiopia. It came out with a report: "Land and Water Resources of the Blue Nile Basin, Ethiopia." It came in 17 volumes and outweighed the 11 volumes of the "Nile Basin". The report identified 33 irrigation and hydropower projects (needing an estimated  $6 \times 10^9 \text{m}^3$  of water). It proposed four cascade dams on the Blue Nile and tributaries at: Kardobi, Mabil, Mandaia and Border. This would give the river a constant flow and a hydroelectric capacity four times that of Aswan.

PLEASE INSERT THE MAP OF THE FOUR DAMS (ON A SEPARATE SHEET) here (Figure 3).

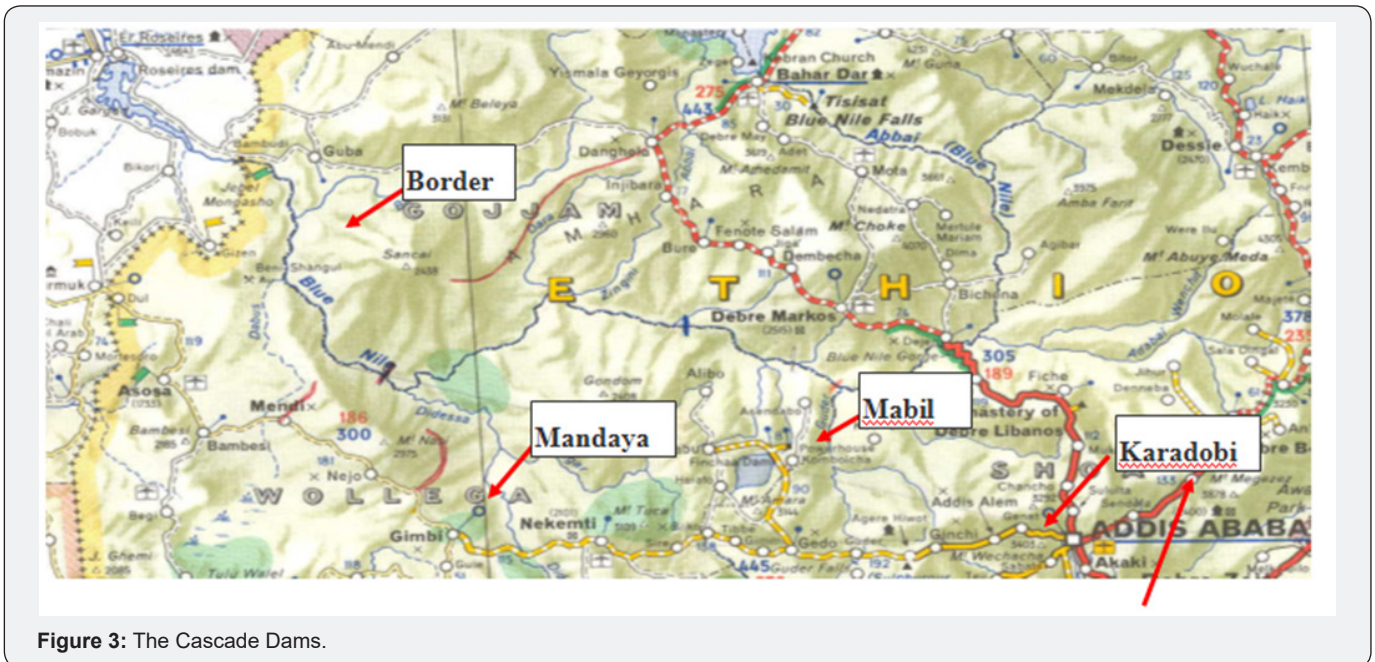


Figure 3: The Cascade Dams.

### The Nile Basin Initiative (NBI)

The Nile Basin Initiative is a partnership among the Nile riparian states that "seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security". The NBI began with a dialogue among the riparian states that resulted in a shared vision to "achieve sustainable socioeconomic development through the

equitable utilization of, and benefit from, the common Nile Basin water resources." It was formally launched in February 1999 by the water ministers of nine countries that share the river: Burundi, DRC, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda, as well as Eritrea as an observer. In 2012 it was joined by the sovereign state of South Sudan as a full member. It had seven "Shared Vision" projects and seven "Fast Track" projects. One of them was the "Power Trade" project located in

the Eastern Nile Technical Regional Office (ENTRO), in Addis Ababa, Ethiopia. ENTRO appointed two European companies; British and French to look into the issue of engineering control works. Their conclusions were: Egypt has no prospects of additional dams. The proposed technically physically possible dams in the Sudan were disregarded for the simple fact that any dam in the Sudan would evaporate seven times more water than that of an equivalent dam in Ethiopia. Furthermore, the volume to surface area to volume ratio is more favorable in Ethiopia due to the mountainous terrain as opposed to the flatness of the Sudan plains, (Blackmore and Whittington, 2008). The work of the French EDF and the British Scott and Wilson was augmented by the counterpart support of three national consulting companies from the Sudan, Egypt and Ethiopia [9].

### The GERD

The present short note is about a dam within the borders of Ethiopia whose impacts will be felt intensely in the two downstream countries; the Sudan and Egypt. In March 2011, the Ethiopian government announced its intention to build the Millennium Dam near the Sudanese Ethiopian borders, on the main channel of the Blue Nile [10]. The dam will hold  $74 \times 10^9 \text{m}^3$  of water and will produce 5,570-megawatt hour. Egypt adamantly protested while opinion in the Sudan is divided. It was initially called "project X", then the "Millennium Dam" and finally "Grand Ethiopian Renaissance Dam (GERD)". The official stance of the Sudanese Government was in support of building the dam. There are still many questions to be answered including the following:

- a) Why did Ethiopia abandon the well-studied cascade dams in favor of a new one?
- b) The dam is only 30% efficient.
- c) No environmental and social impact (ESIA) was carried out.
- d) No economic study was carried out
- e) How long will it take to fill the reservoir, bearing in mind that the average annual discharge of the Blue Nile is  $48 \times 10^9 \text{m}^3$ .
- f) The water released will be  $130 \times 10^6 \text{m}^3$  per day for nine months of the year.
- g) The annual regular predictable flood, and the silt it transports, will consequently be lost. Subsequently more than  $80 \times 10^3$  feddans (1 feddan = 1.308 acre) of floodplains will not be inundated by the regular annual flood. Chemical fertilizers will have to be used to compensate for loss of fertility.
- h) The potential of replenishment of ground water will decrease appreciably, having lost the 'head' that the flood provides.

- i) These wetlands (the floodplains) are the breeding grounds for fish!
- j) Silt free water will augment the serious problem of 'bank erosion' and could cause scouring of the river bed.
- k) If the operation of the dam is not shared between the Sudan and Ethiopia, planning agricultural protocols will be difficult.
- l) If the dam fails for any reason all dams and cities on the Blue Nile will be washed away, bearing in mind that the channel has a maximum capacity of one-billion-meter cube.

Due to pressures and debates the Ethiopian government agreed to appoint an expert committee of ten; two from each respective country in addition to four international experts (Panel of Experts). They met in secrecy. The leaked-out information is that the expert committee emphasized the dearth of studies including the environmental, economic and social ones. The Ministers of water of the three countries met at least eighteen times (up to May 2018) with no apparent positive outcome. In the meanwhile, a war of words broke out between supporters and opposers and between countries. Ethiopian diplomacy and Academia went public propagating for the GRD. The official Sudan's position was supporting the dam. The President of the Sudan even gave Ethiopia millions of dollars worth in earth moving equipment as a present. Opinion of the learnt public community is divided between supporters and opposers.

The GERD has become a national issue in Ethiopia and a source of pride. Egypt and Egyptians were die hard against it. It is not surprising that Public media in both countries have played a pivotal role. The Sudan played the role of moderator. On the 23<sup>rd</sup> of March, 2015, the Presidents of the three countries signed a Memorandum of Principles on the GERD. Details and action plans will follow. It was implicitly agreed to assign an International Company to study the environmental and social impact. In the meantime, construction is progressing at a steady pace. The first filling should have commenced in August 2017; while the contentious issues have not been resolved and the proposed studies have not been completed.

### The Way Forward

The GERD is a fact of life. It is there to stay. Cooperation and coordination by the East Nile Countries is the only rational way forward [11-13]. The two central issues are: the duration of the first filling and the operation of the dam. A mathematical model could be developed. The model should synchronize the operation of the GERD with the downstream dams in the Sudan and Egypt, namely the Roseires, Sennar, Meraowe and the Aswan High Dam. It should be emphasized that none of the eleven Nile Basin countries has a Management Plan for the Nile waters within its borders. Needless to say, the eleven Management Plans could

be the way forward for conflict resolution and the adoption of a Master Plan for the whole Nile Basin [11].

### References

1. Blackmore D, Whittington D (2008) An Independent Report of the Scoping Study Team to the Eastern Nile Council of Ministers.
2. Herodotus (1954) 440 BC The Histories (Transl by Aubrey de Selincourt) Penguin Classics London.
3. Hammerton D (1972) The Nile River A Case Study. In Oglesby RT, Carlson CA, Mc Cann JA, River Ecology and Man., Academic Press, USA.
4. Collins RO (2002) The Nile. Yale University Press.
5. Dumont HJ (Ed) (2009) The Nile: Origin, environments, limnology and human use. Springer.
6. Howell P, Lock M, Cobb S (2009) The Jonglei Canal: Impact and opportunity. Cambridge University Press, USA.
7. Hurst HE, Black RP, Simaika YM (1946) The Future Conservation of the Nile. Egyptian Public Works Gov Press, Egypt.
8. Henkil F (2013) The exodus of Nubians. Arabic translation by Yousif, MF Khartoum Journalism and Publication Center.
9. NBI (2007) Power Trade pre feasibility Study. Nilebasin.
10. Chandler DL (2015) International experts analyze impacts of Ethiopian dam. MIT News Office.
11. Moghraby Aiel (2013) Conflict or Cooperation in the Nile Basin. Celebration of the Nile Day. Bahr Dar, Ethiopia.
12. Whittington W (2004) Visions of Nile Basin Development. Water Policy 6: 1-24.
13. Zhang Y, Block P, Hammond M, King A (2015) Ethiopias Grand Renaissance Dam: Implications for Downstream Riparian Countries. Journal of Water Resources Planning and Management 141: 9.



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