KEY WATER ISSUES IN AFRICAN AND ETHIOPIAN PERSPECTIVES AMID WATER RELATED SUSTAINABLE DEVELOPMENT CHALLENGES

Water Catalyst Award Lecture

Hamilton, ON, Canada

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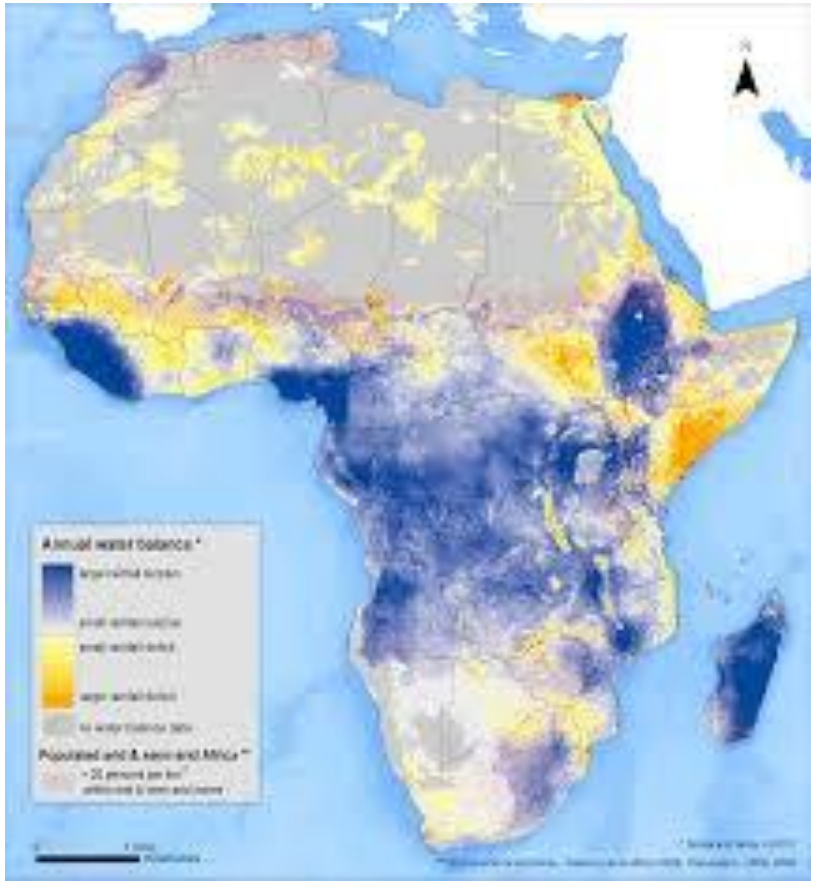
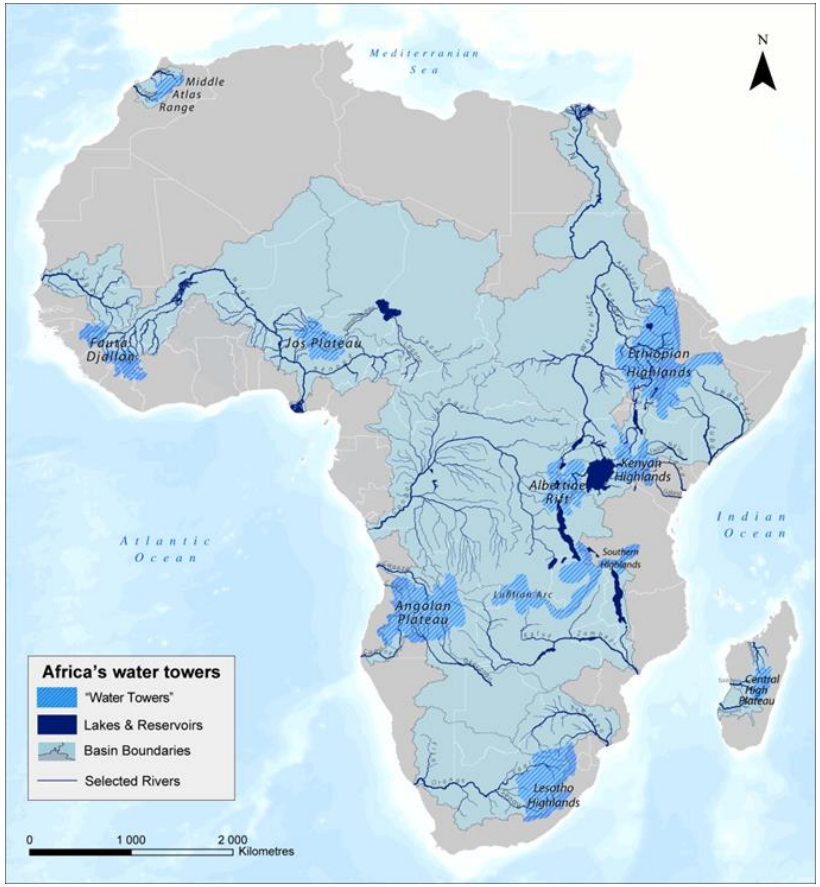
21st July, 2017

OUTLINE

- African Water Resources
- African Water Challenges
- Opportunities of Recent Global Policies
- Progresses in Ethiopia

AFRICAN WATER RESOURCES





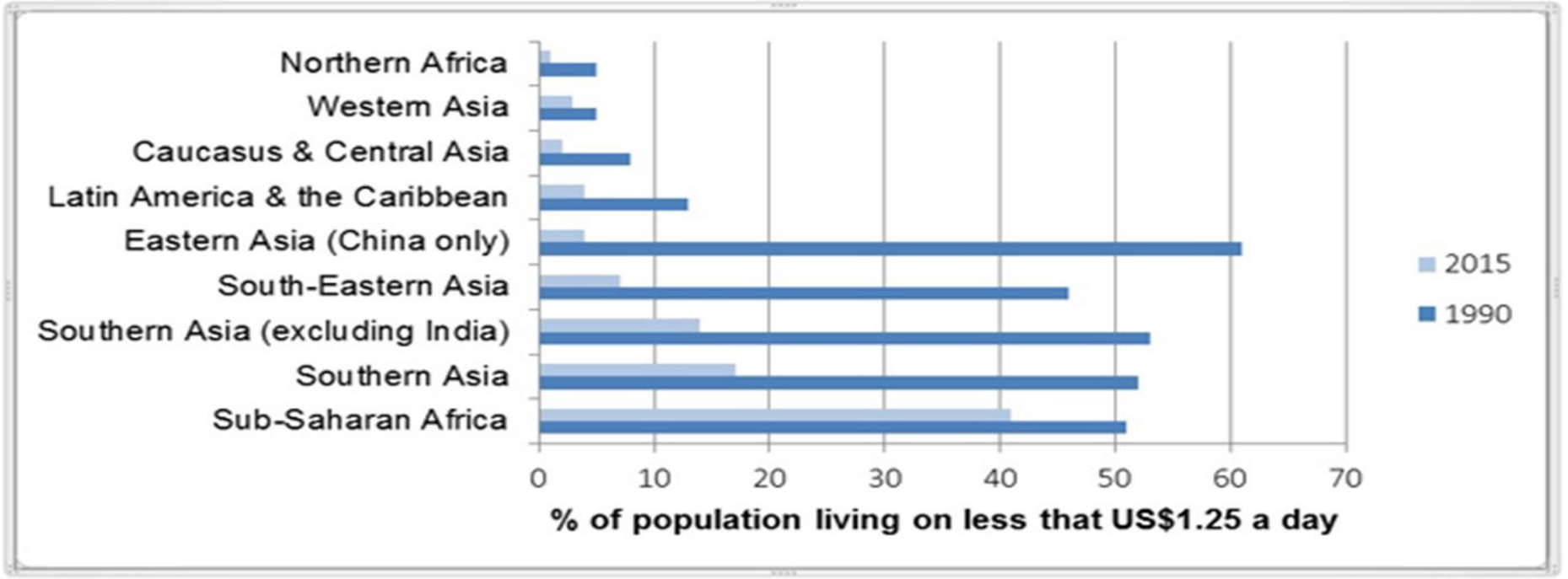
AFRICAN WATER RESOURCES CHALLENGE

(https://na.unep.net/atlas/africaWater/downloads/chapters/africa_water_atlas_123-174.pdf)

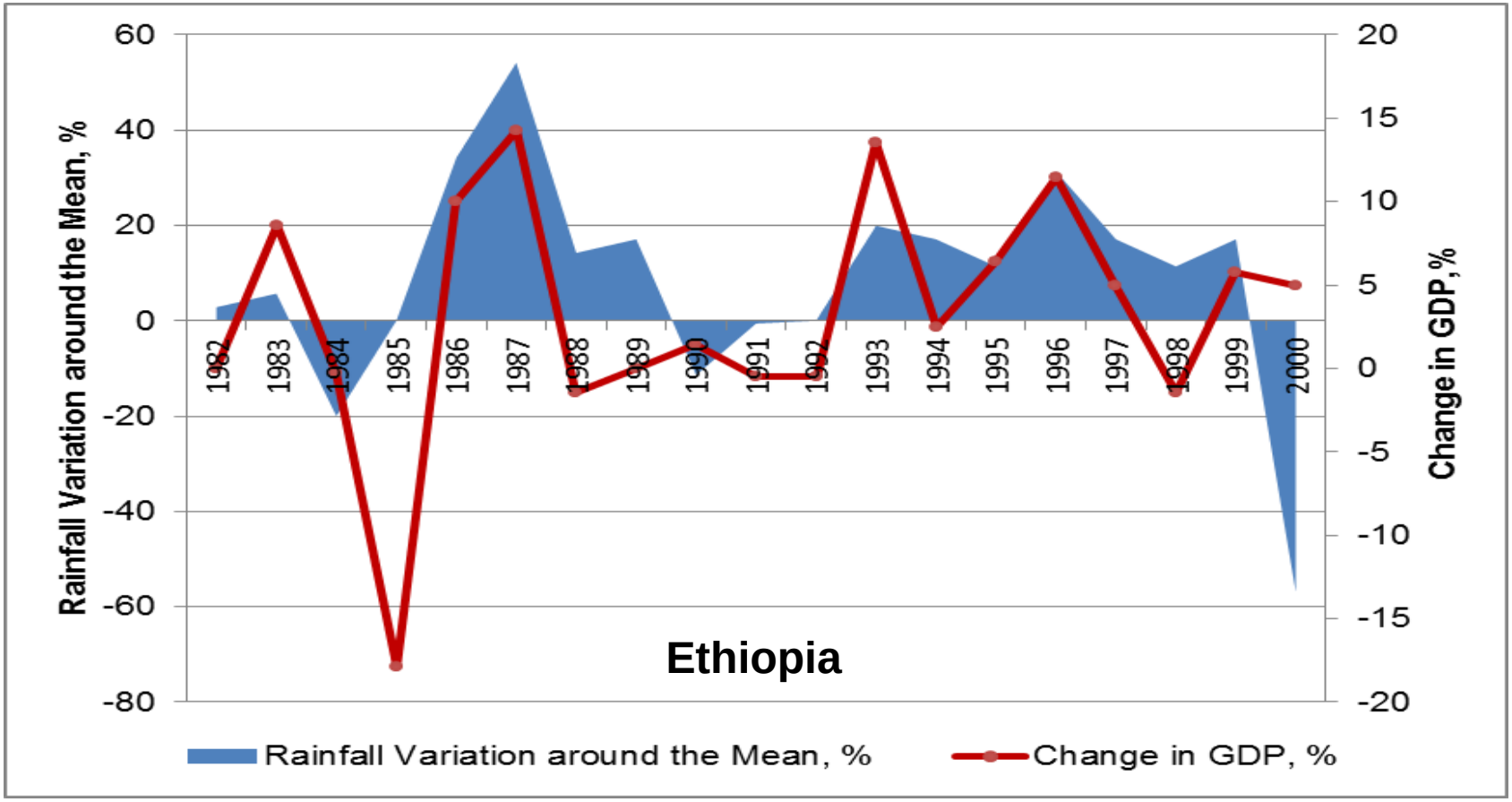
The nine major challenges that Africa faces in addressing its water resource issues:

1. *Provide Safe Drinking Water*
2. *Ensure Access to Adequate Sanitation*
3. *Foster Cooperation in Trans-boundary water Basins*
4. *Provide for Food Security*
5. *Develop Hydropower to Enhance Energy Security*
6. *Meet Growing Water Demand*
7. *Prevent Land Degradation and Water Pollution*
8. *Manage Water under Global Climate Change*
9. *Enhance Capacity to Address Water Challenges*

CONTEXT:
AFRICA LAGS BEHIND IN ITS BID TO ERADICATE EXTREME POVERTY

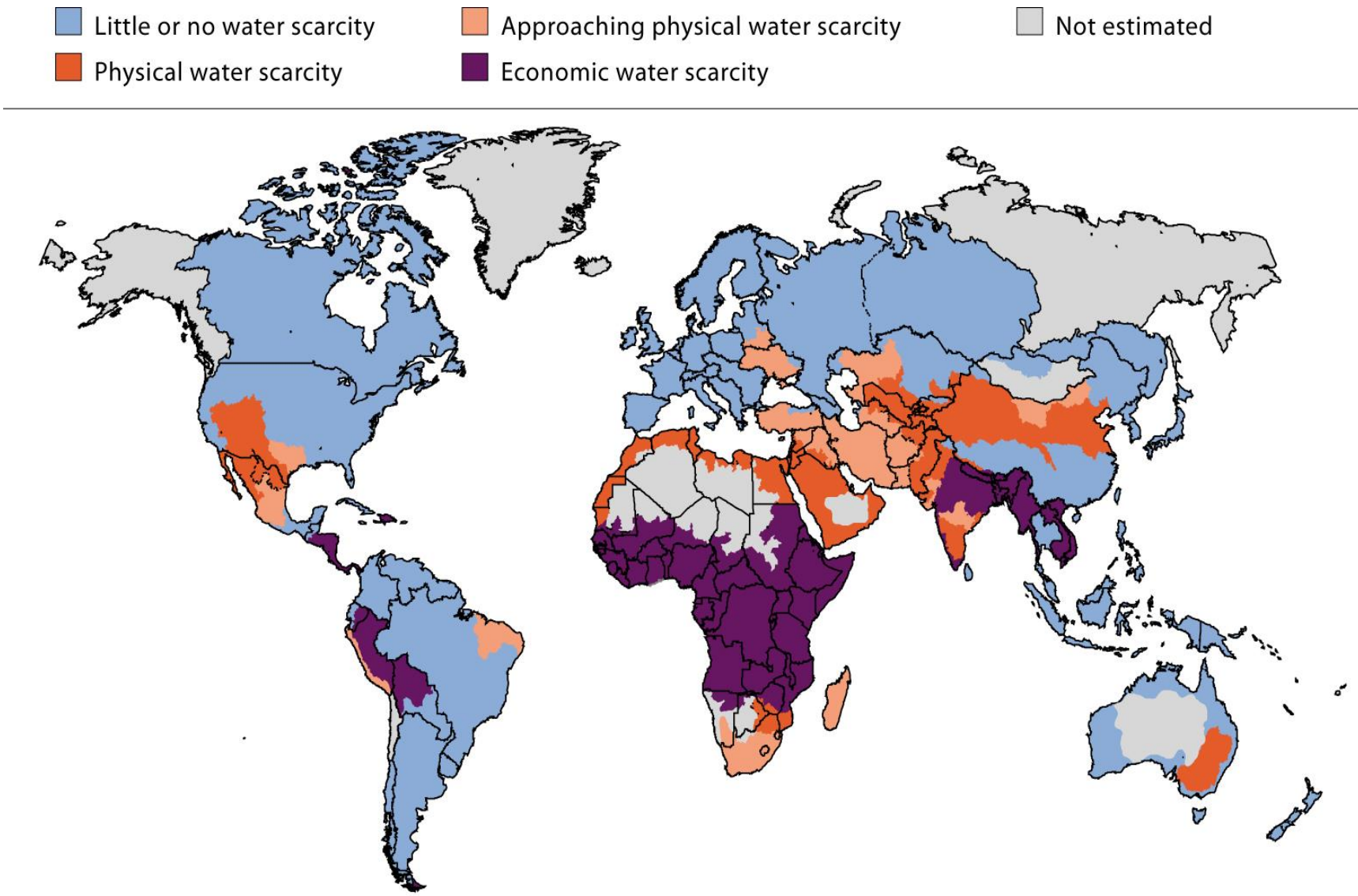


WATER SCARCITY ≈ FOOD INSECURITY



Source: World Bank, 2006

WATER SCARCITY



1/3 of the world's population live in basins that have to deal with water scarcity

ANNUAL WATER WITHDRAWAL OF AFRICA

FIGURE 10
Annual water withdrawal per inhabitant

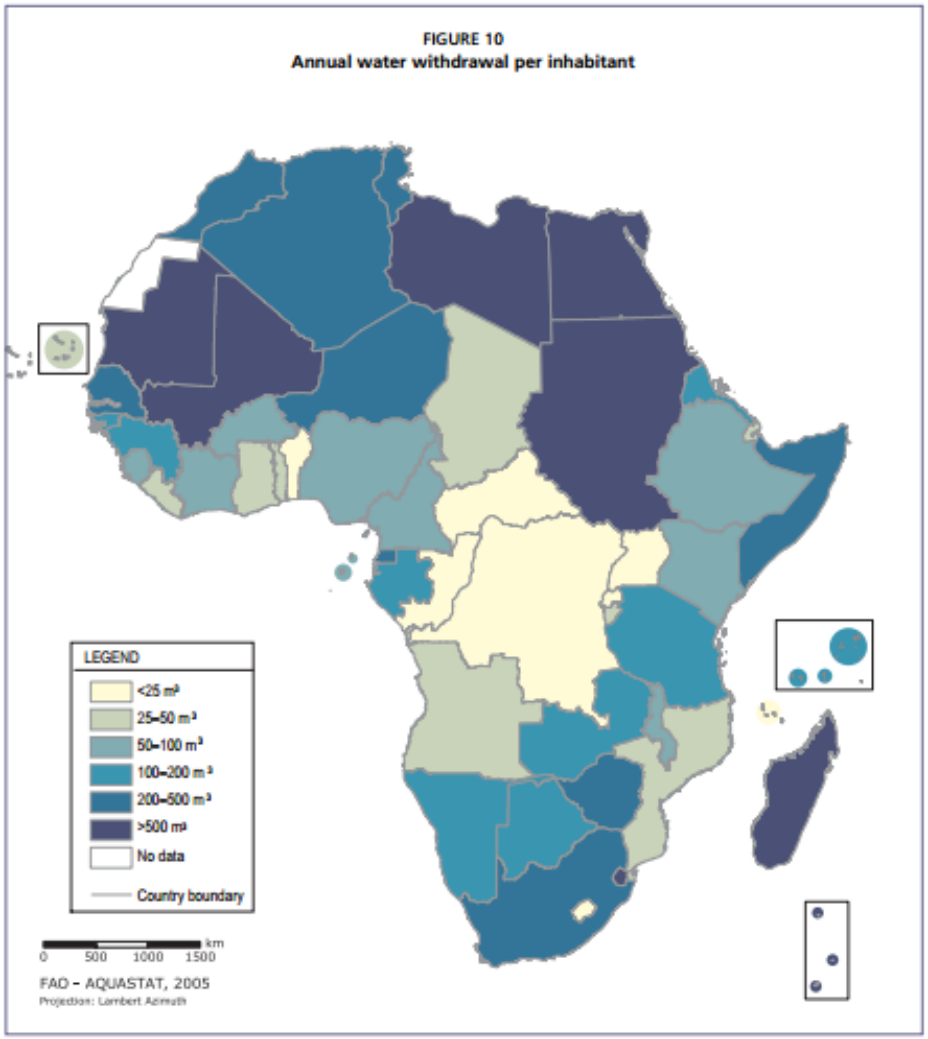
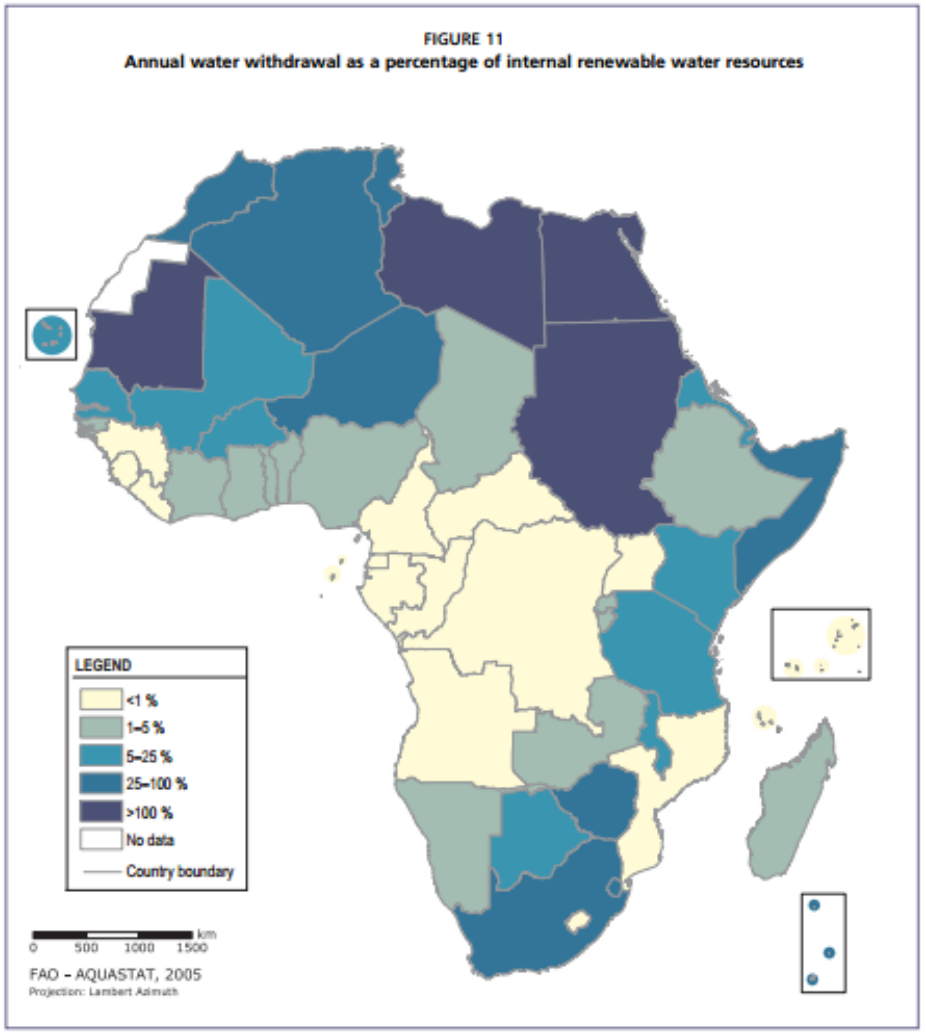
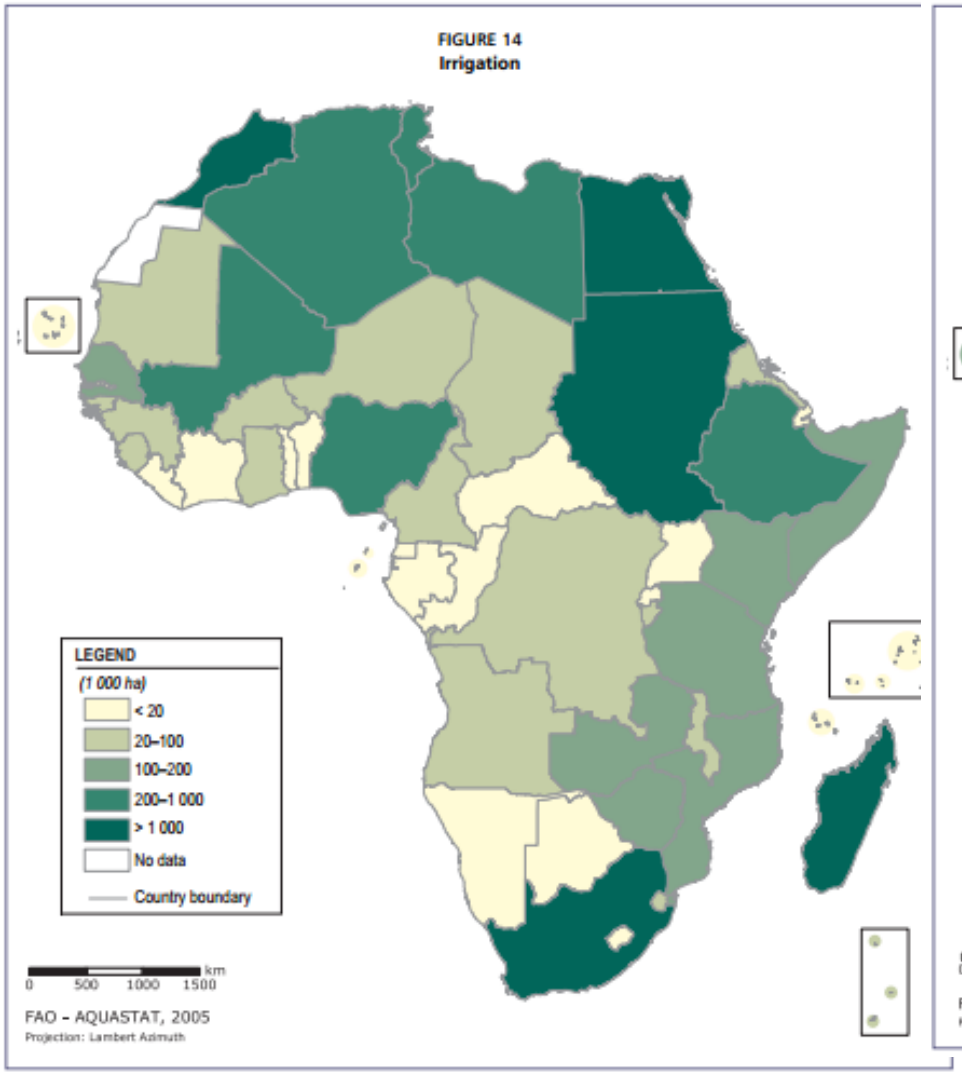
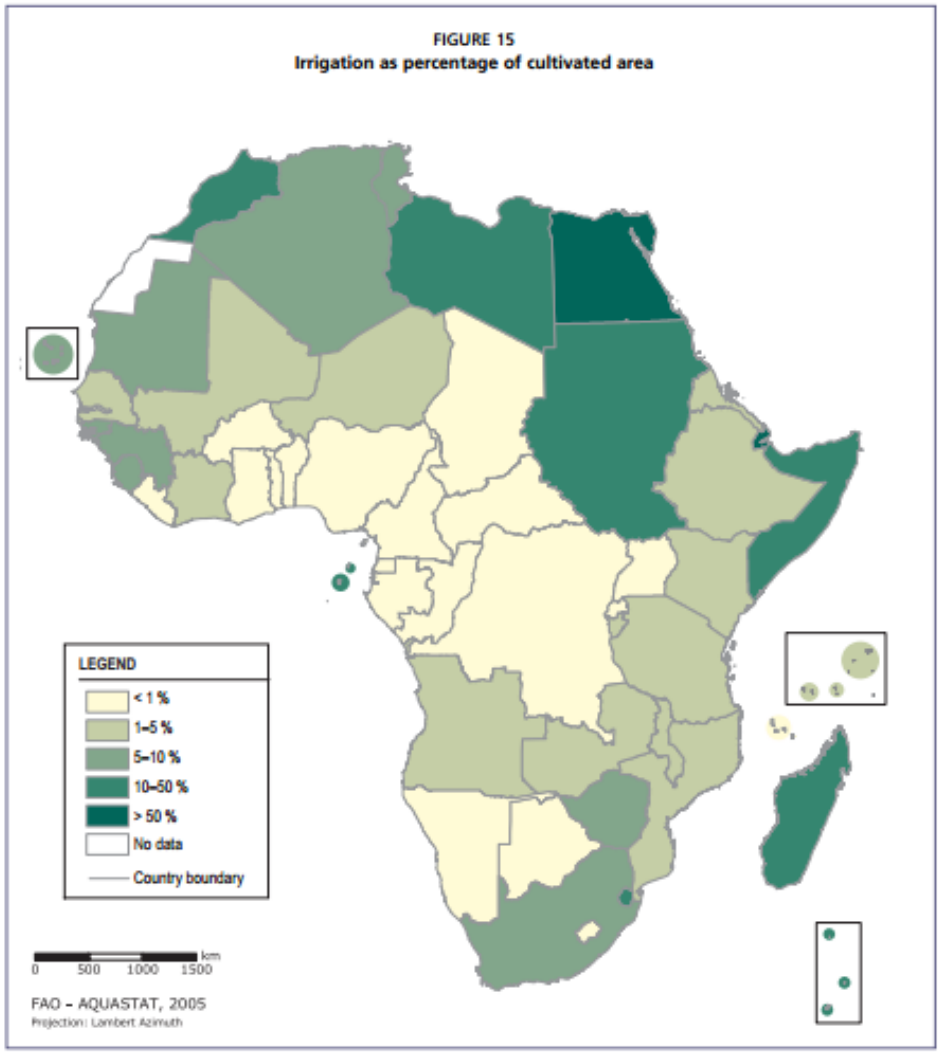


FIGURE 11
Annual water withdrawal as a percentage of internal renewable water resources



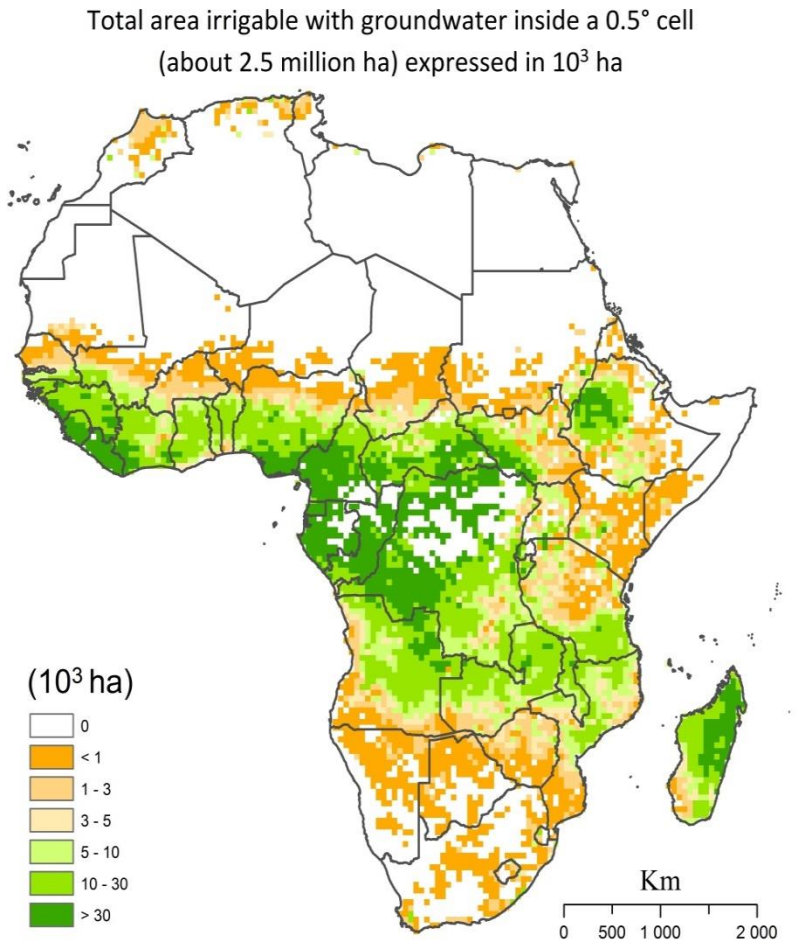
ACTUAL IRRIGATION OF AFRICA

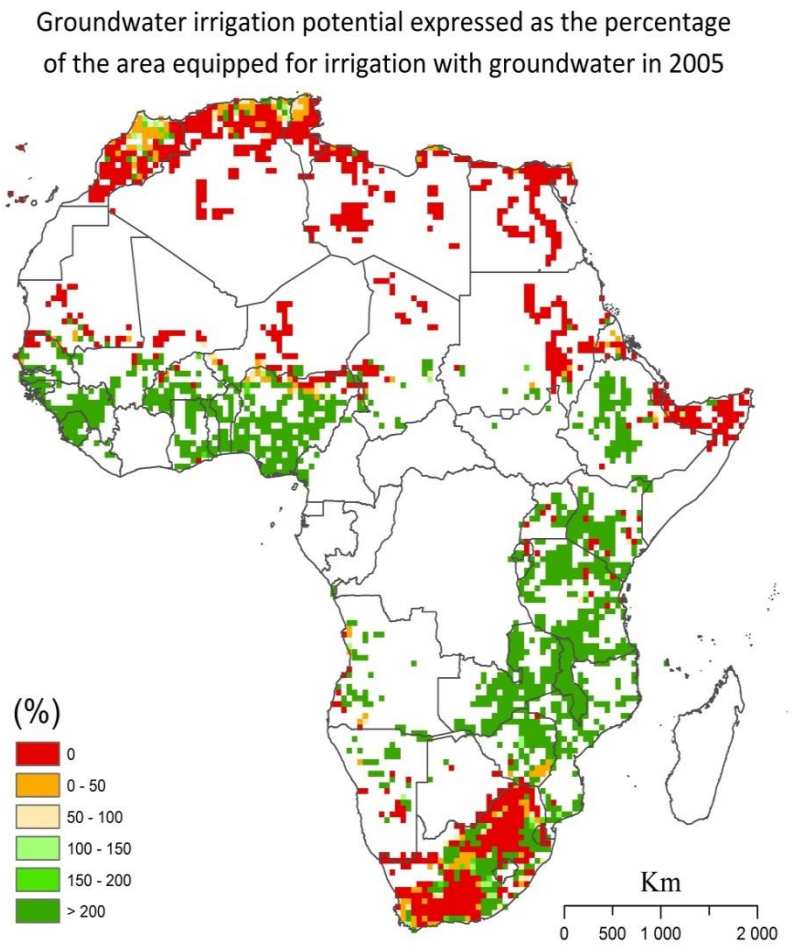




CONTEXT:
AFRICAN EXTENSIFICATION COMPARED WITH ASIAN INTENSIFICATION

MAPPING THE GROUNDWATER IRRIGATION POTENTIAL IN AFRICA

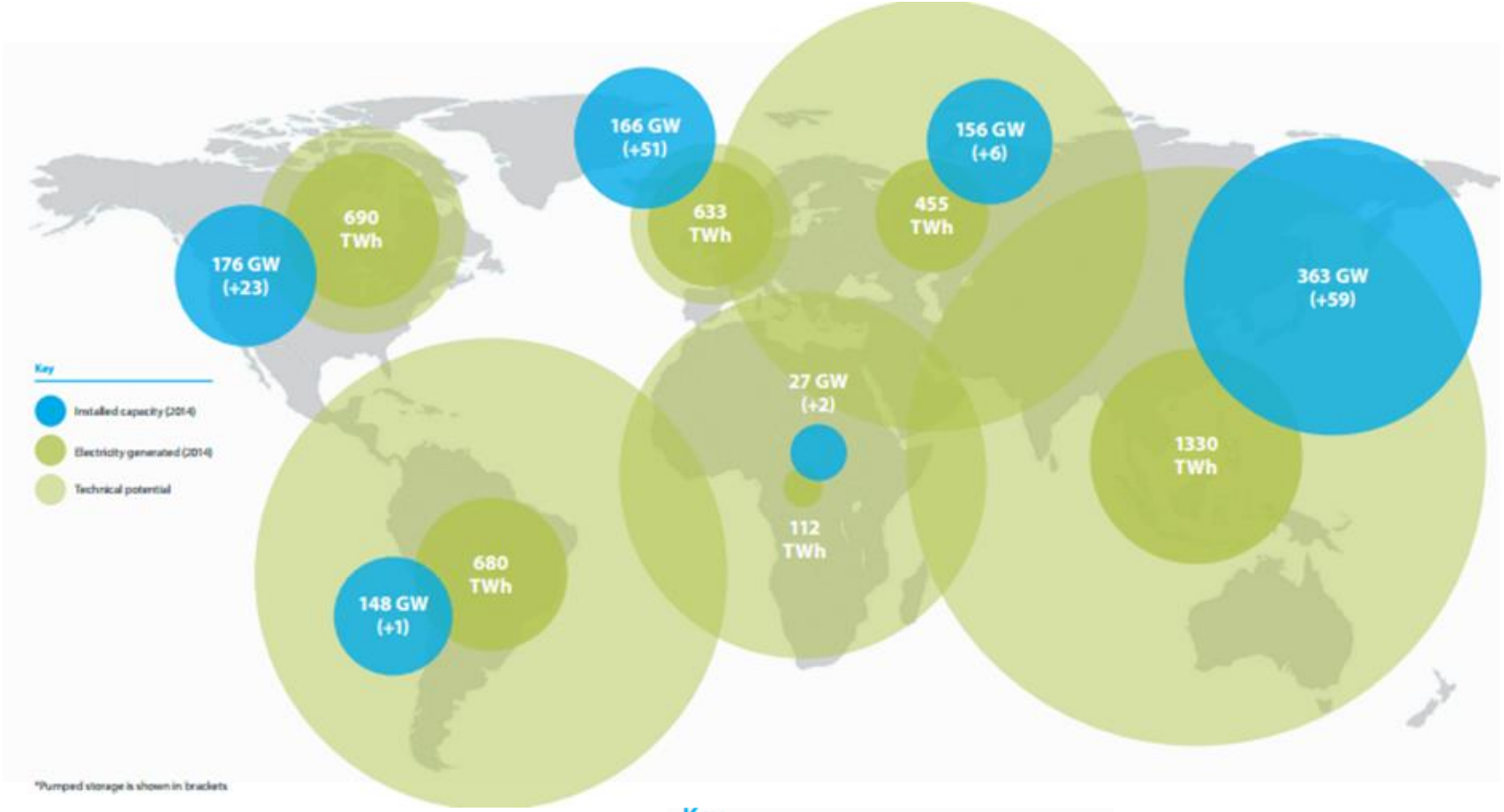




Publication:

Altchenko, Y. and K.G. Villholth, 2015. Mapping irrigation potential from renewable groundwater in Africa – a quantitative hydrological approach. Hydrol. Earth Syst. Sci., 19, 1055-1067. doi:10.5194/hess-19-1055-2015.

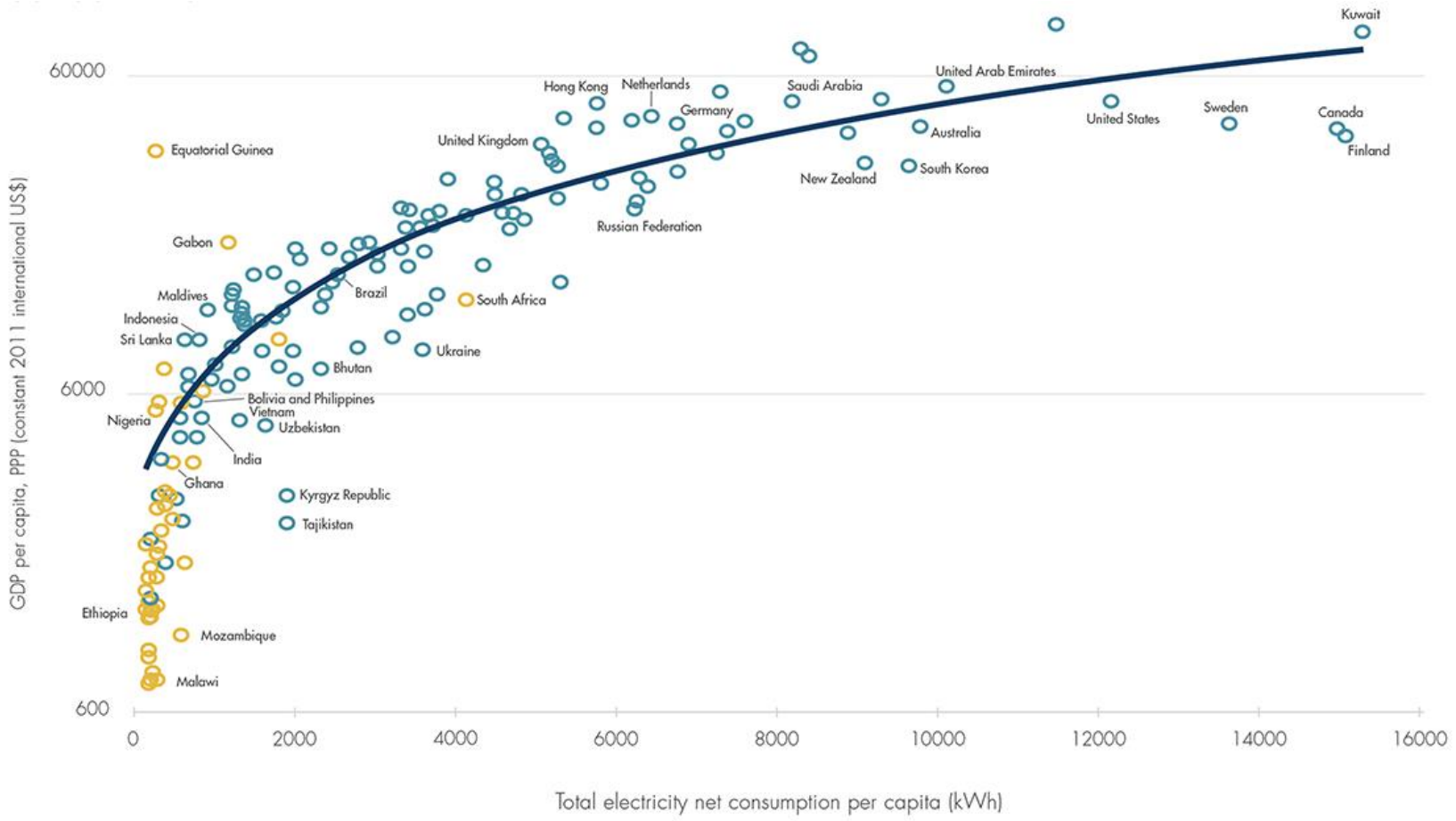
HYDROPOWER POTENTIAL, INSTALLED 2015



Key

- Installed capacity (2014)
- Electricity generated (2014)
- Technical potential

HIGHER INCOME
AND HIGHER ENERGY CONSUMPTION



WATER SUPPLY

147 countries[1] have met the MDG drinking water target

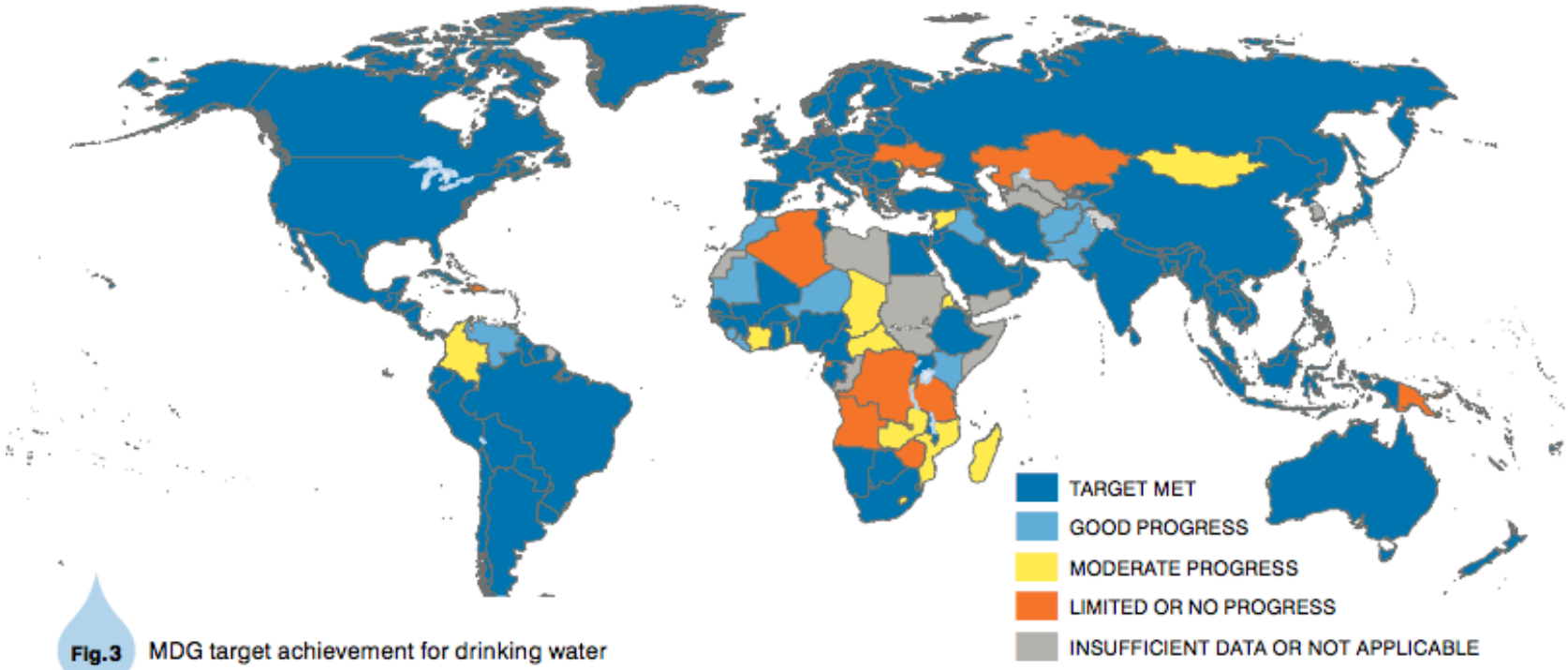
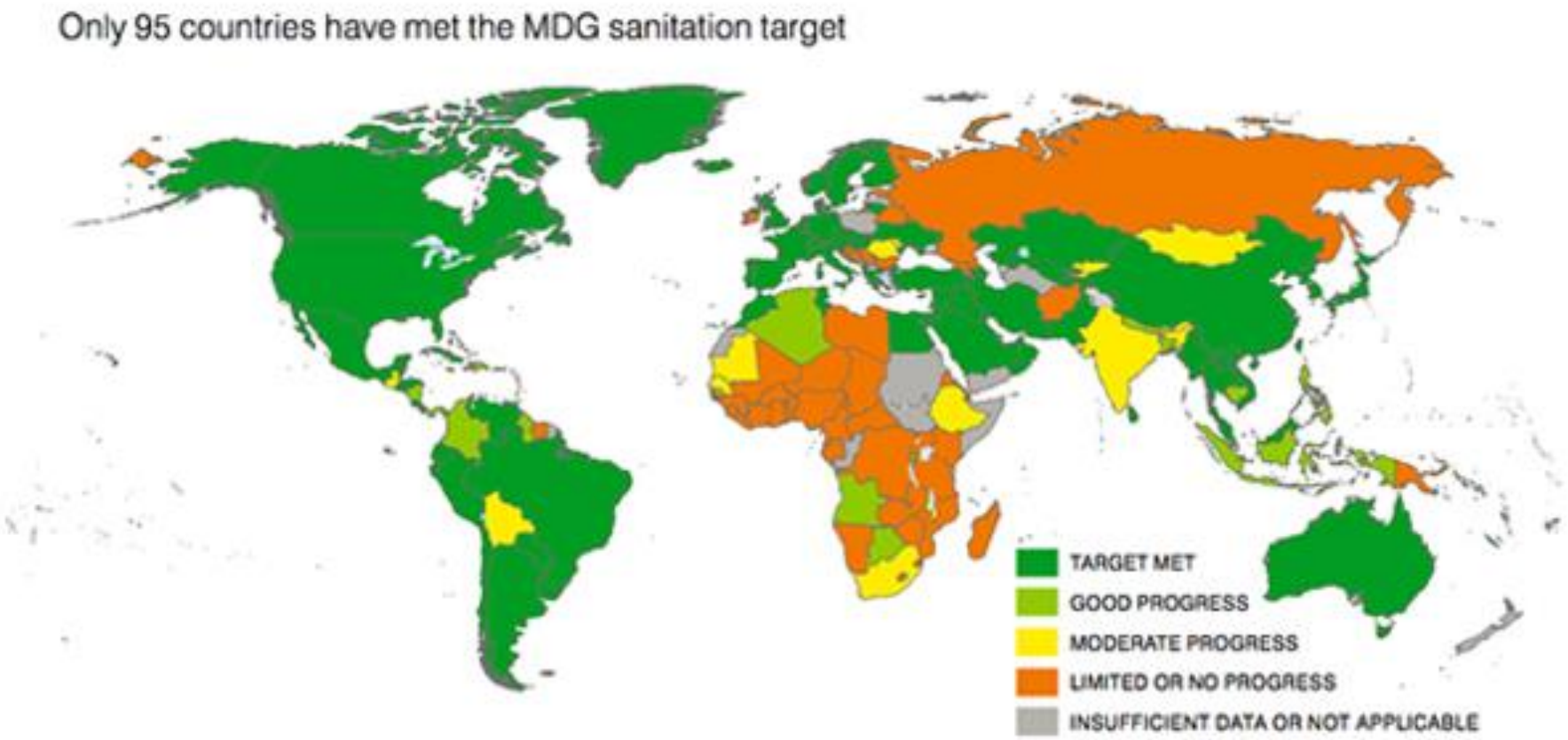


Fig.3 MDG target achievement for drinking water

SANITATION


Only 95 countries have met the MDG sanitation target
TARGET MET
GOOD PROGRESS
MODERATE PROGRESS
LIMITED OR NO PROGRESS
INSUFFICIENT DATA OR NOT APPLICABLE

OPPORTUNITIES OF RECENT POLICIES

- MDG
- SDGs
- Paris 21
- Africa Agenda 2063

Specific Challenges

- Rapid Growth of Population
- Climate Change Induced Drought
- Shortage of Capital
- Nexus of Water Challenges – Health, Education

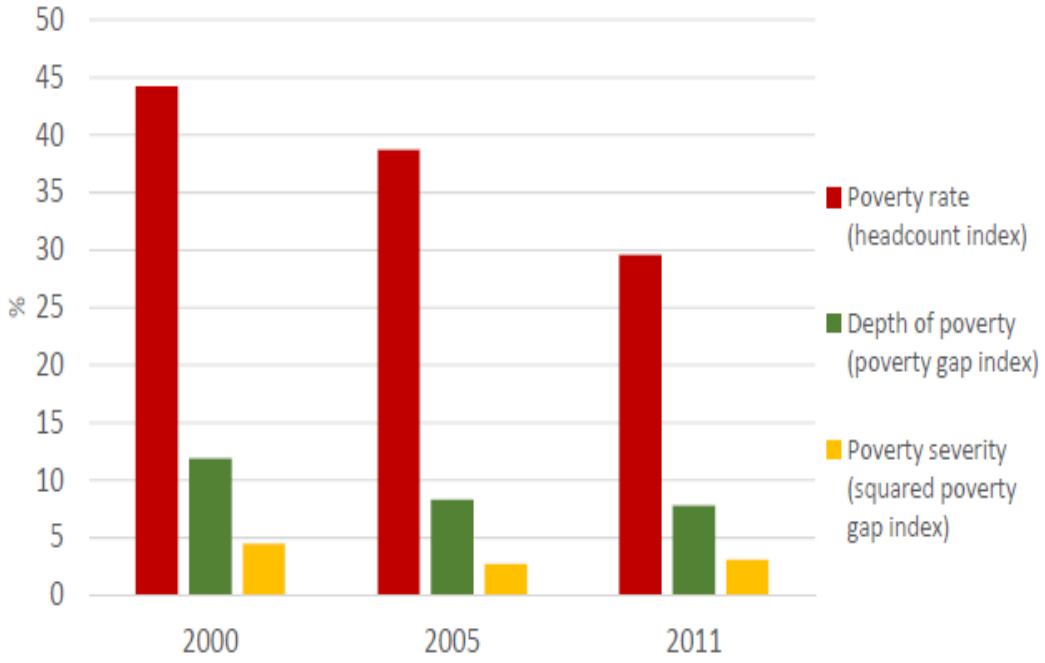
ETHIOPIA-SITUATION

- Country in the horn of Africa
- Total area - 1.13 km^2
- ~ 100 million inhabitants, 2.3% growth rate/year
- Average annual GDP growth rate ~ 10 % - for over decade

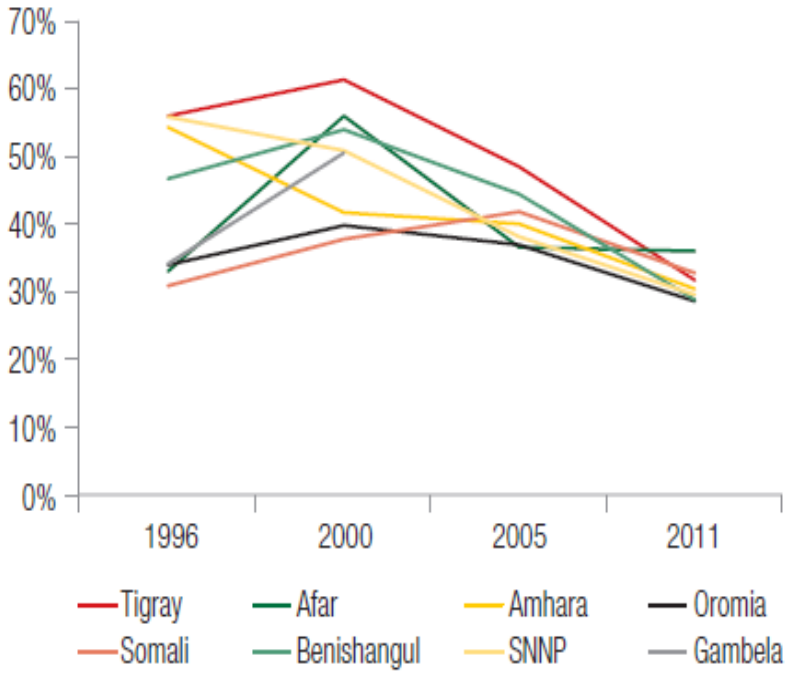
- Water Resources Policy : efficient, equitable and optimum utilization of WR for significant SED on sustainable basis
- Overall objective of water supply and sanitation policy:
  - Enhance the well-being and productivity of the Ethiopians through provision of adequate, reliable and clean WSS services
  - Providing water supply services that meet the livestock, industry and other water users' demands

National poverty rates fell by a third since 2000 and converged across regions

National poverty headcount



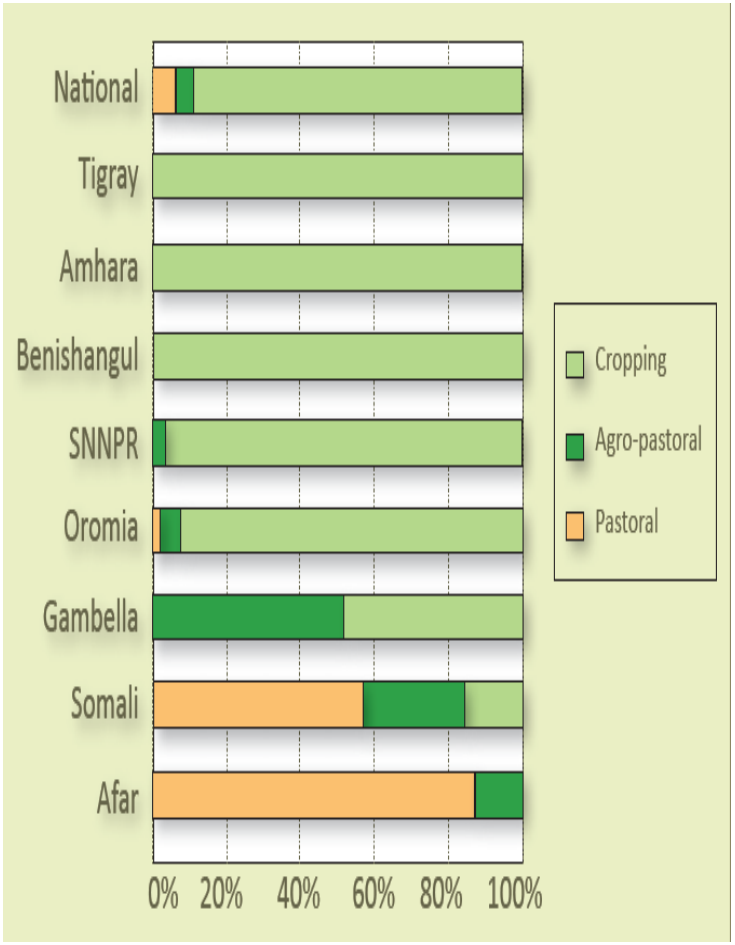
Poverty headcount by Region from 1996 to 2011



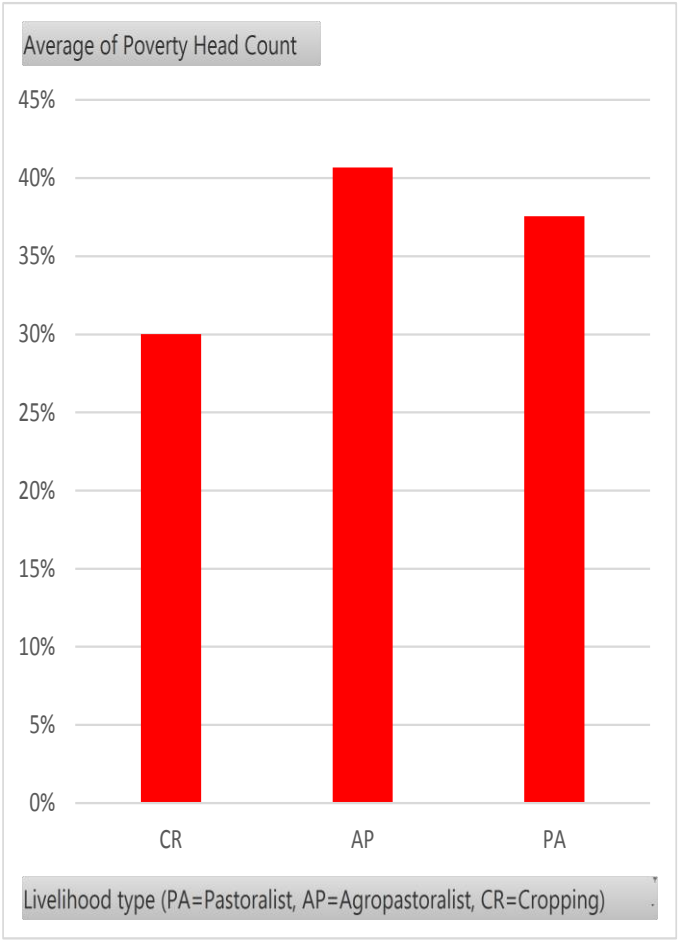
Source: Own calculations using HICES 1996, HICES 2000, HICES 2005 and HCES 2011.

Livelihoods and Poverty

Livelihood types by region



Poverty rates higher among pastoralists and agro-pastoralists



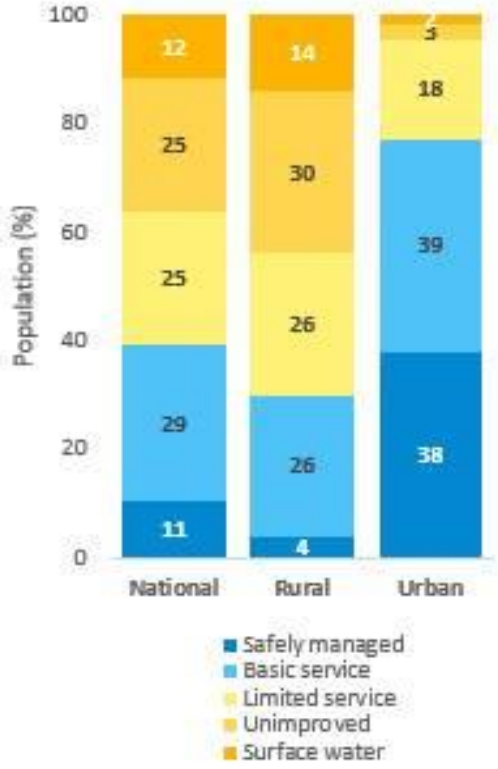
WASH Poverty Diagnostic | SERIES

Big shift in service delivery over past 20 years

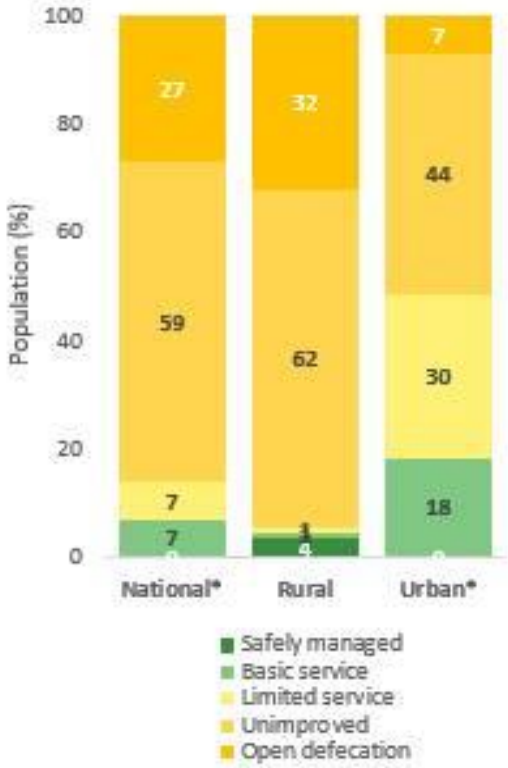
Rural sanitation	Urban sanitation	Rural water	Urban water
From open defecation to basic sanitation **40 million people** have built basic latrines and no longer defecate in the open	From basic latrines to improved facilities **8 million people** have gained access to improved toilet facilities	From surface to improved sources **35 million people** have gained access to water from piped systems, protected hand-pumps and springs	From public taps to taps in the compound **10 million people** have joined those with access to more convenient piped water in their home or compound

- Targets: by 2025 with standards of 40 to 100 LCD urban and 25LCD at maximum distance of 1km in rural areas – reach 100%?
- ODF

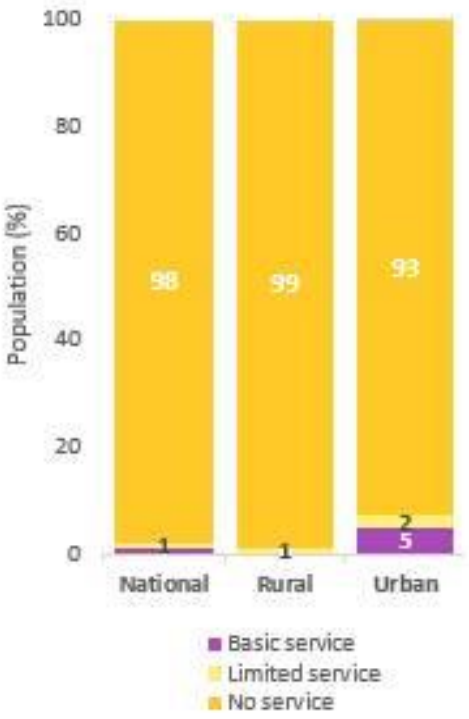
Drinking water



Sanitation



Hygiene



*No safely managed estimate available

Ethiopia	Drinking water			Sanitation			Hygiene		
	National	Rural	Urban	National*	Rural	Urban*	National	Rural	Urban
	2015	2015	2015	2015	2015	2015	2015	2015	2015
Safely managed	11	4	38	-	4	-	-	-	-
Basic service	29	26	39	7	1	18	1	0	5
Limited service	25	26	18	7	1	30	1	1	2
Unimproved	25	30	3	59	62	44	-	-	-
No service	12	14	2	27	32	7	98	99	93

Source: WHO/UNICEF JMP (2017)

MAJOR CHALLENGES OF WS SYSTEM

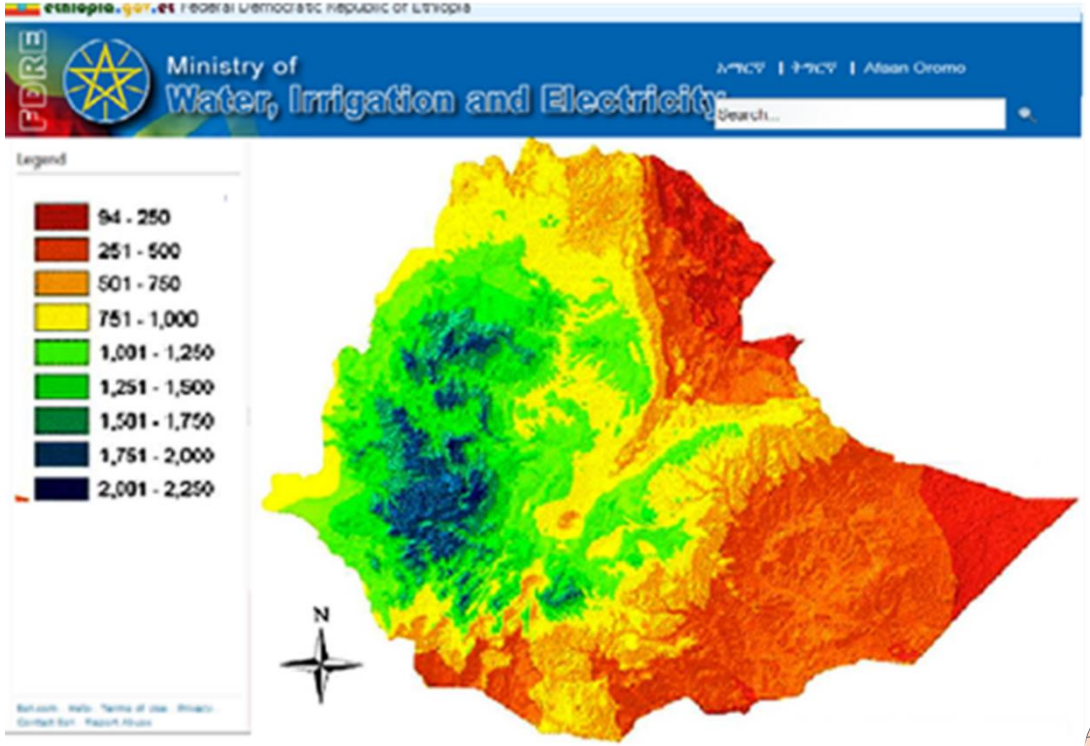
- 40 Million people without access
- Meeting quality, safety and reliability of WS systems
- O&M - non-functional system estimated 23%
- Matching infrastructure with growing population
- **Occurrence of frequent drought exacerbated by CC**
- **Non resilient WS infrastructure**
- Insufficient distribution network and supply points as per standards
- Consequential hazards on health, LLH and environment

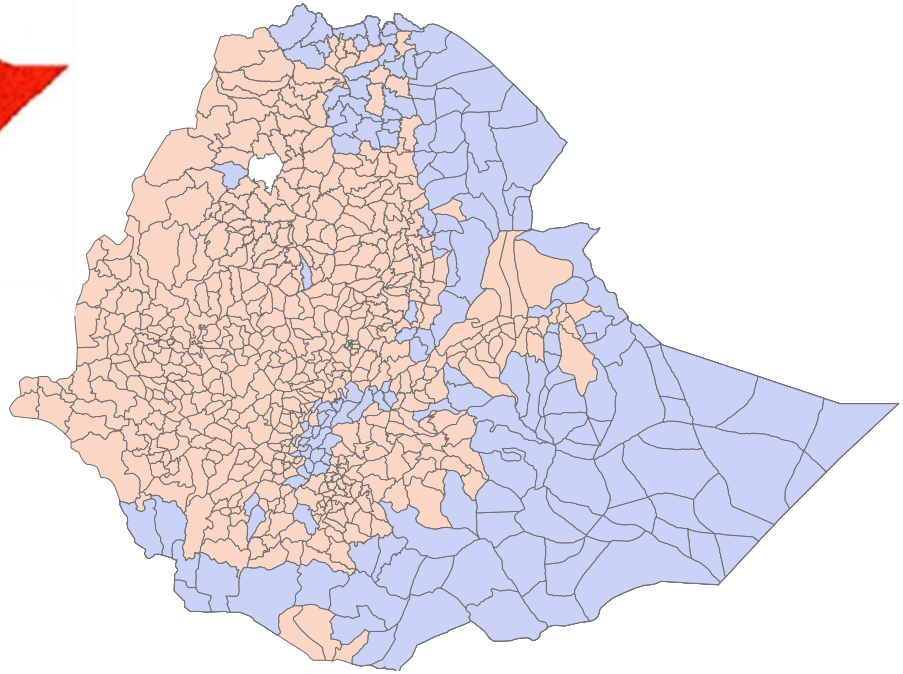
STRATEGIC AREAS OF WSS SYSTEM

1. Urban water supply and sanitation
2. Rural water supply and sanitation
3. Institutional water supply and sanitation – expand beyond Schools and Health
4. Reliable water supply in drought prone arid and semi-arid areas considered as Resilient WaSH
5. Governance, management and capacity development for WSS

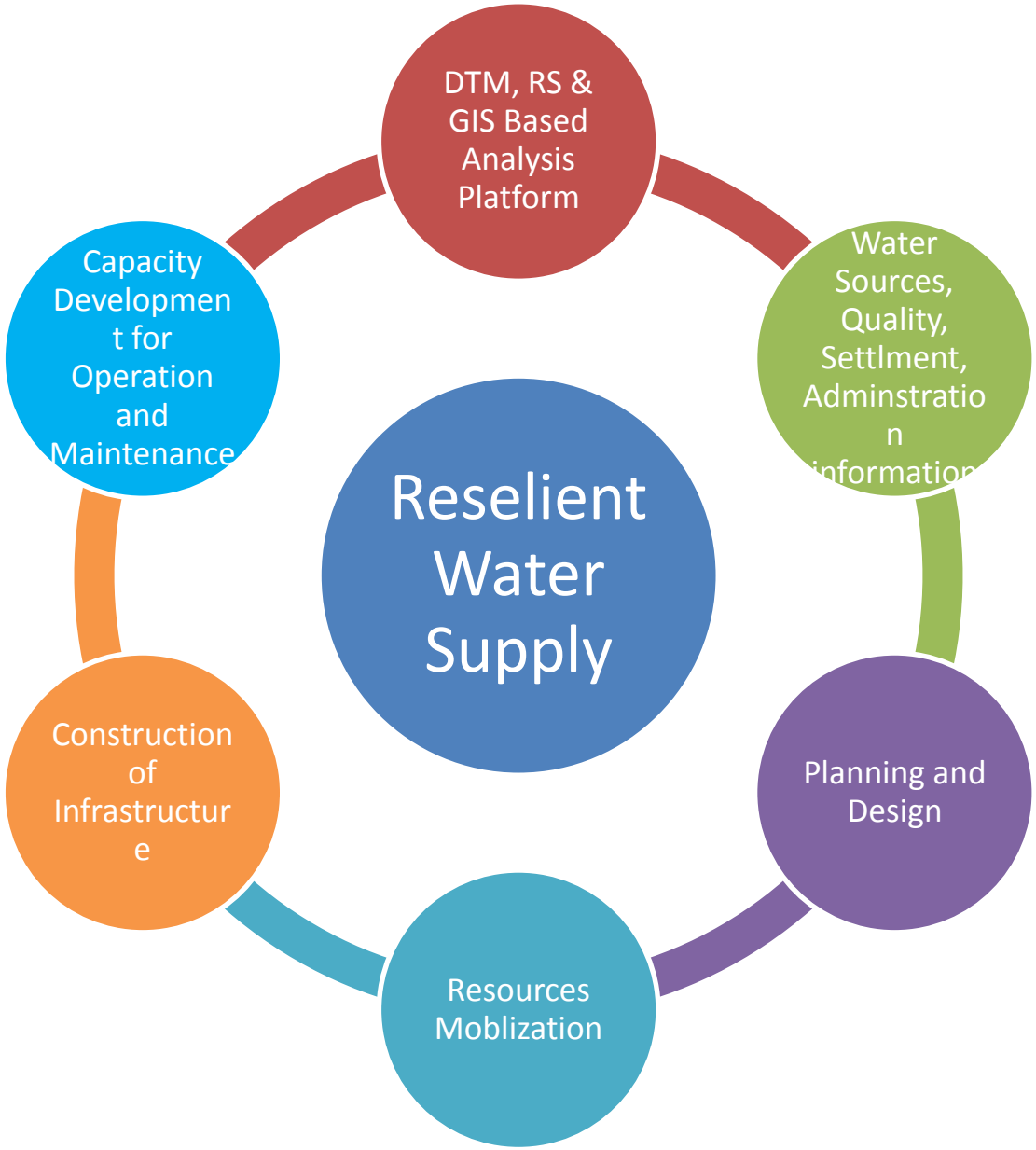
RESILIENT WASH

Drought Prone Areas





CONCEPTUAL FRAMEWORK



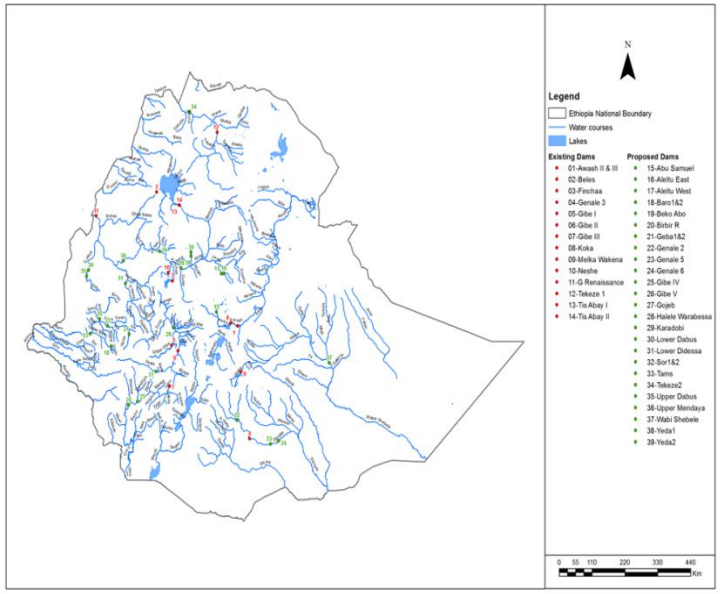
ENERGY POLICY FRAMEWORK

Overarching objectives :

- Ensure a reliable supply of energy at the right time and at affordable prices, particularly to support the country‘s agricultural and industrial development.
- C neutral development, RE based, increase energy access and efficiency
- Public and Private Sectors Participation

RENEWABLE ENERGY RESOURCES POTENTIAL

- Hydropower ~ 45,000 MW
- Geothermal potential ~ 5,000 to 10,000 MW
- Solar energy potential (annual average daily irradiation) ~ 5.5 kWh /m^2 /day
- >1000 GW Wind energy potential (average wind speed of ≥7 m/s , 50 m above ground level)
- Wood ~ 1,120 million tones/year
- Agricultural waste ~ 15 to 20 million tones/year
- Natural gas ~ 113 Bm^3
- Coal ~ 300 Million tones
- Oil shale ~ 253 Million tones



- Generation capacity in the grid – 4,284 MW
  - Hydro – 3,810 MW
  - Wind – 324 MW
  - Geothermal – 7 MW
  - Diesel – 143 MW

96.6% renewable

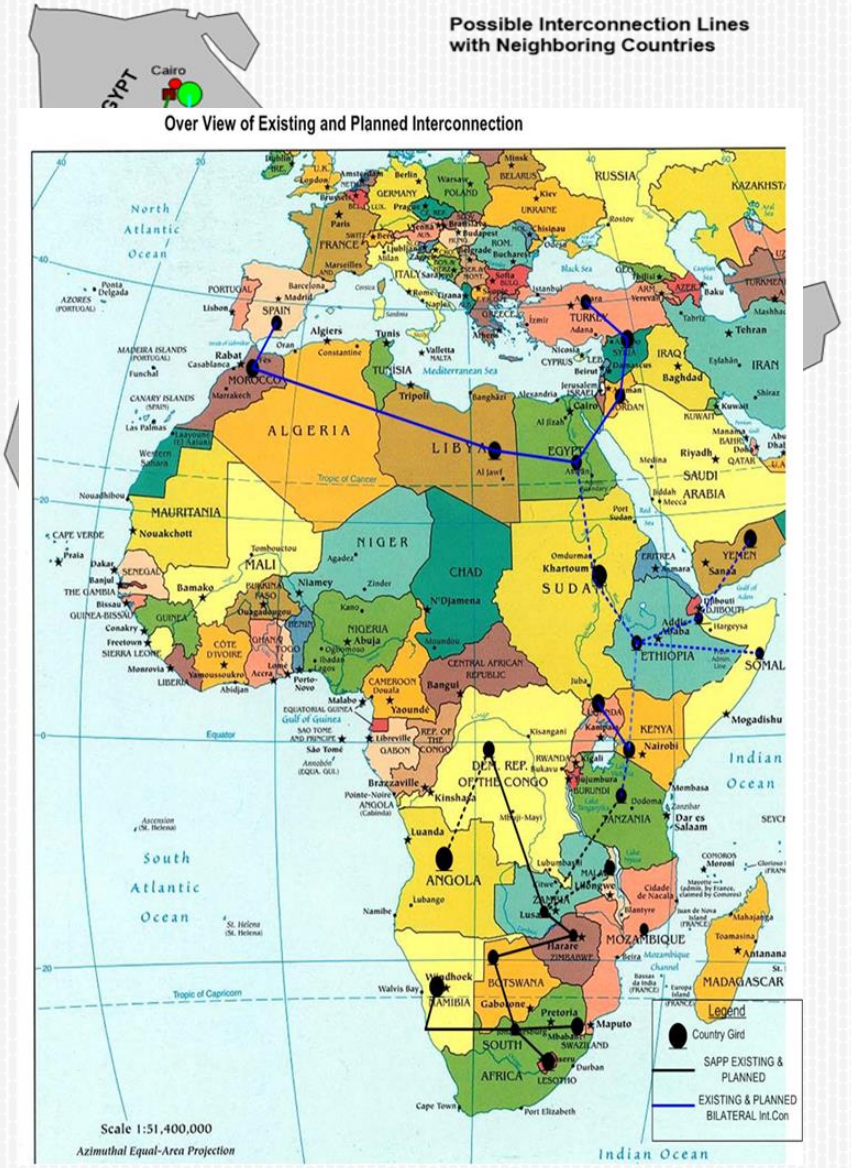

Adama II 153


Aluto Langano geothermal

REGIONAL INTERCONNECTION & MARKET

Ethiopia –a major exporter of RE to the eastern Africa region

- ✓ Ethiopia and Sudan interconnected through 230 kv there is a power flow up to 250 MW.
  - Second 3GW double circuit AC
- ✓ Ethiopia and Djibouti interconnected through 230 kv there is a power flow up to 90 MW
  - Second interconnector feasibility study is underway
- ✓ Ethiopia – Kenya interconnection – 2GW, 500KV (construction to be completed in 2019)



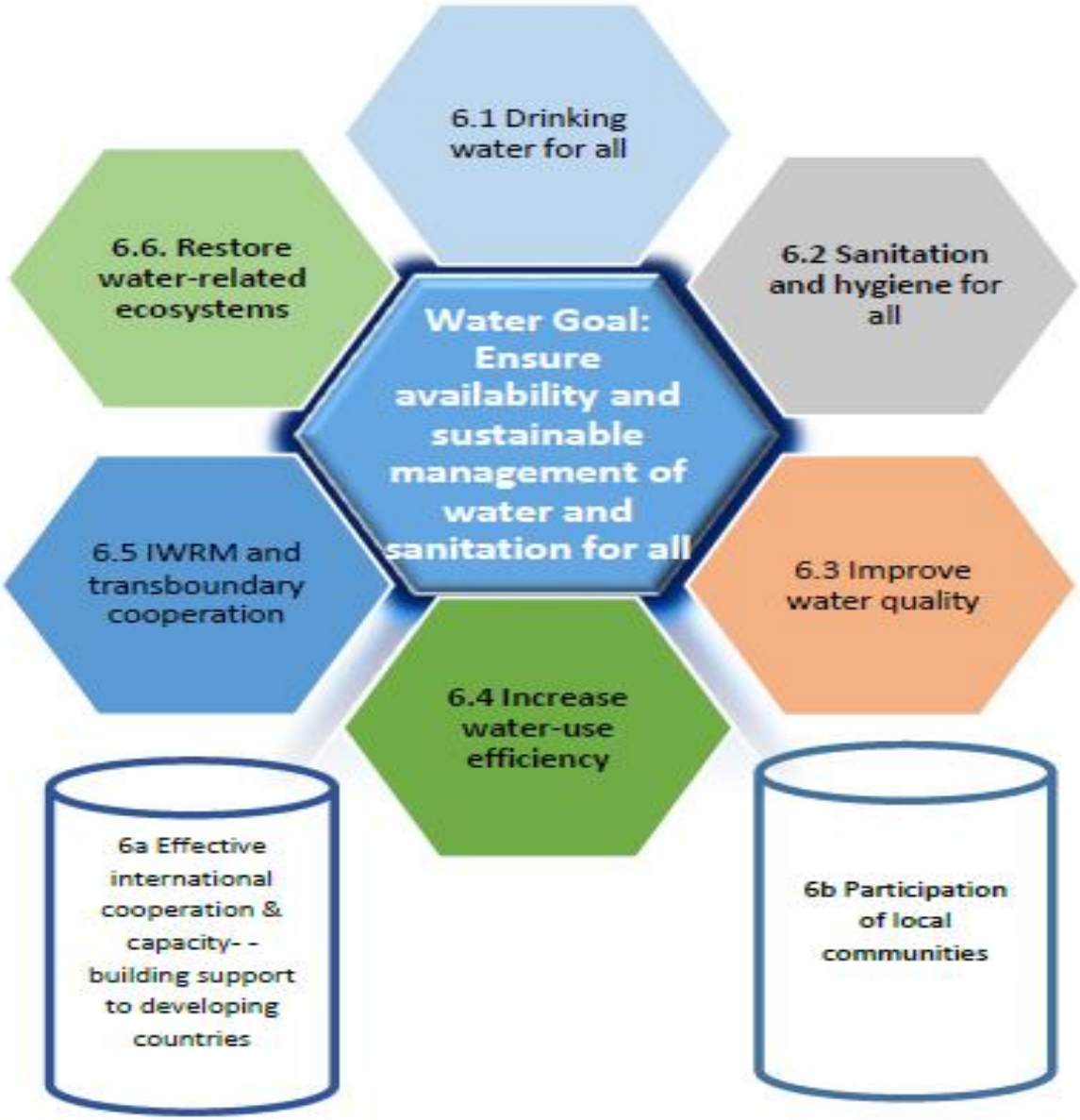
GRAND ETHIOPIAN RENAISSANCE HPP

- ✓ Two power stations with 16 Francis turbines generate 375 MW power with a total installed power of 6,000 MW and estimated production of 15,200 GWh per year
- ✓ At the end of the works, the Grand Ethiopian Renaissance Dam will be the largest dam in Africa: 1,800 m long, 145 m high and with a total volume of 74,000 million m^3.

THE ERA OF 2030 AGENDA

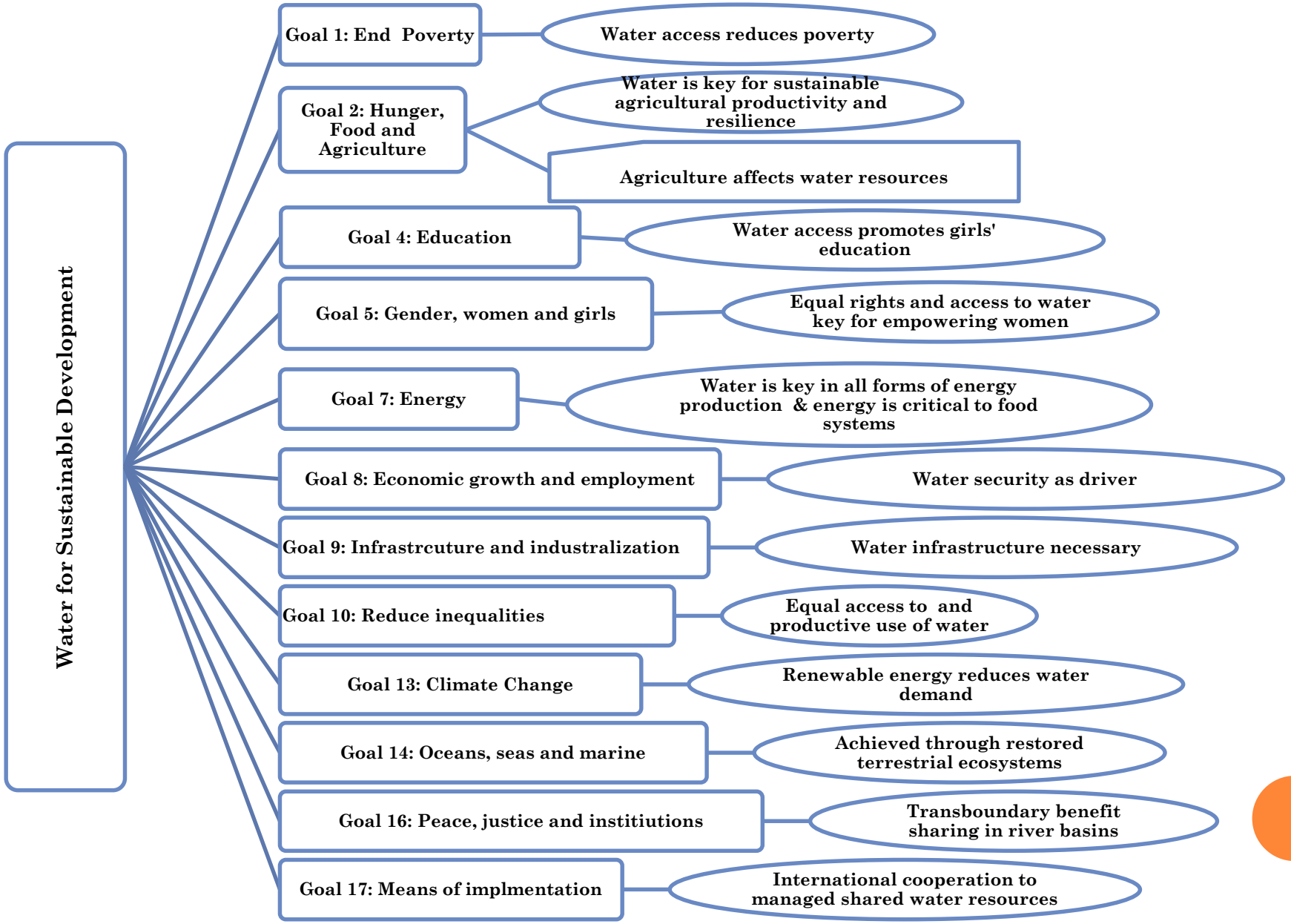
17 GOALS AND 169 TARGETS

WATER AND TARGETS



MENTIONS OF WATER IN SDGs TARGETS

INDICATIVE ROLES OF WATER IN SDGS




THANK YOU