The Grand Ethiopian Renaissance Dam: Challenges and Opportunities

S. Salman

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Structure of the Presentation

- Political Geography of the Nile
- The Nile Basin Initiative (NBI)
- The Nile Basin Cooperative Framework Agreement (CFA)
- The Grand Ethiopian Renaissance Dam (GERD)
- Conclusion
Political Geography of the Nile Basin
- World’s longest river (6,650 km);
- 2nd largest lake; Largest swamps
- Oldest and largest dams
- Oldest and most controversial treaties
- Cradle of Ancient civilizations
- 250 m people (300 m by 2025)
- 10% of the African Continent
- Ethnic, religious and linguistic diversity
- Shared by 11 countries
  - Burundi   D.R. Congo   Egypt
  - Ethiopia   Eritrea   Kenya
  - Rwanda   South Sudan   Sudan
  - Tanzania   Uganda
- Region of Extremes
  - Poverty: 9 of 15 poorest in world
  - High variability & climate change
  - Landscape vulnerability
  - Conflict: 10 countries since 1994
  - Flow pattern of Blue & White Nile
• Small Flow System-wide (~ 84 bcm/yr)
  2% Amazon; 6% Congo;
  12% Yangtze; 17% Niger;
  25% Zambezi

• Very Limited Infrastructure….
  • 10% HEP potential developed
  • 15% population with electricity
  • < 10% irrigable land irrigated
    (excluding Egypt & Sudan)

Other Characteristics of Variability of Nile Basin

⇒ Ethiopia: tributaries contribute 86-95% flow at Aswan
⇒ Egypt: minimal rain & no flow additions
  90% of population on 5% of Nile land
  Uses about 86% of Nile waters
⇒ High equatorial flows lost in Sudd, about 66%; White Nile contributes 14%
⇒ Sudan and South Sudan: 65% basin
  Now about 45%, 20%
  Confluence of major tributaries
Challenges

- Limited flow of 84 BCM - Aswan
  - Increasing demands due to population growth,
  - Current allocation of Nile waters
  - Climate change and environmental degradation
  - Major differences over the Nile Basin Cooperative Framework Agreement (CFA)
  - Unilateral Development Plans - dams
  - The Ethiopian Grand Renaissance Dam (GERD)
# Contribution of Each of the Nile Main Tributaries

<table>
<thead>
<tr>
<th>River</th>
<th>Flow (BCM)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Nile</td>
<td>50</td>
<td>59%</td>
</tr>
<tr>
<td>White Nile</td>
<td>11.5</td>
<td>14%</td>
</tr>
<tr>
<td>Sobat</td>
<td>11.5</td>
<td>14%</td>
</tr>
<tr>
<td>Atbara</td>
<td>11</td>
<td>13%</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100</td>
</tr>
<tr>
<td>Country</td>
<td>Country Area</td>
<td>NB Area</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Sudan</td>
<td>2506000</td>
<td>1933300</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1104000</td>
<td>356900</td>
</tr>
<tr>
<td>Egypt</td>
<td>1001000</td>
<td>277500</td>
</tr>
<tr>
<td>Uganda</td>
<td>241000</td>
<td>238900</td>
</tr>
<tr>
<td>Tanzania</td>
<td>945000</td>
<td>120300</td>
</tr>
<tr>
<td>Kenya</td>
<td>580000</td>
<td>50900</td>
</tr>
<tr>
<td>Congo</td>
<td>2345000</td>
<td>21700</td>
</tr>
<tr>
<td>Rwanda</td>
<td>26000</td>
<td>20800</td>
</tr>
<tr>
<td>Burundi</td>
<td>28000</td>
<td>13000</td>
</tr>
<tr>
<td>Eritrea</td>
<td>118000</td>
<td>3500</td>
</tr>
<tr>
<td>Total Area</td>
<td>8894000</td>
<td>3036800</td>
</tr>
</tbody>
</table>
## Riparians’ Stakes and Interests

<table>
<thead>
<tr>
<th>Stake</th>
<th>Position</th>
<th>Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>v.high ‘acquired rights’, existing uses, existing agreements</td>
<td>water security, more water</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>v.high ‘absolute sovereignty’, equity</td>
<td>hydropower, irrigation, investment</td>
</tr>
<tr>
<td>Sudan</td>
<td>v. High ‘acquired rights’, existing rights, existing agreements</td>
<td>1959 quota, Blue Nile regulation</td>
</tr>
<tr>
<td>South Sudan</td>
<td>v. High Need for a share of Nile waters</td>
<td>Hydropower; some irrigation</td>
</tr>
<tr>
<td>Uganda</td>
<td>High against 1929 agreement; equity</td>
<td>hydropower, some irrigation</td>
</tr>
<tr>
<td>Burundi</td>
<td>medium against existing agreements; equity</td>
<td>hydropower, investment</td>
</tr>
<tr>
<td>Kenya</td>
<td>medium against 1929 agreement; equity</td>
<td>some irrigation, investment</td>
</tr>
<tr>
<td>Rwanda</td>
<td>medium against existing agreements; equity</td>
<td>hydropower, agric, investment</td>
</tr>
<tr>
<td>Tanzania</td>
<td>medium against 1929 agreement; equity</td>
<td>some irrigation, water transfer, investment</td>
</tr>
<tr>
<td>DRC</td>
<td>low Congo 20x Nile flow</td>
<td>regional stature, connectivity</td>
</tr>
<tr>
<td>Eritrea</td>
<td>low observer</td>
<td>Some irrigation, boundaries</td>
</tr>
</tbody>
</table>
The Nile Basin Initiative (NBI)
The NBI

- Born Officially on February 22, 1999 in Dar-es-salaam, Tanzania
- Ministers of Water Resources of Nine riparian countries signed Minutes of the meeting establishing NBI
- Vision – “to achieve sustainable socio-economic development through equitable utilization of, and benefit from, the common Nile Basin water resources.”
- Recognition of the rights of all states on Nile
- Task – to prepare an inclusive treaty
NBI Institutional Set-Up

NILE Council of Ministers
Nile-COM

Nile Technical Advisory Committee
Nile-TAC

NBI Secretariat
Nile-SEC

ENTRO
Addis

NELSAP-CU
Kigali

Burundi, DR Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania, Uganda
Possible Areas for Cooperation

- Ethiopia: Huge hydro-power potential
  - 45,000 megawatts; 30,000 from the Nile
  - Not water consuming

- Sudan, South Sudan: Huge agricultural lands

- Lake Victoria: Fish wealth

- Egypt: Industrial capabilities

- South Sudan: Swamps as a source for more water for the Nile

- Water harvesting in upper Nile countries

Yet unilateral development plans is the norm
**Going with the Flow**

The Nile is already dotted with dams. New projects could help spread the river's wealth of water, but environmentalists fear ecological disaster.

**EGYPT**
POPULATION: 74 MILLION
GDP: $75.1 BILLION

Unlike other Nile states, Egypt has almost fully tapped the hydropower potential of the Nile. Opened in 1971, the 2,100-MW Assuan High Dam is currently the biggest on the river. An ambitious irrigation scheme to water some 220,000 hectares of land in the Toshka Irrigation Scheme is scheduled for completion by 2017. Further north, a series of barrages, most of them originally built by the British but many since updated, help provide much-needed power to Egypt. When it is completed, the Salam Canal will divert water from the Nile to the northern Sinai to make it habitable.

**SUDAN**
POPULATION: 36 MILLION
GDP: $13.6 BILLION

Many of the dams along the White and Blue Niles and the Atbara tributary in Sudan, built between the 1950s and 70s, are now sitting up. The 13-MW Khashm El Girba Dam has lost almost half of its capacity to siltation, as has the 15-MW Sennar Dam. Like the Sennar, the 280-MW Roseires Dam, currently Sudan's biggest, was built for irrigation but converted to hydropower production. These dams will soon be dwarfed by the $1.8 billion Merowe Dam, which will produce 1,250 MW but also will put acres of agricultural land underwater, displace some 50,000 people, flood a trove of ancient Nubian artifacts and, environmentalists fear, change the local ecosystem forever. A 300-MW dam at Kajbar is also being built.

**SOUTH**

Soon after it crosses the border into Sudan, the White Nile disappears into the Sudd, a 330,000-sq-km swamp—the largest in the world. More than half the White Nile's water is lost through evaporation or by being absorbed into thick aquatic vegetation and marshy soil. The Jonglei Canal, a joint Sudan-Egypt project to bypass the Sudd and use the water to irrigate thousands of acres of farmland, was begun in 1978 but stalled with the outbreak of civil war in Sudan in 1983. A peace deal signed in late 2004 could eventually restart the ambitious scheme.

**UGANDA**
POPULATION: 29 MILLION
GDP: $16.8 BILLION

Built by the British in the 1950s and extended in 2000, Owen Falls Dam has a 300-MW capacity, but generates much less due to hydraulic bottlenecks that occur when insufficient water gets through to turn all the turbines. Owen Falls will be joined in the next decade by a dam at Bujagali Falls, a few kilometers downriver. Costing around $1.25 billion, Bujagali will provide 200 MW of power, but will also force the relocation of villagers and flood the Bujagali Falls, a popular tourist site. Ugandans also have plans for a 180-MW dam at Karuma, as well as other sites along the Nile.

**ETHIOPIA**
POPULATION: 77 MILLION
GDP: $12 BILLION

Tis Abay, a new 73-MW hydro plant just below the Blue Nile Falls, took Ethiopia's paltry national power capacity to 170 MW three years ago; a $224 million, 188-MW dam at Takele on a tributary of the Atbara River being built by the Chinese firm responsible for much of China's Three Gorges Dam will soon add 300 MW more. But it's what comes next that could change Ethiopia and the Nile forever: the Blue Nile alone has the potential to generate some 30,000 MW of power for the nation, and officials have identified more than 100 sites for large-scale hydropower development schemes along the Nile and the country's other rivers. Development will help power the country, but it will also cut the flow of water that reaches Sudan and Egypt, block sediment transfer, and require the relocation of thousands of people.
The Nile Basin Cooperative Framework Agreement (CFA)
Entebbe Agreement
<table>
<thead>
<tr>
<th>Date</th>
<th>Parties</th>
<th>Name of Treaty</th>
<th>Treaty Objective/Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1891</td>
<td>G.B. Italy</td>
<td>Protocol for spheres of influence in E. Africa</td>
<td>Italy agreed not to construct any works on Atbara that would affect flow into Nile (main concern: irrigation works)</td>
</tr>
<tr>
<td>1902</td>
<td>GB Ethiopia</td>
<td>Treaty on Frontiers between Anglo-Egyptian Sudan, Ethiopia, &amp; Eritrea</td>
<td>Ethiopia agrees not to interfere with flow of Nile without consulting Great Britain &amp; Sudan.</td>
</tr>
<tr>
<td>1906</td>
<td>GB Congo</td>
<td>Agreement on spheres of influence in E. &amp; C. Africa</td>
<td>Congo agreed not construct any work which would diminish flow into Lake Albert, unless in agreement with Government of Sudan.</td>
</tr>
<tr>
<td>1925</td>
<td>GB Italy</td>
<td>Exchange of Notes re. Concessions for Barrage at Lake Tana…</td>
<td>Italy recognized prior hydraulic rights of Egypt &amp; Sudan &amp; agrees not to construct on headwaters of Blue Nile &amp; White Nile &amp; their tributaries works which might modify Nile flow</td>
</tr>
<tr>
<td>1929</td>
<td>GB Egypt</td>
<td>Exchange of Notes re. Use of the Waters of the River Nile for irrigation</td>
<td>Egypt claims ‘natural &amp; historic rights’ in Nile waters; without agreement of Egypt, no measures to be taken on Nile &amp; its tributaries in Sudan or in countries under British administration (Kenya, Tanganika &amp; Uganda)</td>
</tr>
<tr>
<td>1934</td>
<td>GB Belgium</td>
<td>Agreement re. Water Rights between Tanganyika &amp; Rwanda-Burundi</td>
<td>Regulates utilization of boundary waters, notification of projects, water quality &amp; navigation</td>
</tr>
<tr>
<td>1949 &amp;</td>
<td>GB Egypt</td>
<td>Exchange of Notes re. Construction of Owen Falls Dam (Uganda)</td>
<td>Uganda to build hydroelectric dam that “did not adversely affect discharges of water passed through”; reconfirms curves agreed in 1929; resident Egyptian engineer at Owen Falls; (1952) Egypt agrees to bear part of cost of dam to raise L. Victoria level for water storage</td>
</tr>
<tr>
<td>1959</td>
<td>Egypt Sudan</td>
<td>Agreement for the Full Utilization of the Nile Waters</td>
<td>Parties agree to: allocate of full yield (55.5 bcm/year Egypt; 18.5 bcm/year Sudan); Permanent Joint Technical Commission; have unified view for Nile negotiations with others</td>
</tr>
<tr>
<td>1977</td>
<td>Rwanda Tanzania Uganda</td>
<td>Agreement to Establish Kagera River Basin Organization</td>
<td>Establishment of KBO as regional integration and development organization (now defunct)</td>
</tr>
<tr>
<td>1993</td>
<td>Egypt Ethiopia</td>
<td>Framework for General Cooperation</td>
<td>Confirm intention to cooperate on Nile Waters &amp; agree to refrain from engaging in any activity that may cause appreciable harm to interests of other</td>
</tr>
<tr>
<td>2003</td>
<td>Kenya Uganda Tanzania</td>
<td>Protocol for Sustainable Development of Lake Victoria Basin</td>
<td>Parties agree to cooperate on sustainable development and management of the basin. Establishment of the Lake Victoria Basin Commission</td>
</tr>
</tbody>
</table>
Treaties or Disputes?

Legacies of Nile colonial treaties

- 1902 Nile Treaty – Britain and Ethiopia
- 1929 Nile Treaty – Britain and Egypt

1959 Nile Waters Treaty

- Bilateral Treaty between Egypt and Sudan
- For full control of the Nile
- Dividing entire Nile flow between Egypt and Sudan
- Recognizes other Nile states rights but gives Egypt and Sudan right to allocate such rights
Negotiations started in 1999

Based largely on UN watercourses Convention

Deadlocked in 2009 over three main issues

- Existing uses and rights of Sudan & Egypt
  - Basically the 1902, 1929 & 1959 treaties
- Prior notification on projects planned measures
- Amendment to CFA: consensus or majority
Current Status of the CFA

Six countries signed the CFA in 2010
- Ethiopia, Tanzania, Uganda, Kenya, Rwanda and Burundi
- Vehemently opposed by Egypt and Sudan
- Ethiopia ratified CFA in June 2013, Rwanda in August 2013, Tanzania in March 2015
- South Sudan declared it supports CFA, but took no action
- Democratic Republic of Congo undecided

The CFA needs ratification by six countries to enter into force
Signing the CFA in May 2010
Grand Ethiopian Renaissance Dam (GERD)
History and developments of the GERD

- Earlier dams in Ethiopia on the Nile
  - Fincha, Tana Beles, Tekeze
- Announcement made in March 2011
- Construction started in April 2011
  - Egypt was busy with January 2011 revolution
- Lies 20 km from Sudanese borders
- 170 meters in height
- Lake capacity: 74 BCM of water
  - Largest Dam in Africa
  - Tenth largest in the world
History and developments of the GERD

- Expected to be completed in 2017
- To generate 6000 megawatts of electricity
  - 16 turbines each 375 megawatts
  - First turbines to operate in December 2015
- Construction by Salini company of Italy
- Chinese building transmission lines
- Europeans providing mechanical equipment
- Cost estimated at 5 billion dollars
- Funding from Ethiopia’s own resources and bonds issued to Ethiopians
The GERD January 2014
Egypt and Sudan Reaction

- Egypt opposed vehemently the GERD
  - Decrease of water flow to Egypt
  - Decrease in irrigated area
  - Decrease in electricity at High Dam

- Sudan wavered between opposition and support
  - Finally formally supported the dam on 4th of December 2013 through President himself
  - A major shift away from Egypt, the first since 1959
  - Flurry of diplomatic activities during last 4Y
Egyptian government and opposition discussing GERD June 2013
Benefits & Risks of GERD to Sudan

Benefits of GERD to Sudan:
- Trapping sediments, stopping floods, regulating flow round year
  - regulation of electricity generation, replenishment of groundwater
- Cheaper electricity, possible storage for Sudan

Risks
- Safety of the dam – only 20 kilometers from Sudan
- Period in which Lake to be filled
- Erosion of river banks in Sudan because of decrease in sediments, decrease in fisheries
Location of the GERD
International Panel of Experts

- Ethiopia proposed establishment of international Panel of experts to review possible negative effects of the GERD
  - Two from each Ethiopia, Egypt and Sudan, four from outside Nile basin countries
- Panel established in November 2011
- Submitted Report in May 2013
  - Three days after Ethiopia diverted Blue Nile
- Recommended more in-depth studies
  - Reading of Egypt & Ethiopia of the Report
Report of the International Panel of Experts on the GERD

INTERNATIONAL PANEL OF EXPERTS (IPoE)
ON
GRAND ETHIOPIAN RENAISSANCE DAM PROJECT (GERDP)

FINAL REPORT

Addis Ababa, Ethiopia
May 31st, 2013
International Panel of Experts

- Egypt demanded halt in construction of dam
  - Studies to be done by international experts
- Ethiopia refused halting construction
  - Panel did not ask for that – its mandate
  - Agreed to undertake studies by three parties
- Tripartite meetings in Nov, Dec 2013, January, August, September, October, 2014
- Breakthrough in 4th and 5th, 2014 meetings
  - Egypt dropped demand for halt of construction
  - 2 studies to be undertaken by international firm
Sisi and Halie Mariam in Malabo, Equatorial Guinea, June 26, 2014
March 23, 2015 Agreement on GERD

DoP on the GERD Signed by three leaders in Khartoum on March 23, 2015

Consists of 10 points, 6 on international water law:

- Cooperation;
- Obligation not to cause harm;
- Principle of equitable & reasonable utilization;
- Exchange of data and information;
- Sovereignty, territorial integrity;
- Peaceful resolution of disputes
March 23, 2015 Agreement on GERD

- Consists of 10 points, 4 on the GERD
  - Principle of development, regional integration and sustainability – acceptance of GERD
  - Cooperation on management of the GERD
    - Agree on rules for first filling of reservoir
    - Agree on rules for annual operation of GERD
  - Priority for electricity sale to Egypt and Sudan
  - Principle of Dam safety

- Agreement is a major breakthrough
  - First trilateral agreement; between 3 main riparians; on major & difficult dispute
Conclusion

- Nile is a river of limited flow resulting in increasing competition and disputes.
- Unilateral development plans - dams.
- Existing treaties have led to a monopoly of Nile waters by Egypt & Sudan.
- Disputes & grievances: source for conflict instead of route for cooperation.
- Major power shifts in the Nile Basin:
  - CFA as an “African Peaceful Spring”
  - GERD sign of the leveling of the playing fields.
Conclusion

Large areas for possible cooperation
- Ethiopia hydropower, Sudan irrigable lands, Lake Victoria fisheries, South Sudan swamps, Egypt industrial capabilities

Cooperation is the only way for optimal utilization of shared watercourses

GERD should have been a jointly owned and operated project by three countries
- Yet resolution of dispute is major achievement
- DoP Can and should form the basis for serious & constructive basin-wide cooperation
Thank You

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