Beyond GERD: Hydropolitical, Hydrological, Technological and Investment (HHTI) Imperatives for Sustainable Economic Cooperation in the Nile Basin

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2020 International conference on Nile and GERD, Florida International University, USA, August 20-21, 2020

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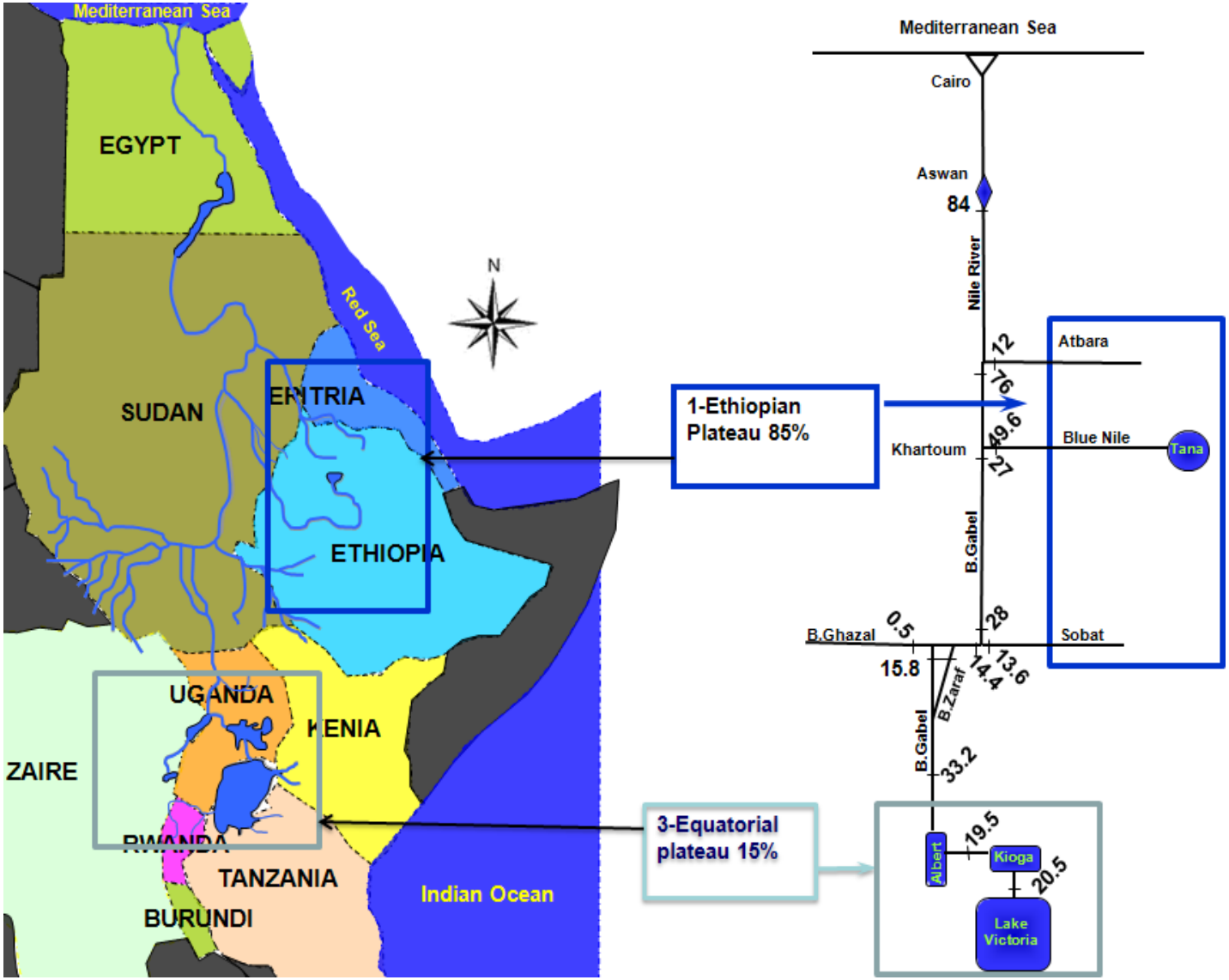
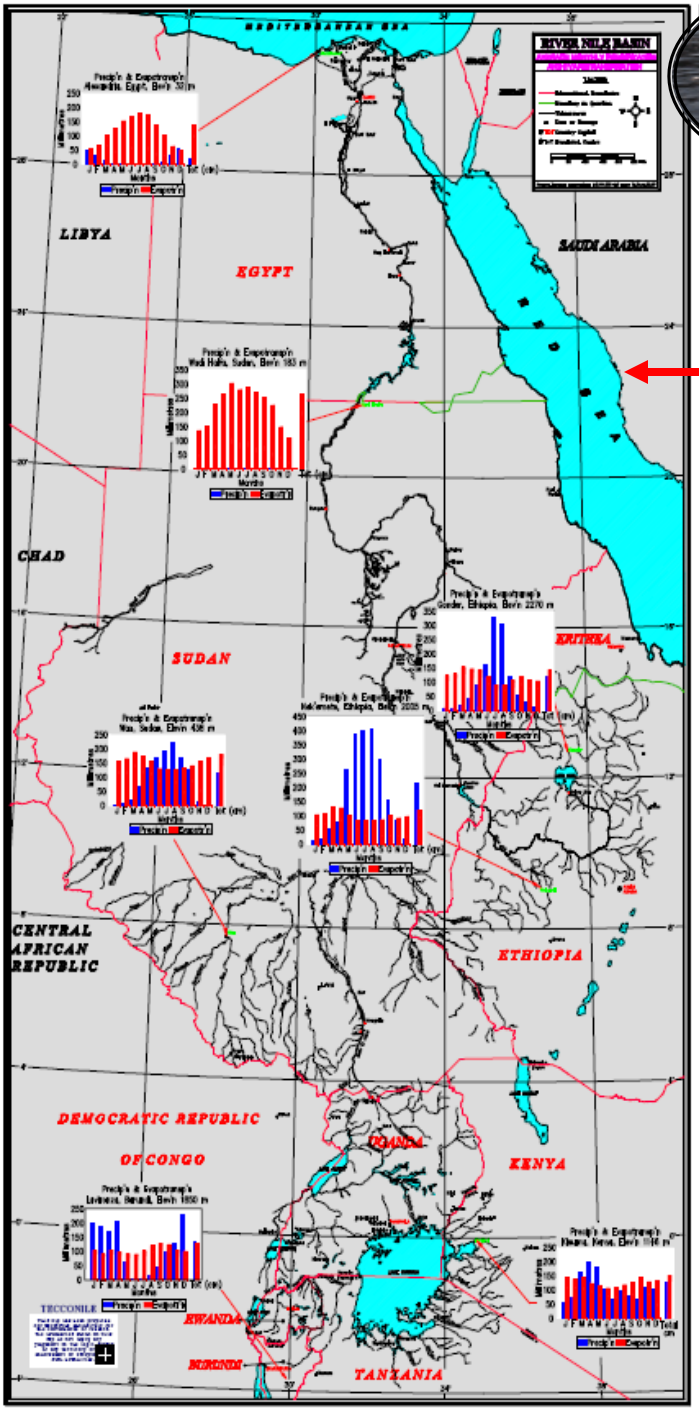
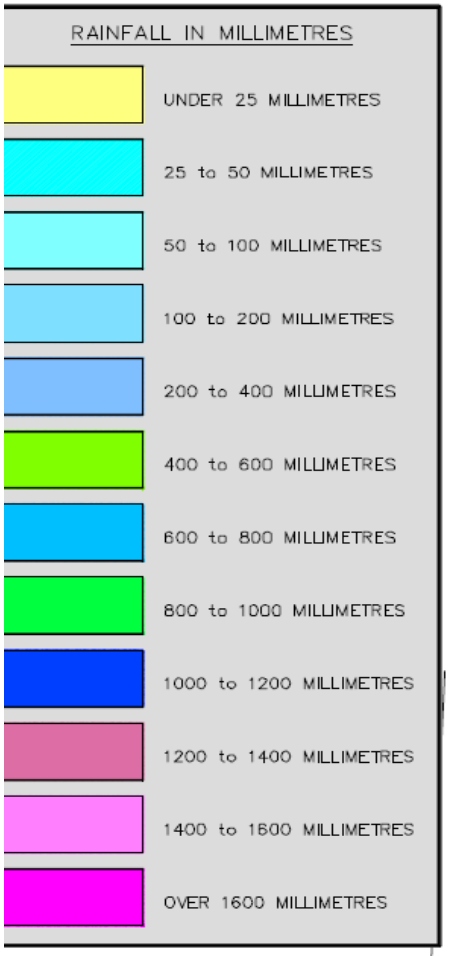
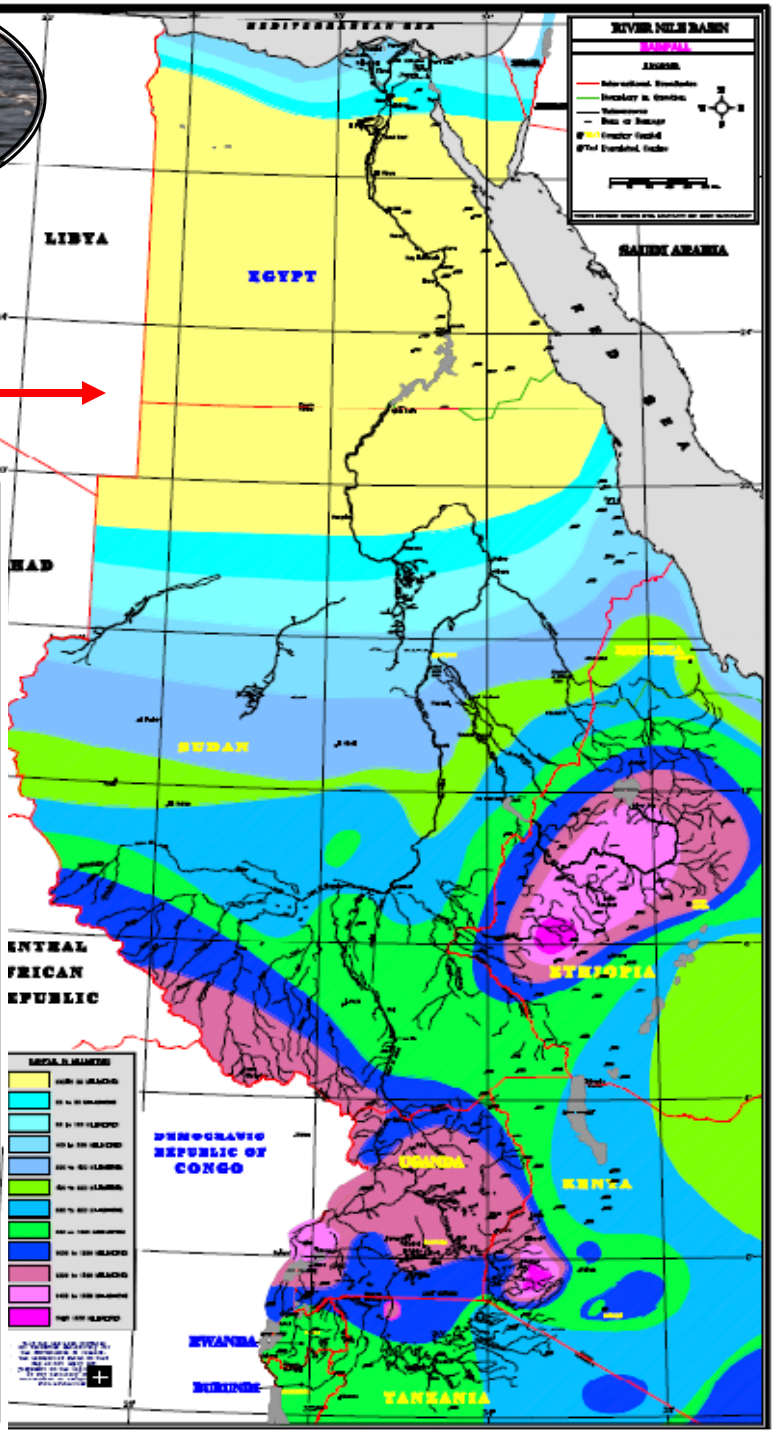


Hyd & Climate

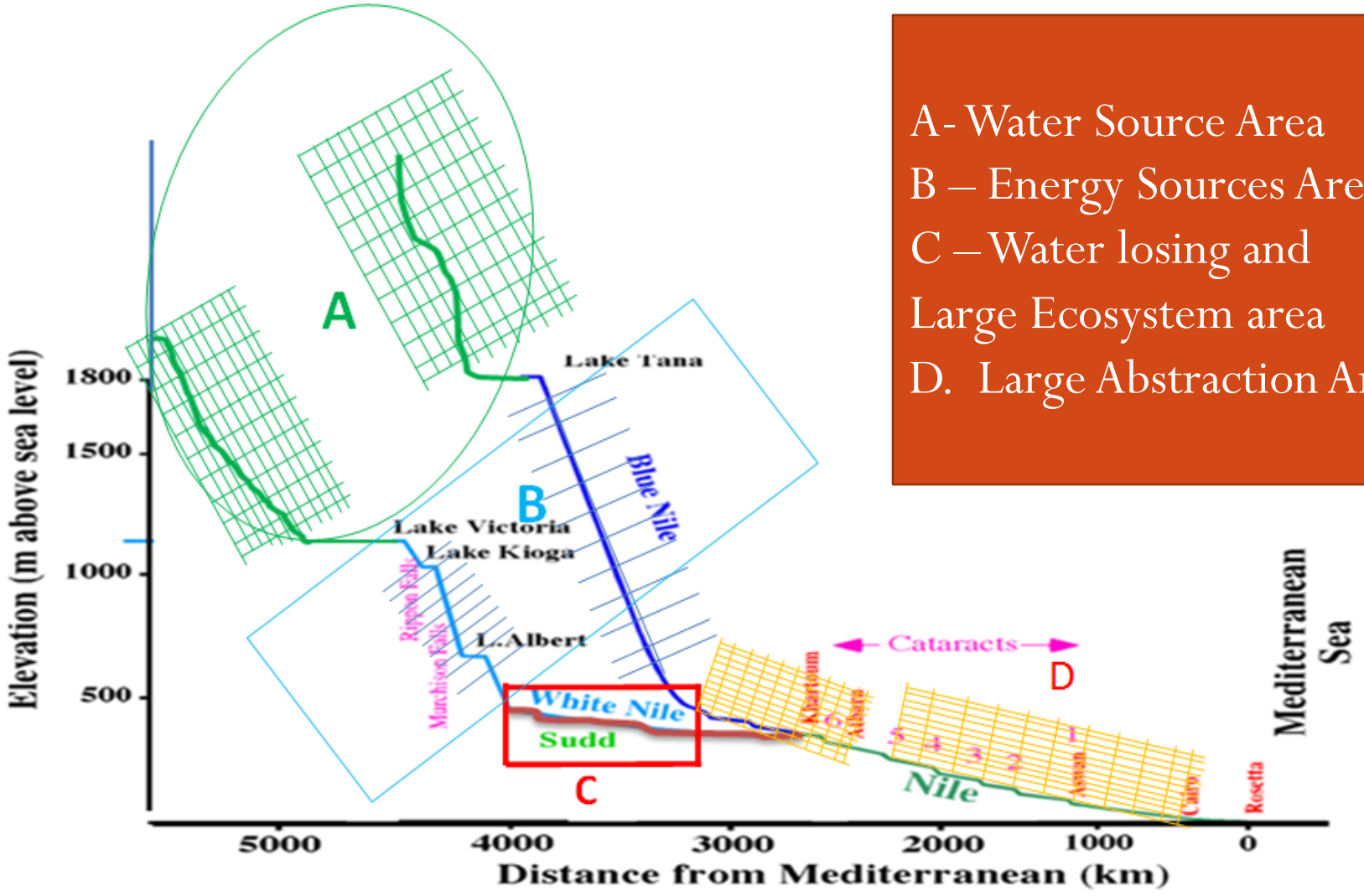


Teconile (1998)





1. Background: The Nile River Basin:

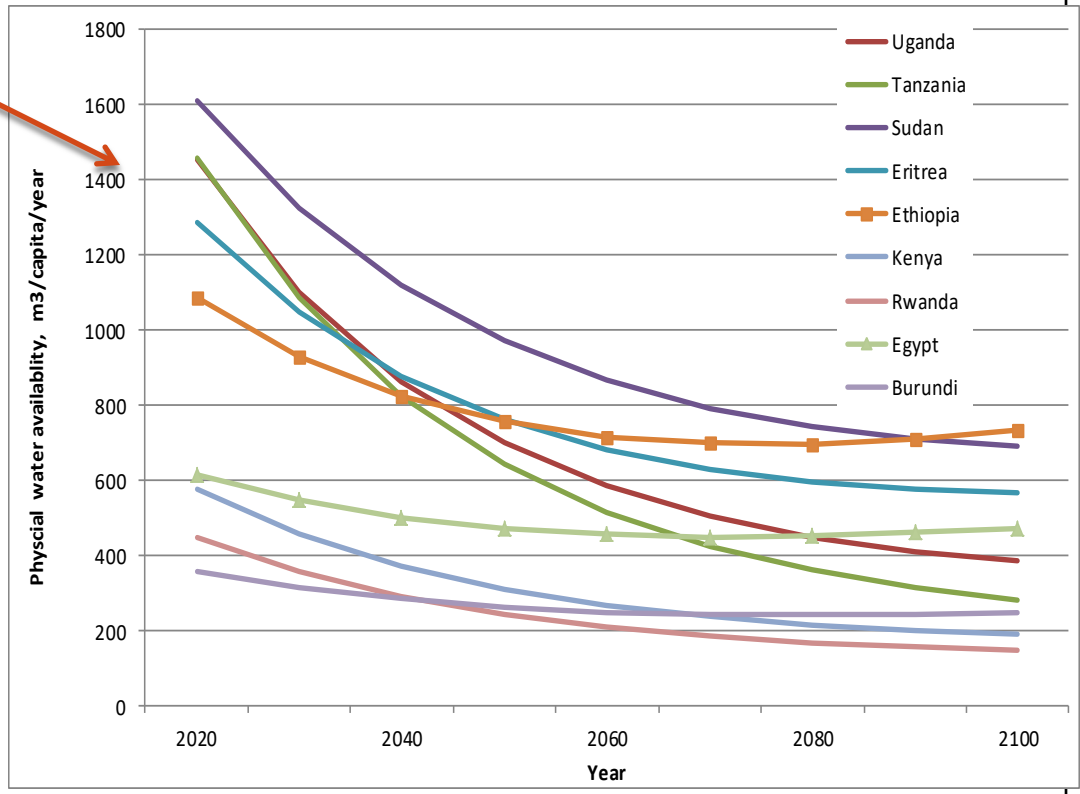


A- Water Source Area
B – Energy Sources Area
C – Water losing and Large Ecosystem area
D. Large Abstraction Area

2. Water Scarcity Drivers: Population and Economic growth

Pop. In 2020 > 550 million

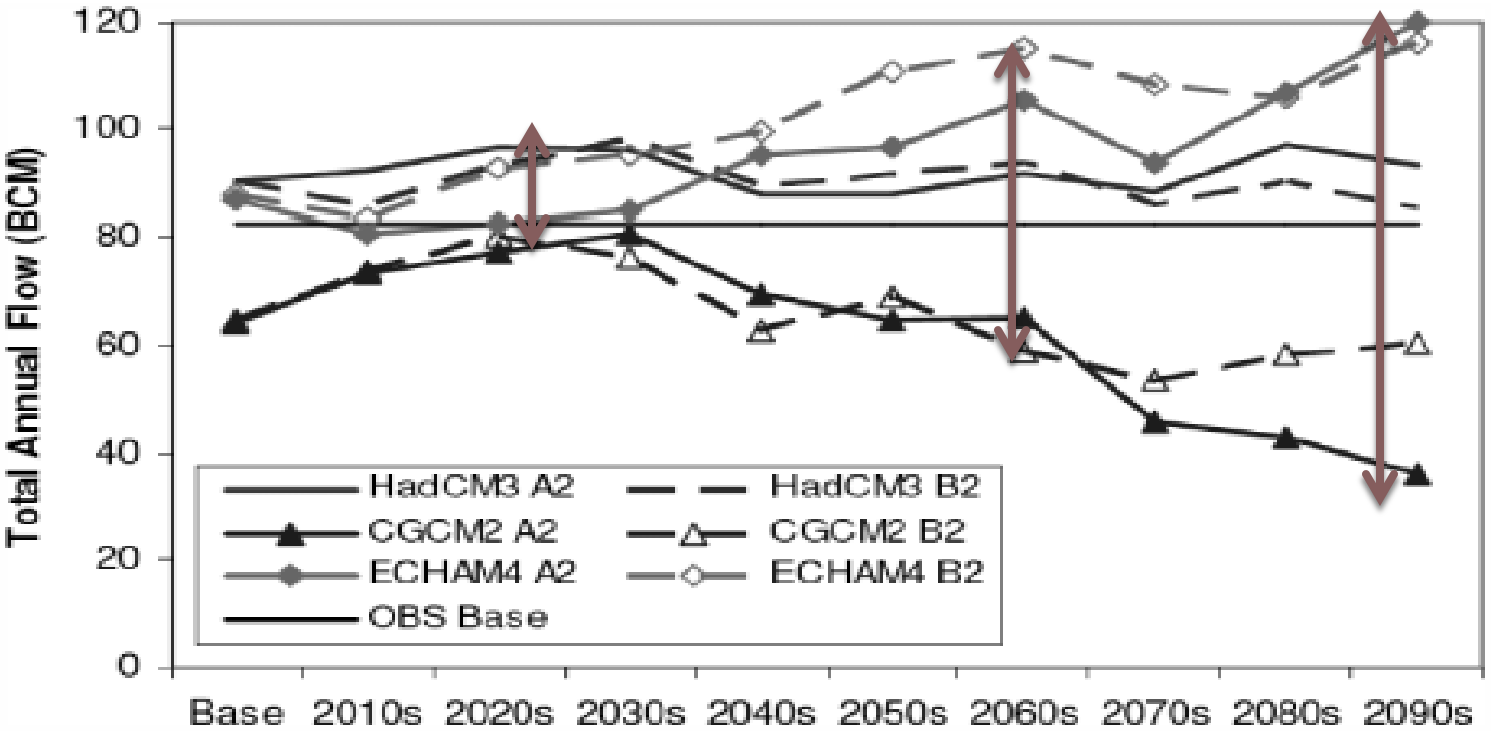
- Population based Water Scarcity Index – a tip of the iceberg
- Superimposing emerging Economic and other water needs and climate change – huge change in water scarcity index



Water Scarcity is a real Issue to be tackled – **Undermines Future Water Security of the Basin Countries**

2. Water Scarcity Drivers: Climate Change and Uncertainties

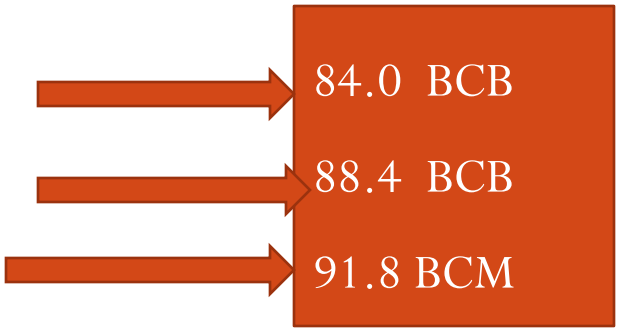
- Most predictions is that increased tendency of precipitation with increased variability (Flood and drought)
- Uncertainty of the prediction is an issue for planning



Di Baldassarre et al, 2011

3. Available Renewable Water

1. Nile River Flow
   - Historical Mean Nile Flow – (1901 - 1959)
   - Historical Mean Nile Flow – (1913 - 1976)
   - Historical Mean Nile Flow – (1871-1999)



2. Rainfall and Green Water
   - Overall 2000 BCB Rainfall
   - 51% Sudan (both Sudans)
   - 23 % Ethiopia
   - 13% Uganda

- Other supplementary water sources are also discussed later
- Water in old aquifer systems and desalinization

4. Imperative for Sustainable Nile Development: Hydro-Political Cooperation

Pop. In 1959
98 million

Pop. In 2020
554 million

Pop. In 2050
> 1.0 Billion

Early conclusion of basin wide agreement is essential

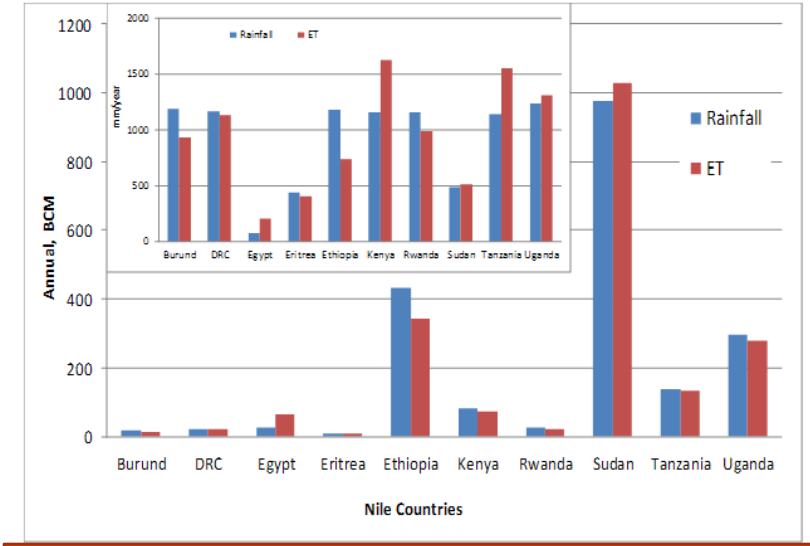
- Delayed Cooperative Agreement will become less relevant to riparian countries and aggravates water scarcity in the basin

Building Integrated Framework can achieve future water security and Human Development in the Nile basin – Integrating Hydrosolidarity principles, Strict Cooperative Agreements, Institutional Mechanisms and IWRM Principles

- *This leads Regional Infrastructure Development and Economic integration – Leading to Human Security in the basin*

4. Imperative for Sustainable Nile Development: Hydrology a) Rainfall productivity Enhancement

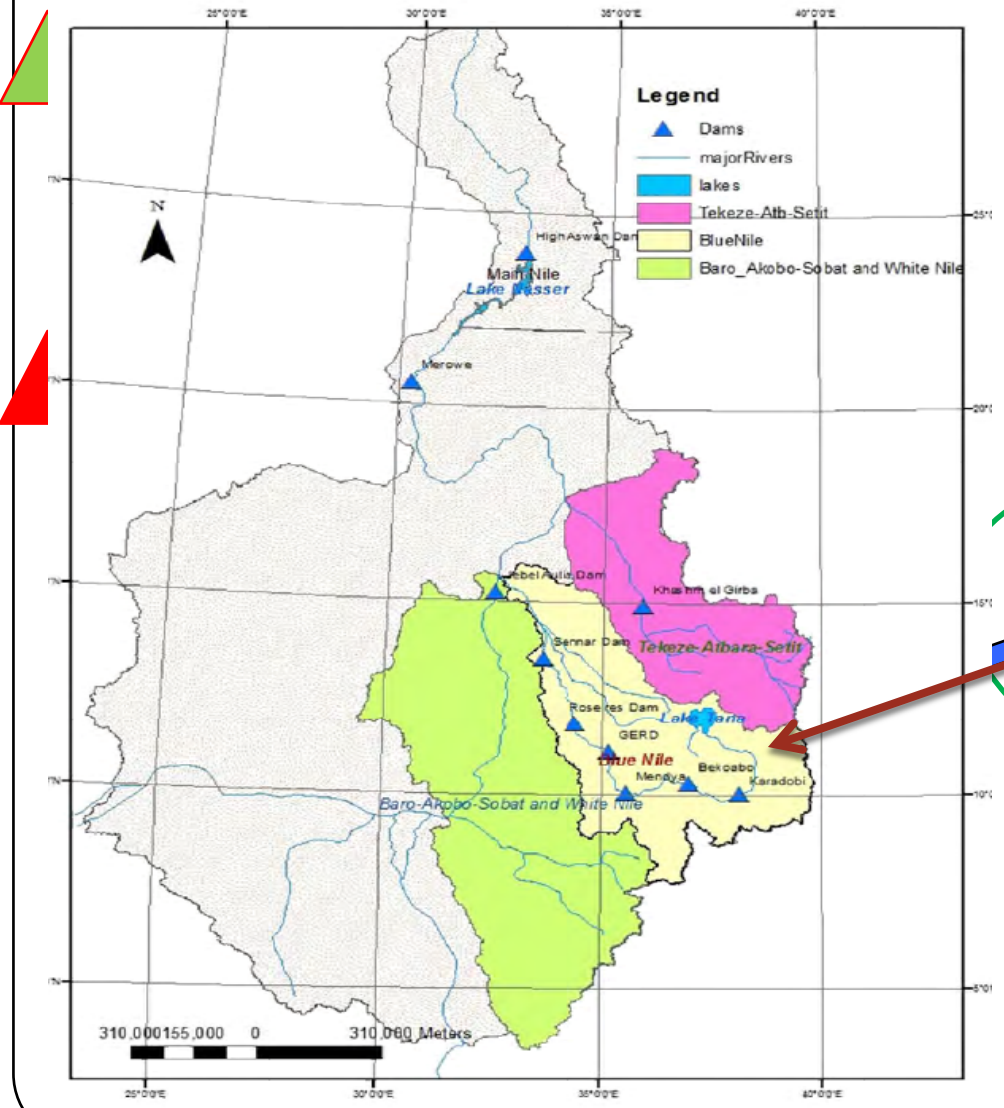
- The total rainfall in the basin exceeds 2000 BCM,
- The Sudan including South Sudan (51%), Ethiopia (23%) and Uganda (13%) generate over 87% of the total volume of rainfall (FAO, 2011)
- *Productive use rainfall – Soil moisture infiltration enhancement, supplementary irrigation and Watershed management*

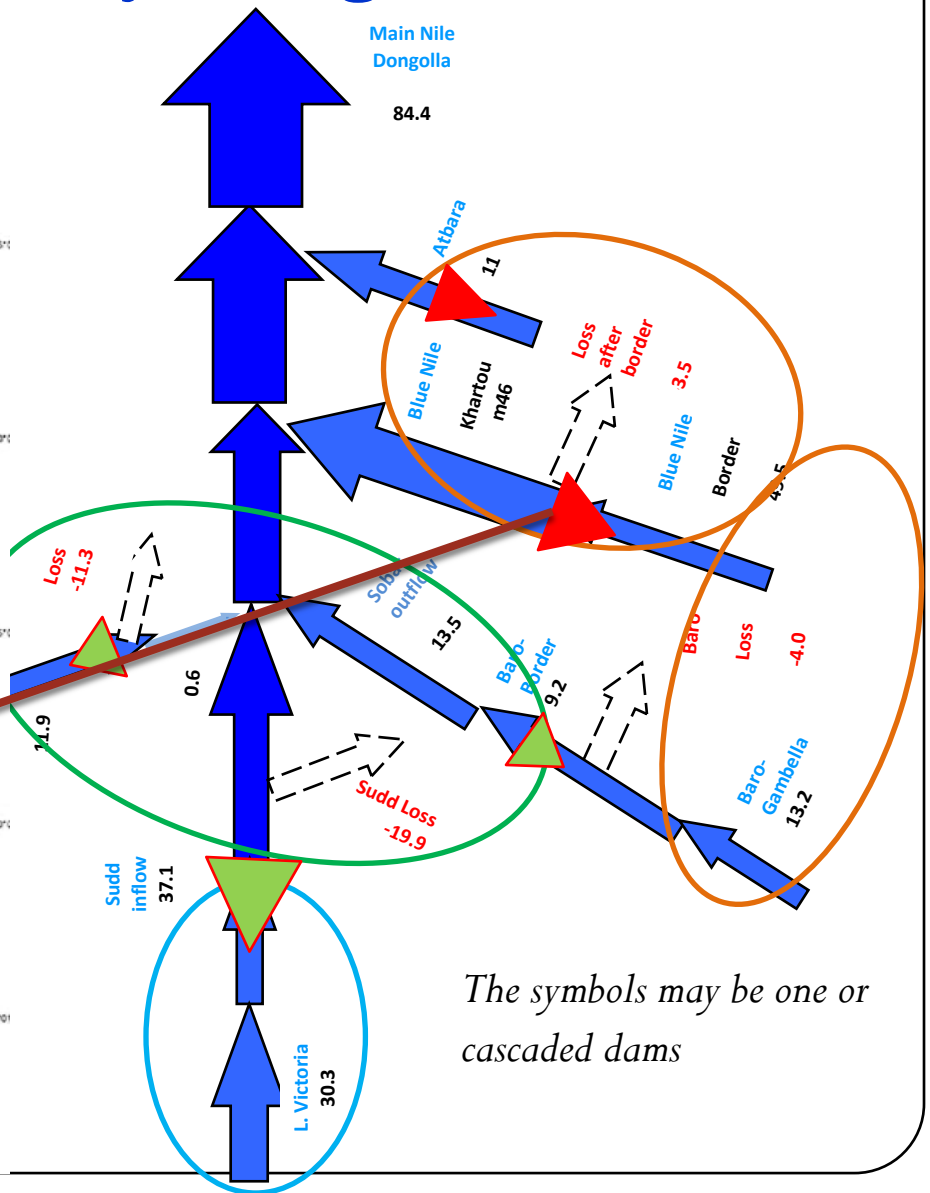


- Wide Area Productive Rainfed Agriculture Development
- Improving crop productivity, Rainfed Technology, Resilience and Farmers Capacity, Organic, Market Linkage and Branding

4. Imperative for Sustainable Nile Development: Hydrology

b) Water gain through 21st Century Storage Schemes

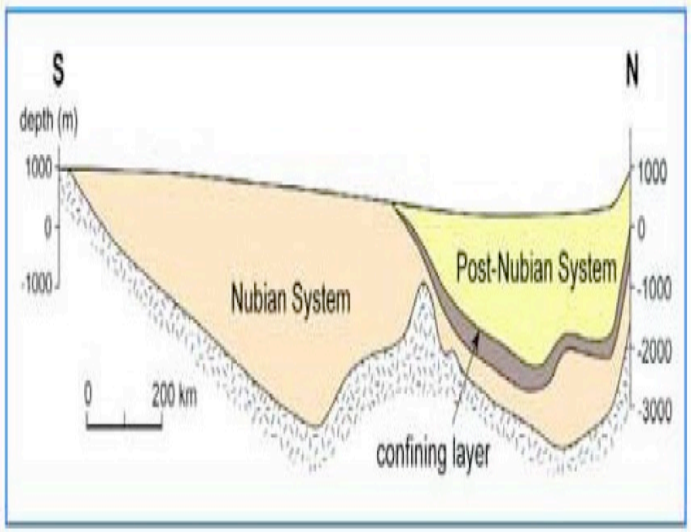




The symbols may be one or cascaded dams

4. Imperative for Sustainable Nile Development: Hydrology c) Non-Renewable -Aquifer Water Utilization

No.	Stored GW (Km3)	Author	Remark
1.	15,000	Ambroggi (1966)	
2.	135,000	Gossel et al (2004)	
3.	457,550	CEDARE (2002)	
4	373,000	-do-	NSA (41.5%-Egypt, 36.6%-Libya; 9%-Sudan & 12.8%-Chad
5	84,600	-do-	PNA (46%-Egypt; 54% - Libya
6	14,818	Abu Zeid, 2003	Recoverable
7	543,500	-do-	Storage volume
8	60,000	Fatima (1999)	
9	372,950	Bakhbakhi (2011)	Total fresh GW
10	14,459	Bakhbakhi (2011)	Total recoverable fresh GW

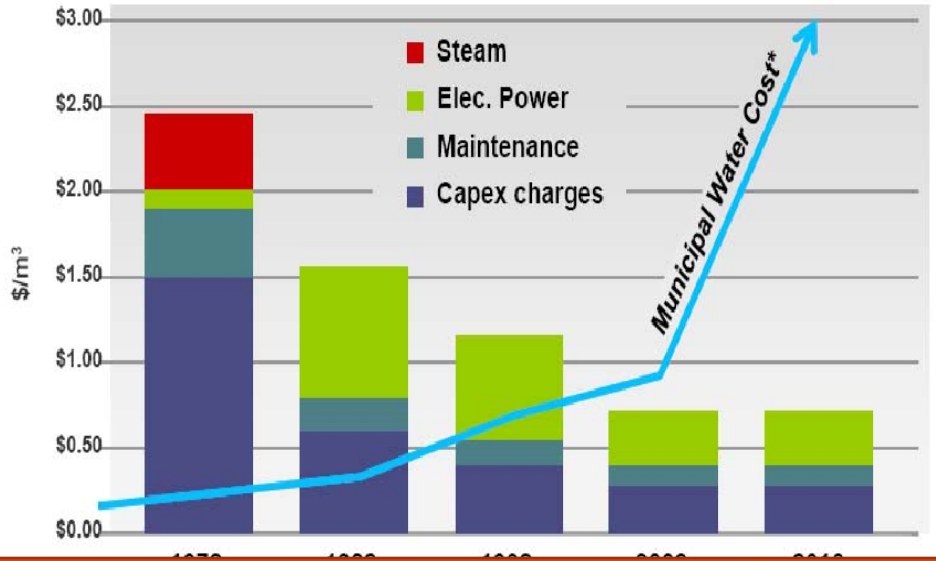


-Even though the recoverable volume is uncertain, the potential as abatement for increase population is huge,

-A study on the 100 thick aquifer in Egypt indicates a water yield in the order of 5000 Km3 (Bakhbakhi, 2006)

4. Imperative for Sustainable Nile Development: Hydrology d) Desalinization

- The total cost of desalinization has reduced to 0.6$/m3 and adding 70% for distribution, the total cost is around 1.02$/m3
- Current municipal water supply cost reached 3.1$/m3
- Experience exists : in 2008 about 3.1 Billion m3/yr in the Arabian Gulf and 800 Million m3/yr in the Mediterranean region (Waterline Report Series No. 9, 2008



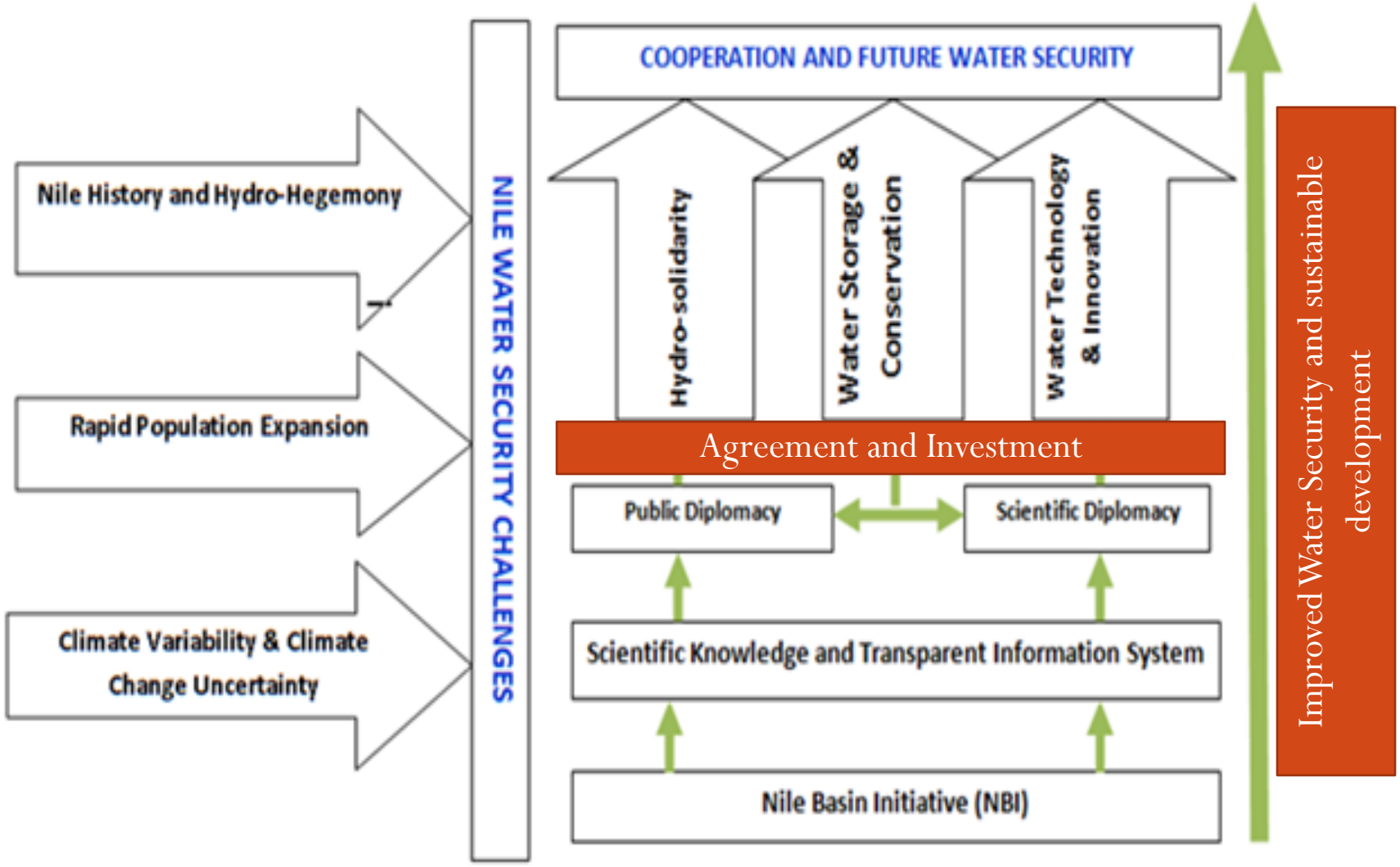
- Collective Regional Initiative such as Linking with Nile Basin Vision and funds and Technology can be acquired for large scale desalinization in coast line countries

4.Imperative for Sustainable Nile Development: New Technologies and Large scale water use Management

- Many studies indicate water loss in Egypt and Sudan is Significant
  - more than 85% of the large irrigation schemes are gravity system
- By 2017, about 40% of the agricultural withdrawal in Egypt is being lost in Egypt
  - evaporation and seepage losses from canals and fallow lands, (31,000 km of irrigation canals,
  - infiltration losses from lands, or consumption losses of aquatic weeds in water streams
  - About 15% of deep groundwater withdrawal is being lost either (Omar and Moussa, 2016
- Agricultural water saving strategies that outlines modernizing the old irrigation system in Egypt indicted as much as 40 BCM water can be saved from water losses (El-Nashar and Elyamany , 2018)

- There is similar trend of water lose in Sudan - large scale performance indicators in the Gezira - irrigation efficiency varies between 19% and 36%, while for the whole Gezira scheme irrigation efficiency stands at 22% (Mohammed et al, 2011)

The way forward: Cooperative Agreement, Institutions and Investment



Thanks you