Towards an integrated approach to dam impact assessment in the Eastern Nile

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1- Introduction

- **Main Nile**
  - (27%)

- **White Nile**
  - (27%)

- **Blue Nile**
  - (60%)

- **Atbara**
  - (13%)

- **Length**: Around 6,700 km long
- **Area**: Covers around 10% of Africa
- **Countries**: 11 riparian countries
- **Population**: 505 million

(Coordinates and map of the Nile River in Africa)
2- Methodology

GERD impacts on Sudan

**Risks**
- Loss of recession agriculture
- Loss of Traditional Fired Clay Brick Production
- Loss of natural land fertility
- Other environmental impacts

**Opportunities**
- Increase in hydropower
- Flood control
- Reliable irrigation & food security
- Other

Other environmental impacts
2- Methodology

Alam, S. A. Use of biomass fuels in the brick-making industries of Sudan: Implications for deforestation and greenhouse gas emission. (University of Helsinki, 2006).
2- Methodology

Pywr

(1) River system infrastructure modeling

- Irrigation
- Hydropower generation

Changes in:

- Irrigation water supply
- Hydropower generation

(2) Two-dimensional flood modeling

- Change in flood hazard on built-up areas

IFPRI CGE

(3) Economywide modeling

- Multisector socioeconomic impacts
3- Model development

- Eastern Nile River system model
- Sample aggregate CGE model
- Sudan flood model
3- Results

- Positive impact on hydropower generation, irrigation, and flood damage.

- Negative impact on brickmaking, by eliminating production along the Blue and Main Nile.
4- Results

Aggregate impact on GDP in 2025:

- Agriculture, manufacturing and service sector related GDP would grow
- Industrial GDP would shrink under high and low hydrologic conditions
- Overall GDP with GERD would grow up to 0.1%, ceteris paribus
4- Results

Distributional impacts on household welfare in 2025:

- All household groups experience positive welfare impacts
- Welfare improvements are larger for urban than rural household groups
5- Conclusions

- Need to develop broad frameworks of potential impacts from large dam infrastructure

- Need to identify policies, institutions and technologies that reduce negative impacts for some populations

- There are additional impacts not yet considered in this analysis

- Models inherently contain uncertainties
Thank you for your attention!

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3- Simulation scenarios

- Three hydrologic conditions:
  - High flow
  - Median flow
  - Low flow

- Two dam scenarios:
  - With GERD
  - No Gerd

- Simulating the economy in 2025