

Egypt's Lifeline: Managing Water Consumption and Nile Conservation

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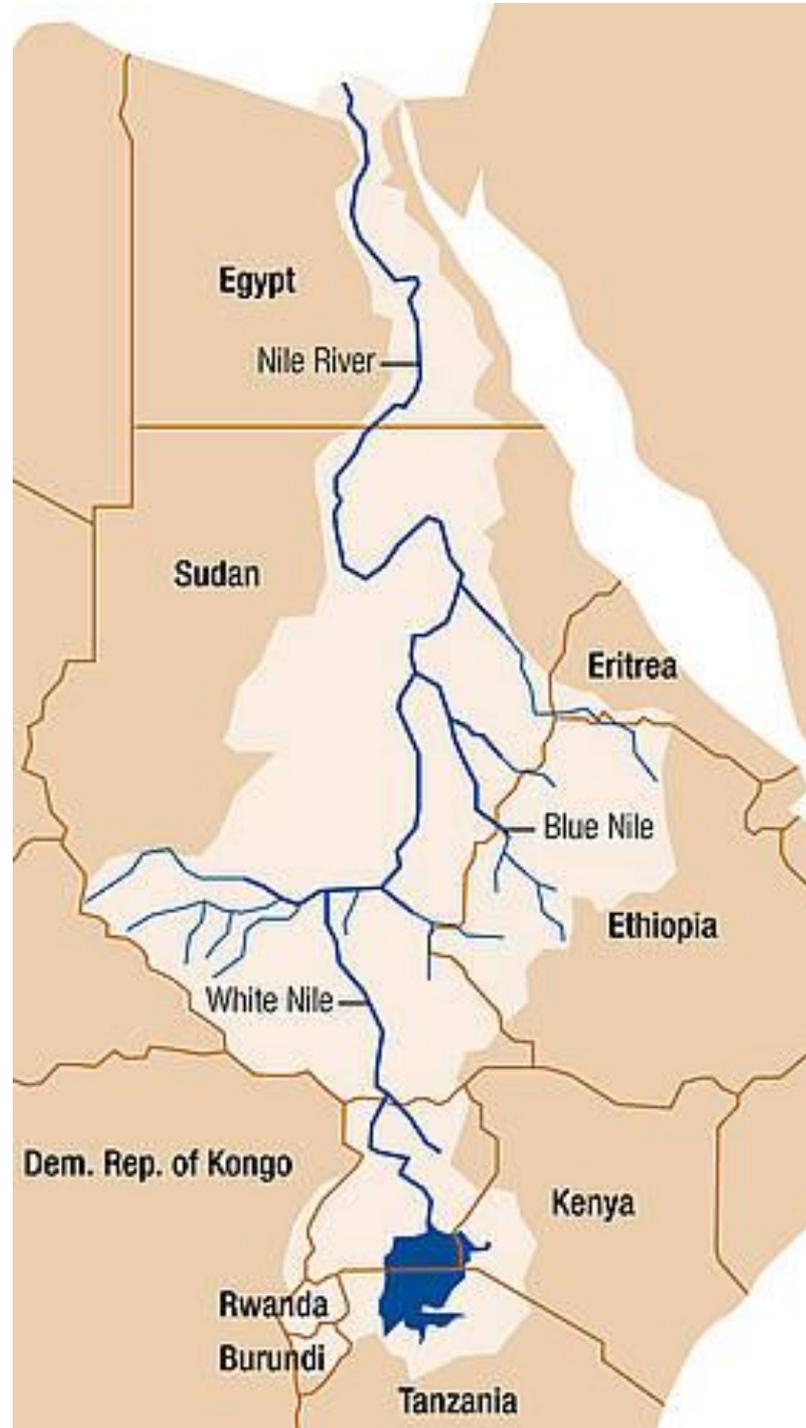
RWTH Aachen University, Germany

35th Cairo Climate Talks,
November, 24th

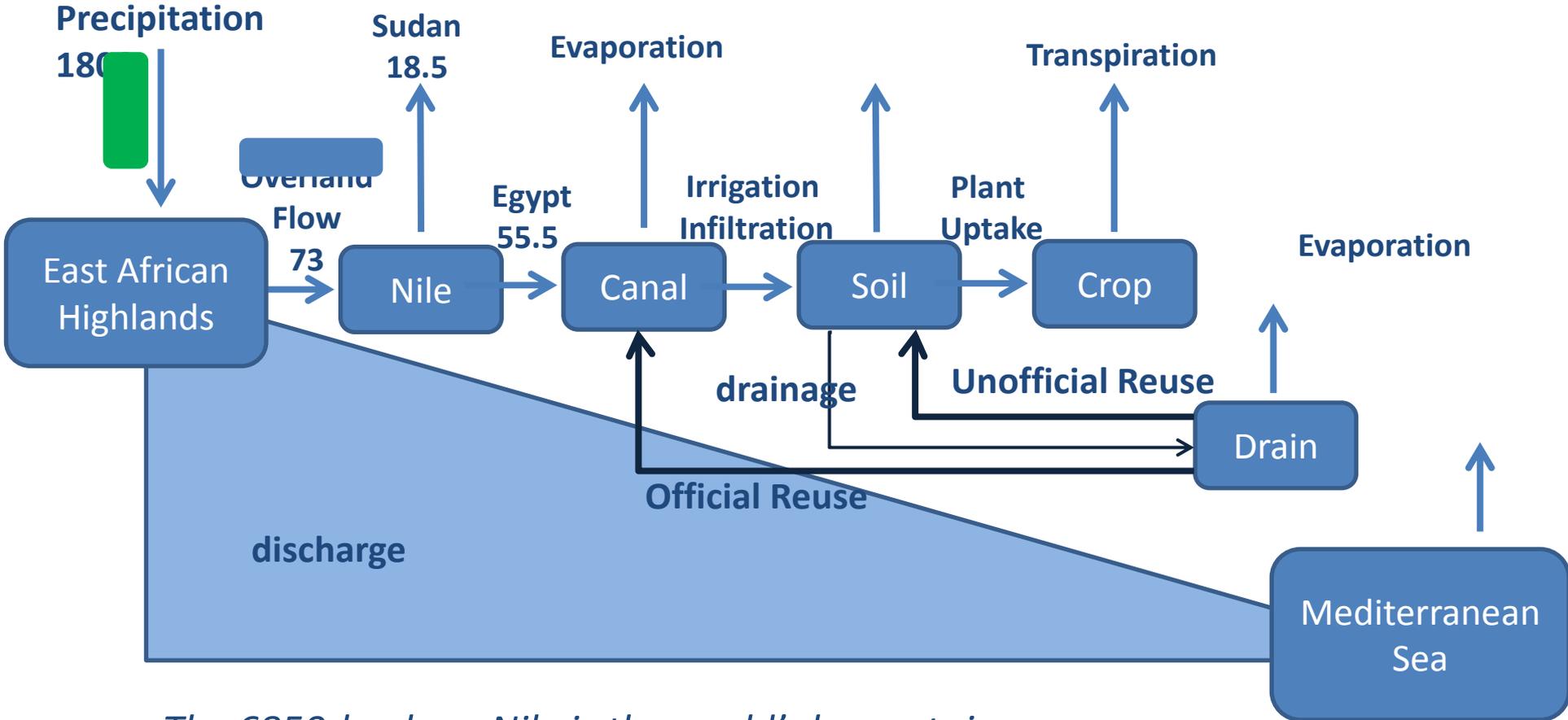


River Nile

1. Burundi,
2. Congo,
3. Egypt,
4. Eritrea,
5. Ethiopia,
6. Kenya,
7. Rwanda,
8. South Sudan,
9. Sudan,
10. Tanzania, and
11. Uganda.



The Nile Hydrological Cycle



The 6850-km long Nile is the world's longest river

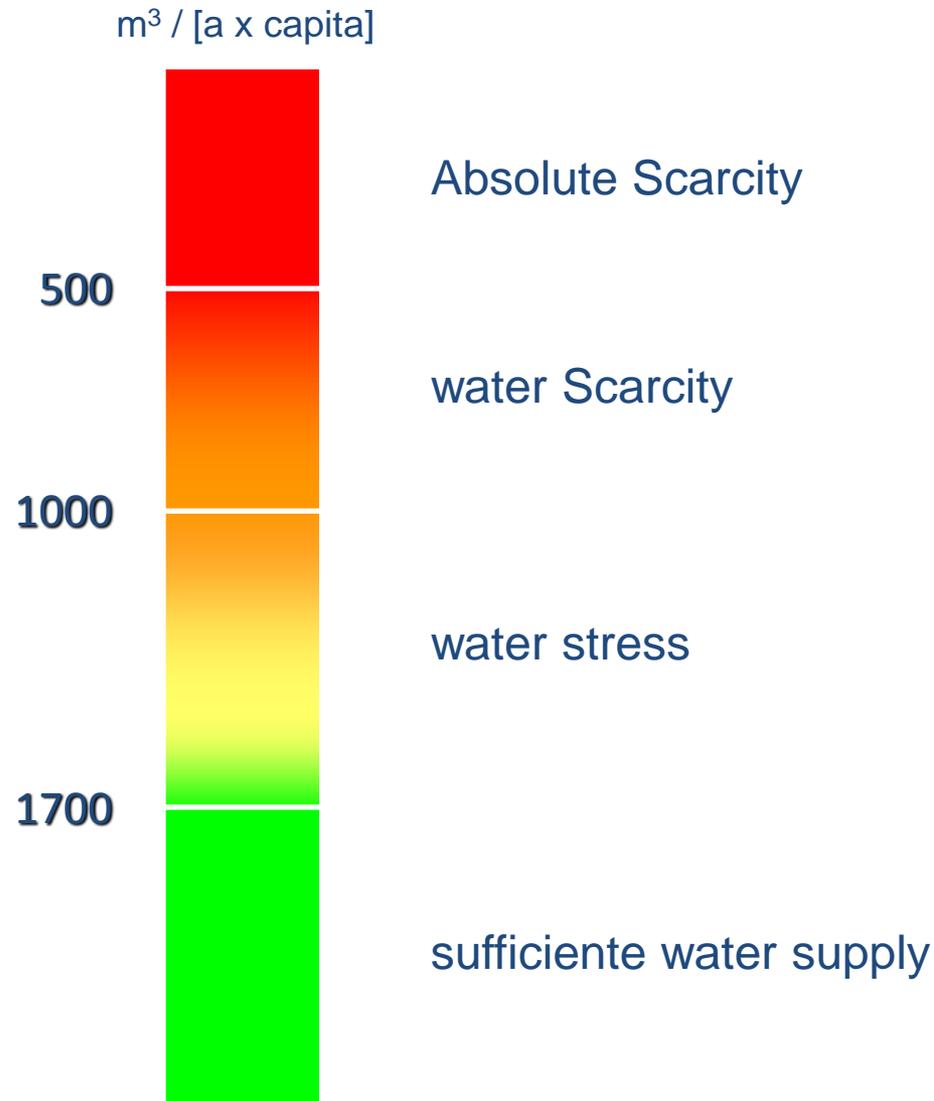


Important

- Quantity of rain water received by the upstream countries hits **1,800** BCM quota of downstream countries (Egypt and Sudan) hits **73** BCM annually, **55.5** billion of which goes to Egypt and **18.5** billion goes to Sudan.
- Egypt is receiving 55.5 and using 72 BCM

Egypt takes 3% (Blue Water) of the rain hits US countries (Green Water)

The Falkenmark Indicator





The river has three tributaries: the White Nile, the Blue Nile, and the Atbara.



The Grand Ethiopian Renaissance Dam

(Millennium Dam)

A dam to generate 6,000 MW of electricity.

To store 74 billion cubic metres,

Costs have been estimated at nearly \$5bn.



Historical Rights vs Equity & Efficiency



Water Footprint

The water footprint of a product is an **empirical indicator** of how much **water is consumed** and **polluted, when and where**, measured over the whole supply chain of the product.



1 glass of milk



200
litres

1 cup of tea



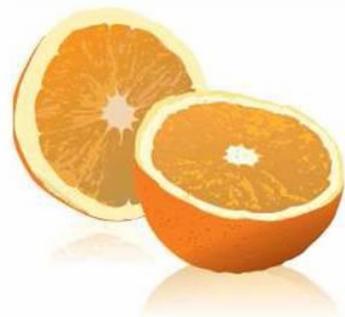
35
litres

1 cup of coffee



140
litres

1 orange



50
litres

1 apple



70
litres

1 glass of wine



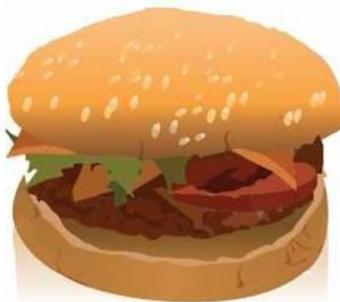
120
litres

1 potato



25
litres

1 hamburger



2400
litres

Virtual Water

VIRTUAL
WATER



4500

*litres of water for
one steak (300g) of*
Beef



Water Footprint



The blue water footprint refers to consumption of **blue water resources (surface and groundwater)** along the supply chain of a product.



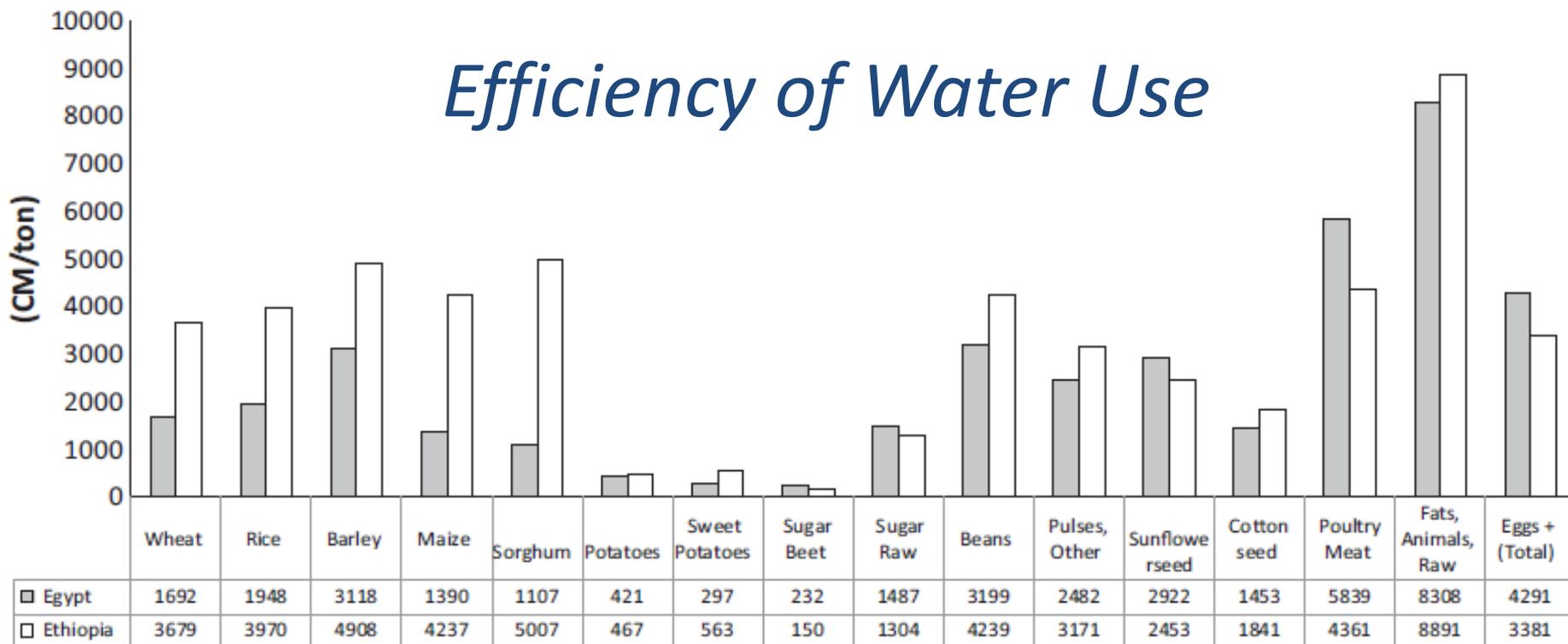
The green water footprint refers to consumption of **green water resources (rainwater insofar as it does not become run-off)**.



The grey water footprint refers to pollution and is defined as the **volume of freshwater that is required to assimilate the load of pollutants** given natural background concentrations and existing ambient water quality standards.

The water footprint of selected commodities in Egypt and Ethiopia.

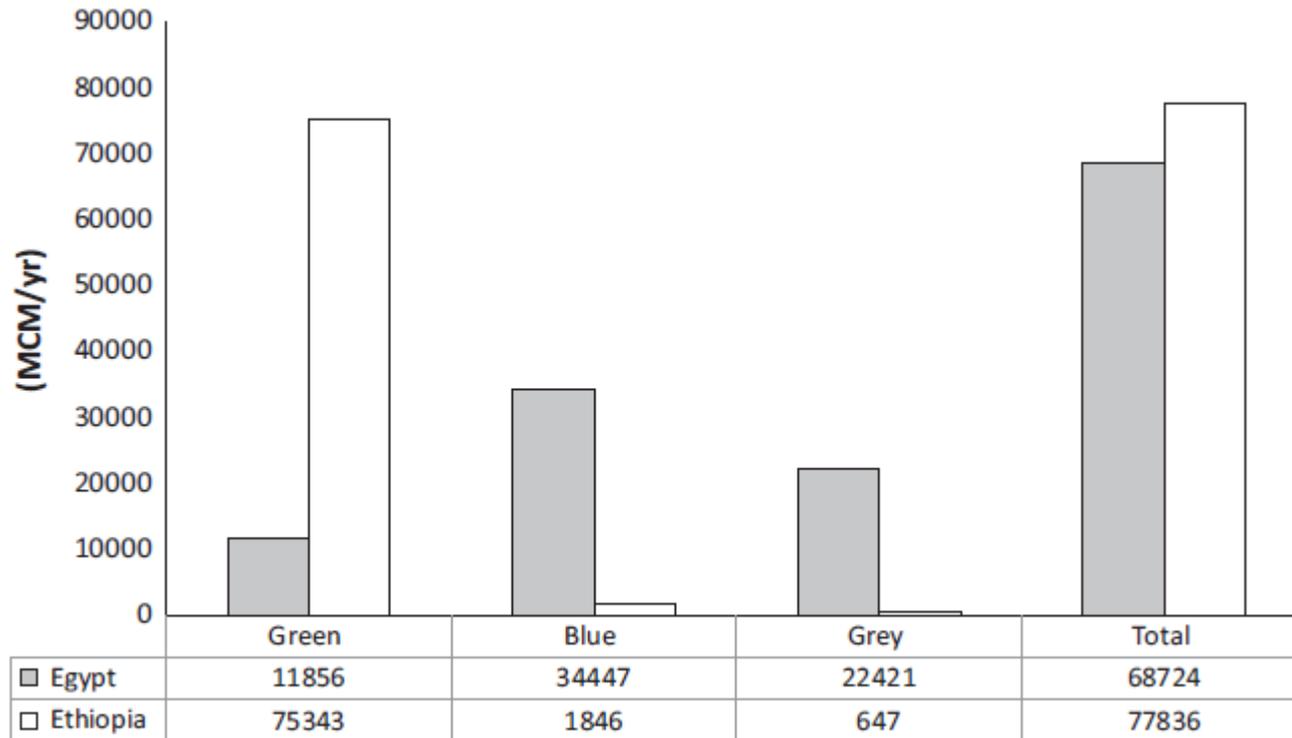
Efficiency of Water Use



(Sallam, 2014)



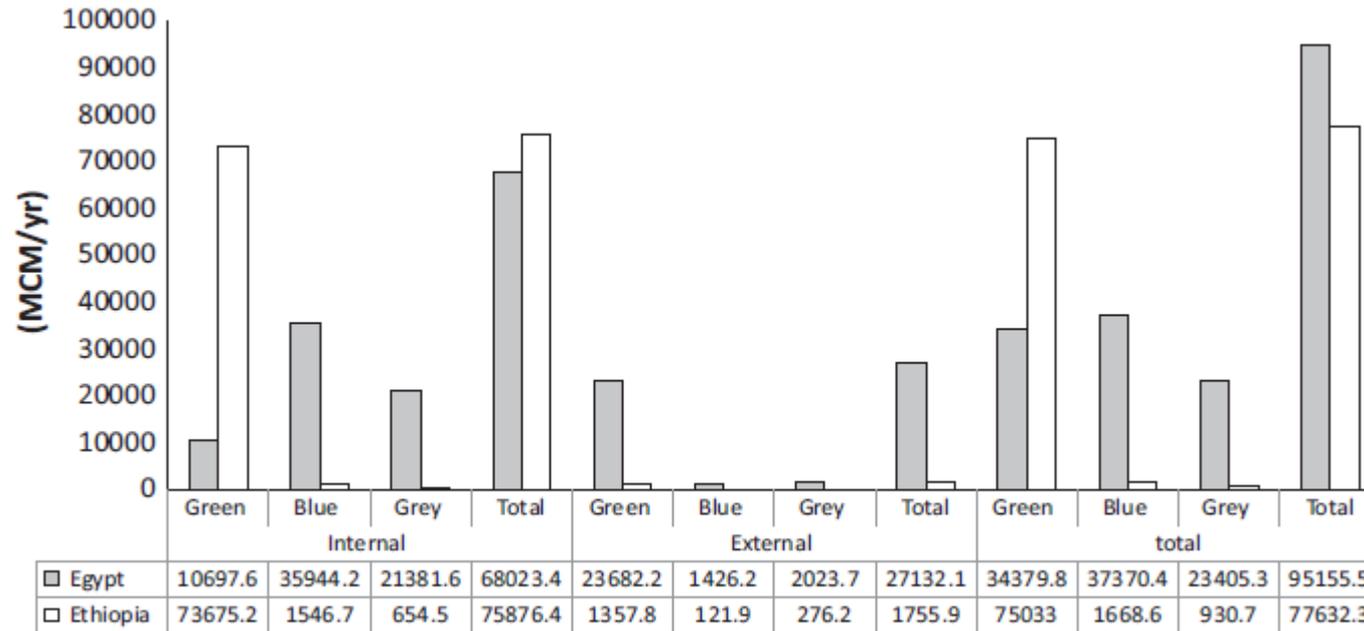
Water Availability / Equity



The average water footprint for total national productions within Egypt and Ethiopia during the period from 1996 to 2005 (Sallam, 2014)



Water Needs / Equity



Water footprint of total national consumption during the period from 1996 to 2005 (Sallam, 2014).



Historical Rights vs Equity & Efficiency

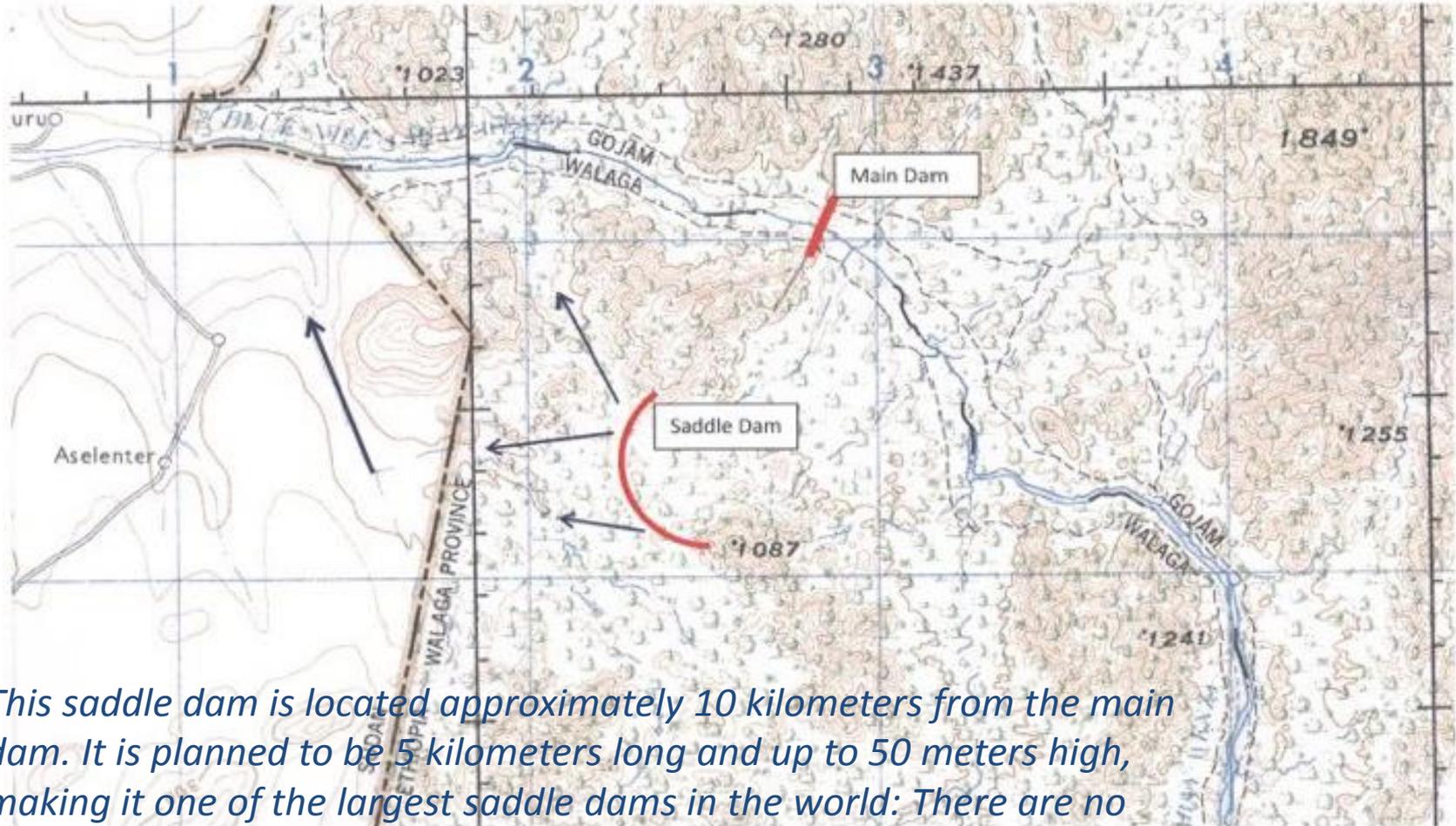


What are the main concerns of the GERD?

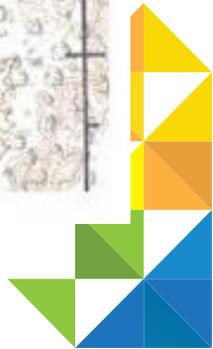


What are the main concerns of the GERD?

1. Assessing the design and identifying whether there is a significant harm on downstream countries (**Safety**).



This saddle dam is located approximately 10 kilometers from the main dam. It is planned to be 5 kilometers long and up to 50 meters high, making it one of the largest saddle dams in the world: There are no control works for the release of water from the saddle dam.



What are the main concerns from the Dam?

2. Assessing the design and identifying whether there is a *significant harm* on downstream countries (**Operation**).

Filling Policy

>50 years under the 5% flow policy

7 years (on average) under the 25% flow policy

25% filling policy will affect the flow reaching HAD by 11.5% (Zhang, et. Al 2015)



Ethiopian Future Plan

Table 1: Planned Hydropower Projects in Ethiopia

Project	Capacity (MW)	Average Energy (GWh/yr)	Commissioning Year
Fan	100	212	2011
Gibe III	1870	6400	2013
Genale 3	258	1200	2014
Halele Werabesa	422	2233	2015
Chemoga Yeda	278	1250	2015
Genale 6	256	1000	2015
Geba 1 and 2	366	1788	2015
GERD	5250*	15000	2014-2015
Total	8800	29083	

Source: EEPCO "Highlights on Power Sector Development Program (2010 – 2015 G.C.) Oslo 2011

Notes:

1. Gibe III now expected to be commissioned in 2015
2. GERD capacity now reported as 6000 MW
3. GERD now expected to be commissioned in 2017



What are the available scenarios?



Black Scenario

Current Negotiations

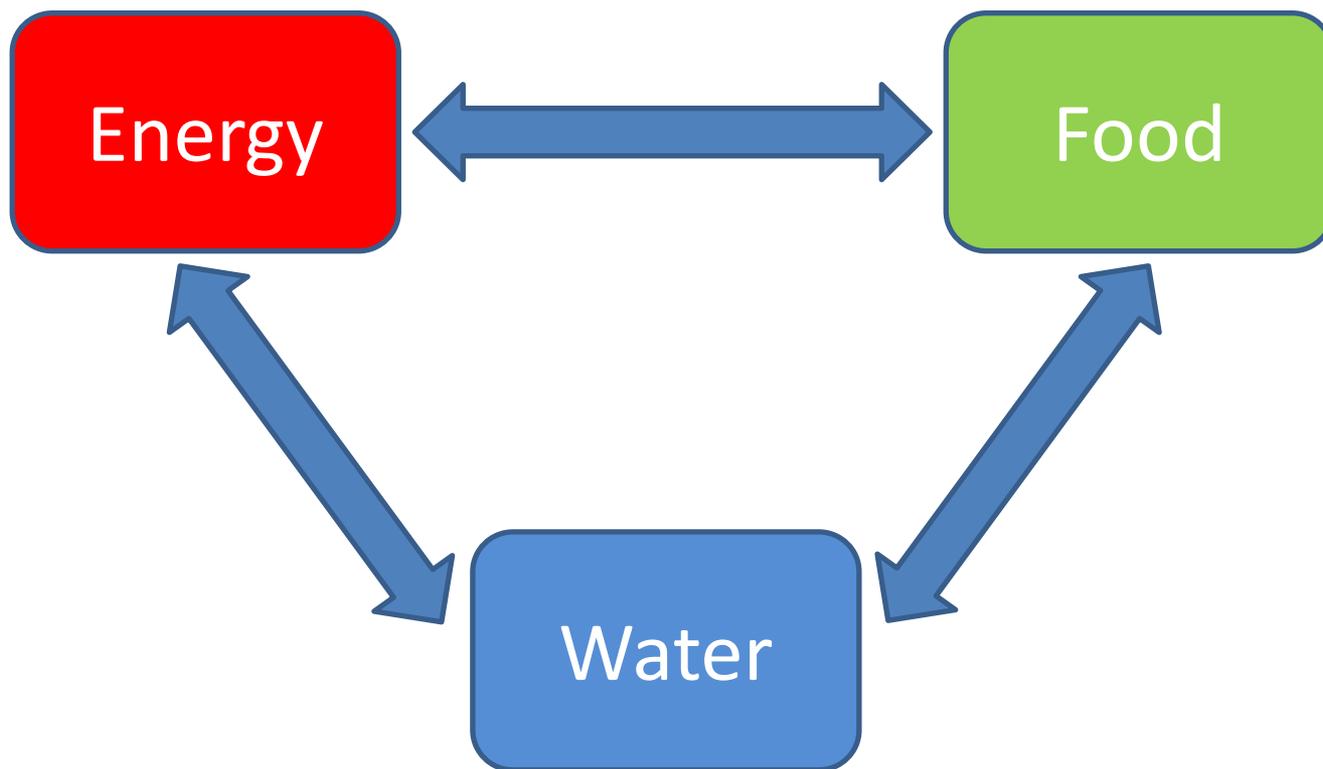


Gray Scenario

The International Law Commission of the United Nations endorsed the principle of equitable utilization in 1991 so long as an upstream riparian did not cause appreciable “harm” to those downstream who had established “historic entitlement” to the water by need, development, and use without its agreement.



Blue Scenario



To feed them in 2050 we have to produce more food than what we produced over the last 8000 Years





Thank You

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