



Cooperation and Practice in River Basin Management (Case Study)

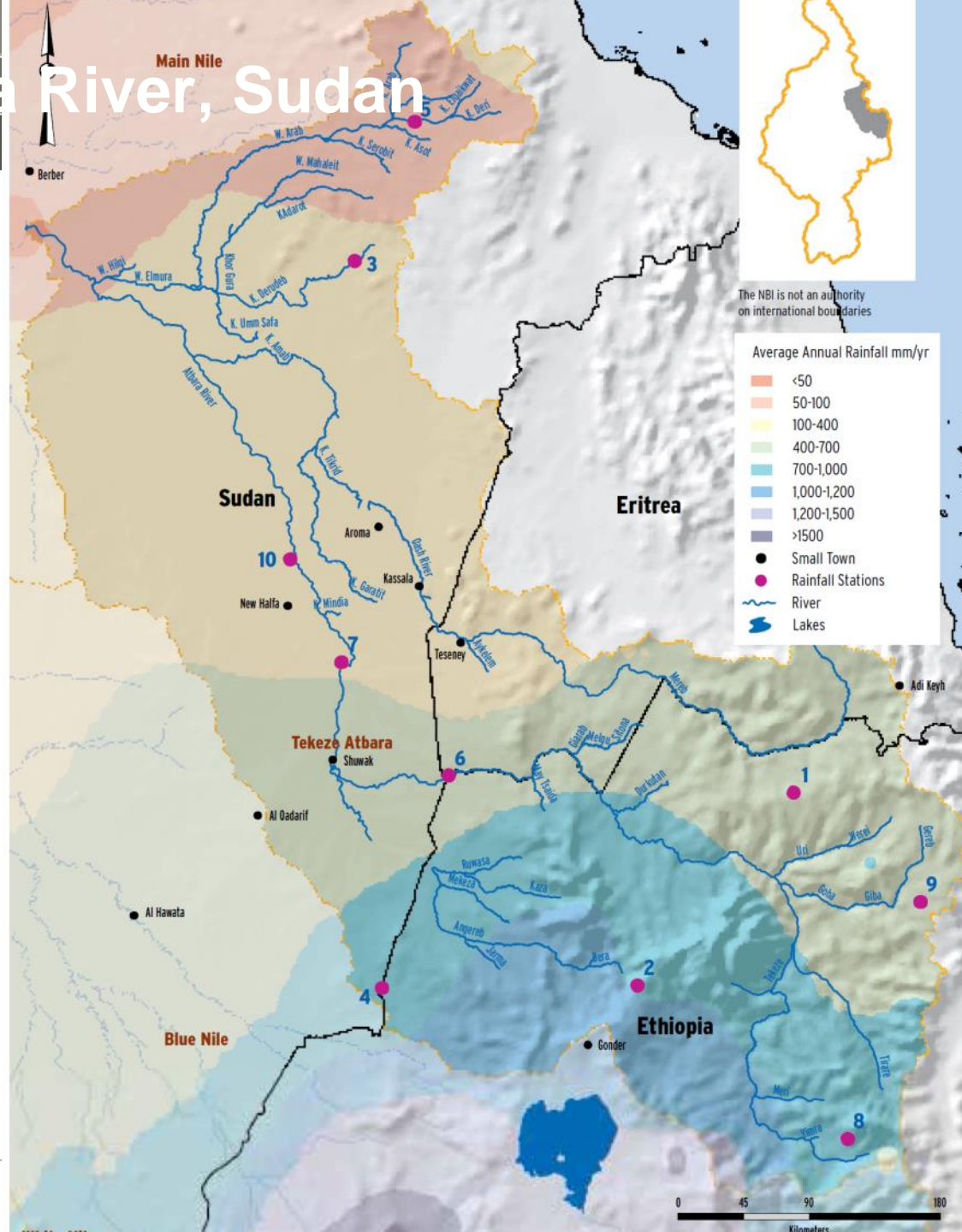
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Case study Atbara River, Sudan

Atbara River:

- Shares its source of water and sediment from Ethiopia
- Tekeze River in Ethiopia feeds into the Setit River in Sudan, then into the Atbara River, and then flows into the Main Nile



Tekeze River in Ethiopia



Main source of water for Atbara
(source is in the Water Tower of
the Nile)

Setit River in Sudan



Wad El Heliew

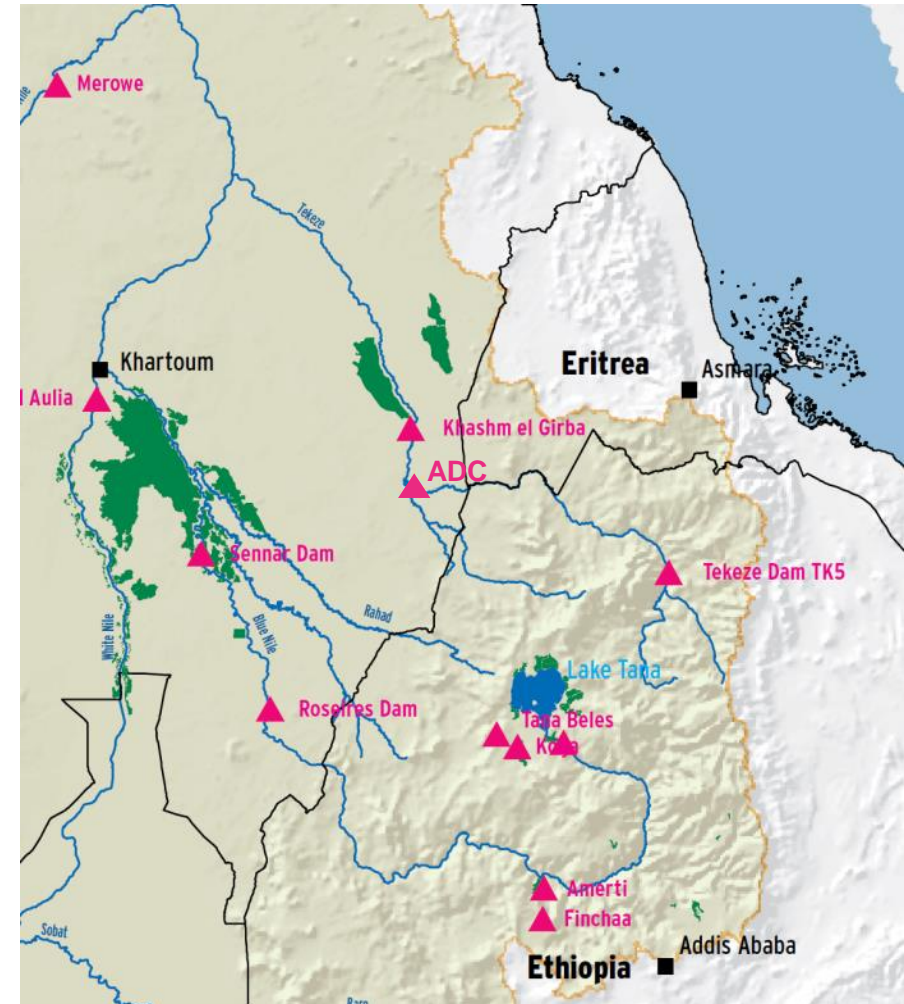
Relatively dry, but with high
sediment supply (Kharab soil)

Atbara River, Sudan

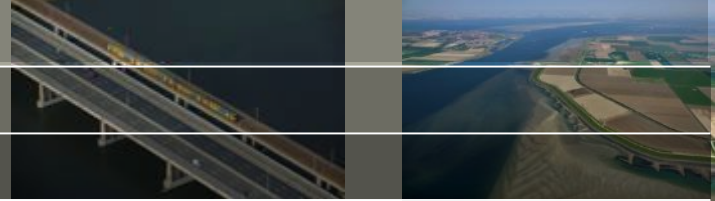


From Khashm el-Girba dam

- The Atbara is the most seasonal of major tributaries of the Nile
- There are three storage dams in the sub-basin: TK5 (live storage: 9.2 BCM) in Ethiopia, Khashim el Girba Dam (live storage: 0.654 BCM) Sudan and the new Atbara Dam Complex (ADC) recently built by Sudan to increase water supply for irrigation downstream (live storage 2.5 BCM)
- The average annual flow for River Atbara at Khashim el Girba dam is 11.4 BCM.



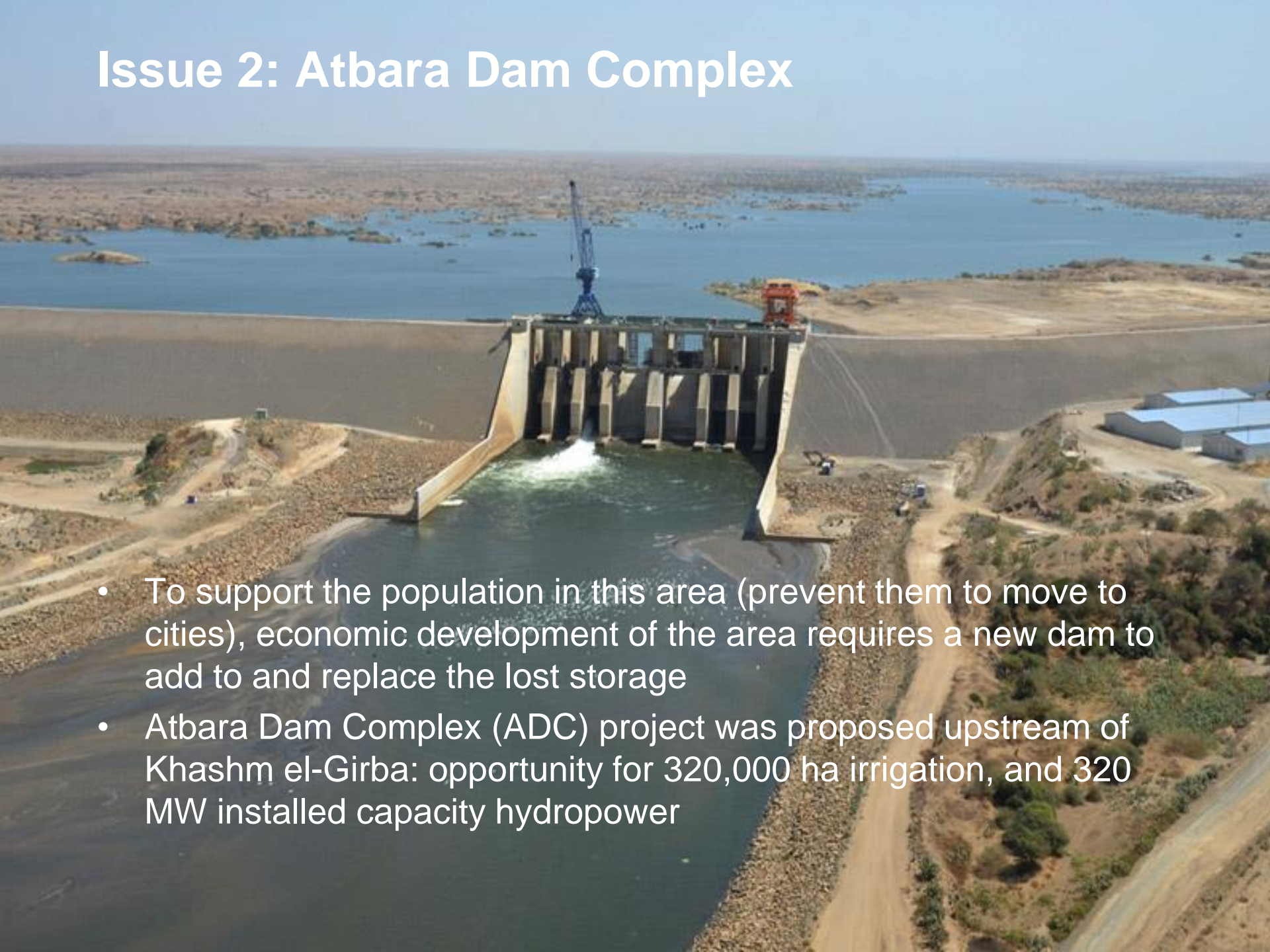
Issue 1: Khashm el-Girba dam



- Khashm el-Girba dam was built in the 60's with the help of Egypt to support the people that were relocated after construction of High-Aswan Dam (New Haifa town)
- Khashm el-Girba reservoir has lost 60% of its capacity due to sedimentation. It lost already more than 40% of its capacity after the first 12 years of operation without sediment management.
- It is a consequence of bad planning: the 'Kharab' soil in this reach is highly erodible. The rivers are full of fine sediment !



Issue 2: Atbara Dam Complex

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- To support the population in this area (prevent them to move to cities), economic development of the area requires a new dam to add to and replace the lost storage
 - Atbara Dam Complex (ADC) project was proposed upstream of Khashm el-Girba: opportunity for 320,000 ha irrigation, and 320 MW installed capacity hydropower

Issue 3: TK5

- During construction of ADC, Ethiopia completed the TK5 hydropower dam in the Tekeze River (Setit River) upstream of ADC. A 188 m high Arch dam, 300 MW
- Inflow to ADC goes from seasonal to regular



The Tekeze hydro project in Ethiopia won the Project of the Year Award of Power Engineering magazine for the renewable/sustainable project category.

Issue 4: complications for ADC

- After TK5 was 'discovered', design of ADC was changed: increased storage to generate more hydropower
- More precise: probably ADC should not have been built if it was known that TK5 was coming
- Risk: Tekeze 1 to 4 still to be build: what if these dams are for water-supply, and much water is extracted for irrigation?

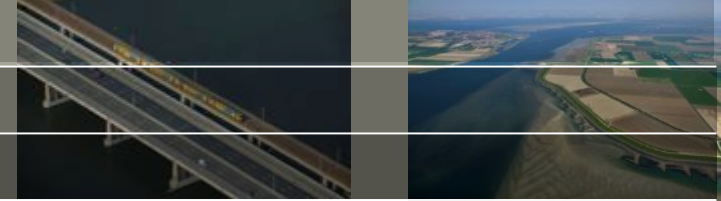


Issue 5: sediment?

- A study at Unesco-IHE (Yasir Salih Ahmed Ali) was carried out for Blue Nile, using sediment corings in reservoirs and sampling in catchments, to define the sources of sediment in the reservoirs
- Storage losses can best be managed by targeting the relevant catchment (catchment sediment management strategies)
- However, many of these catchments are in Ethiopia. Transboundary cooperation required



Solution?



Sudan could 'invest' in Tekeze 4:

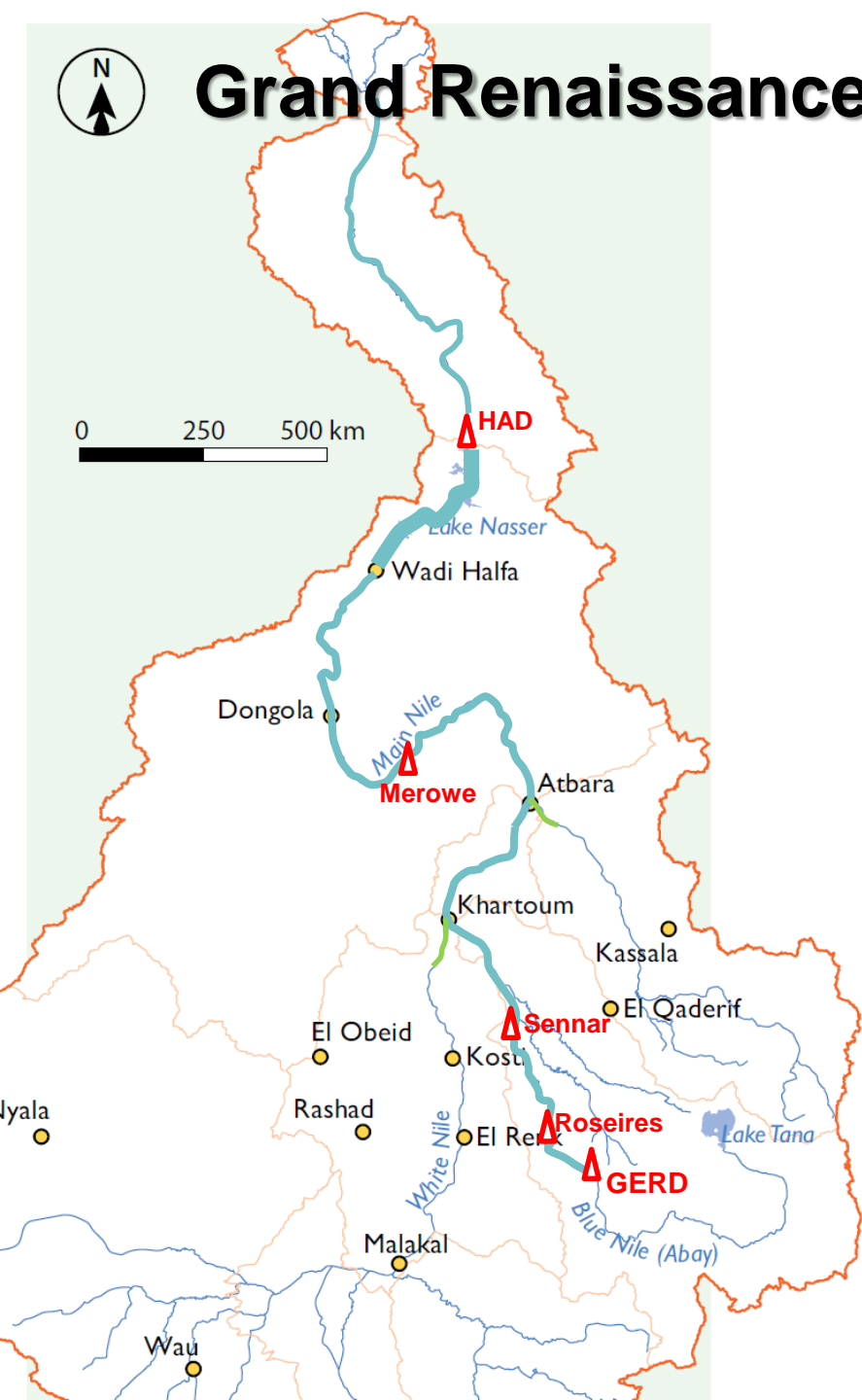
- Adds storage to Atbara/Setit system
- It is possible for Sudan to purchase the power to influence the operation
- Siting for this dam is good, as it will receive much less sediment (in mountains). Storage is more sustainable than in Sudanese river section

Only realistic if there will be a boost on transboundary cooperation
Sudan-Ethiopia



Grand Renaissance Dam: repeating story?

0 250 500 km



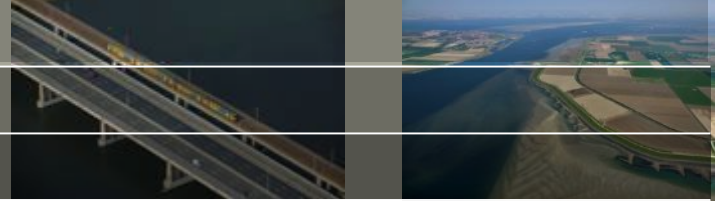


Trans-boundary environmental risks and vulnerabilities Nile River in Sudan:

- Sediment starvation causing erosion, loss of nutrients
- Modified hydrograph causing high low flows and low high flows
- Worries about droughts
- Etc....

Still time for mitigation?

Observations



Why not do something?

- Lack of trust and lack of willingness to co-operate
- Legal framework is weak

To get dialogue useful?

- Get accurate and useful *field data* on hydrology, sediment, social, ecology, etc.
- Use of advanced and validated *models* to predict impacts and show the benefits of avoidance, mitigation and compensation (use science rather than emotion)
- *Stakeholder involvement*
- etc.

Still a long way to go....





Thank you