GLOBAL WATER CRISIS: CAUSES, CHALLENGES, AND OPPORTUNITIES

United Global Citizens Luncheon
October 28, 2021
Bowling Green, KT

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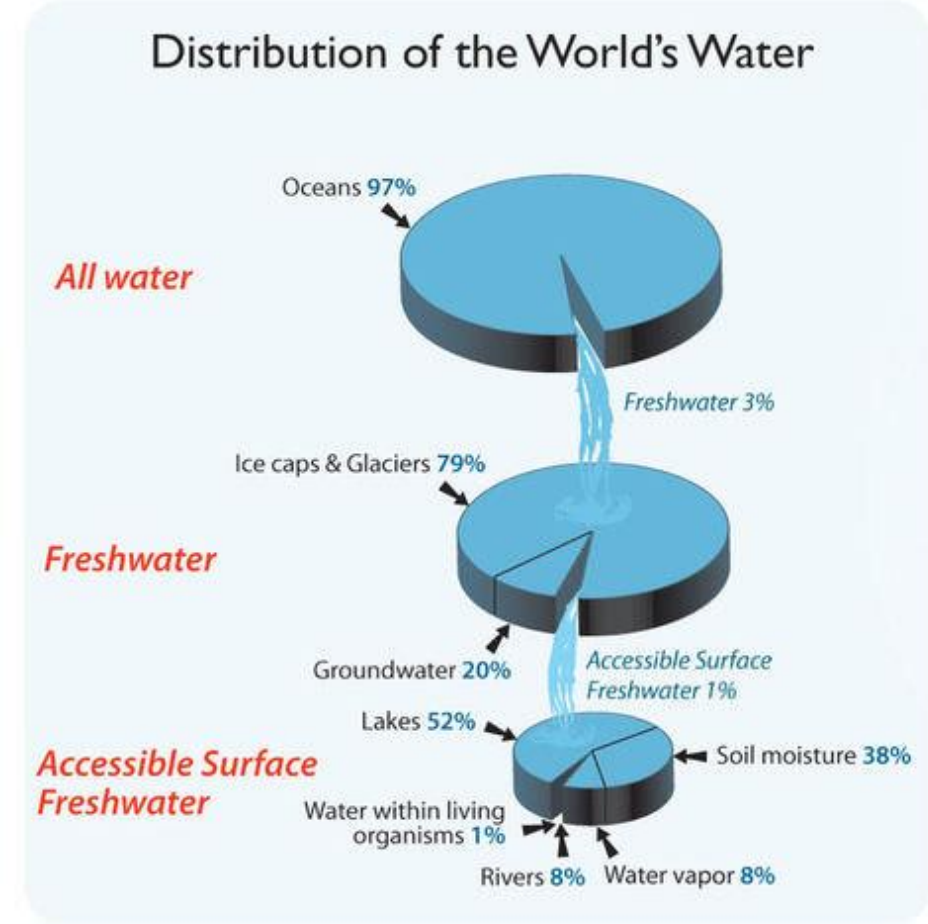
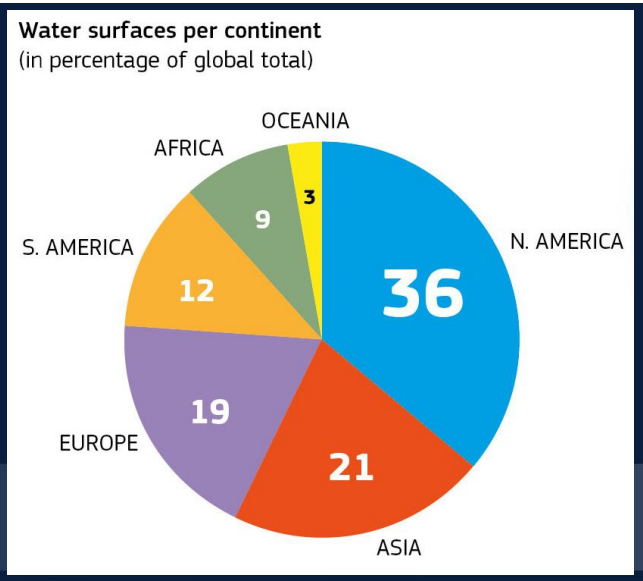
Presentation Outline

- Global Water Issues
  - Where on Earth is the Water?
  - Historical Timeline
  - Sustainable Development Goals
  - Close to Home – The Colorado river basin
  - Water Stress – Countries at risk
  - Global Water Facts
- Africa
  - Water in Africa in Numbers
    - Water management and use
    - Water Dependency in West Africa
    - Water Conflicts – The Nile Basin
- Household access: The USAID WA-WASH Approach
    - Strategy and Results -- Water Quantity and Quality
    - Water Investment Sustainability – Burkina Faso, Ghana, and Niger
- Africa Water Challenges

Where on Earth is the Water?



Source: k12.libretexts.org



Source: World Atlas of Desertification, JRC

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Global Water Timeline 1/4

1700s to 1800s: Industrialization leads to increased urbanization in England, highlighting the need for clean water supplies and sanitation.

1800s: Water shortages first appear in historical records.

1854: Dr. John Snow discovers the link between water and the spread of cholera during an outbreak in London.

1866: In the United States, there are 136 public water systems; by the turn of the century, there are 3,000.

1900: Since 1900, more than 11 billion people have died from drought, and drought has affected more than 2 billion people.

1972: The U.S. Clean Water Act updates 1948 legislation to control water pollution and funds construction of sewage treatment plants..

Global Water Timeline 2/4

1993: The U.N. General Assembly designates March 22 as World Water Day

2000: The U.N. member states set Millennium Development Goals (MDGs) for development progress, including a 2015 target to halve the number of people without sustainable access to safe drinking water.

2003: UN-Water was founded as a coordinating platform for issues of sanitation and freshwater access.

2005: About 35% of the global population experiences chronic water shortages, up from 9% in 1960.

2005 to 2015: U.N. member states prioritize water and sanitation development during International Decade for Action “Water for Life.”

2008: The U.N.-recognized International Year of Sanitation prioritizes health and dignity.

Global Water Timeline 3/4

2010: The MDGs clean water access target is achieved five years ahead of schedule. More than 2 billion people have gained access to safe drinking water since 1990. The U.N. General Assembly recognizes the right of each person to have adequate supplies of water for personal and domestic use that are physically accessible, equitably distributed, safe, and affordable.

2013: The U.N. designates November 19 as World Toilet Day to highlight the global issue that billions of people still do not have access to proper sanitation.

2015: About 2.6 billion people have gained access to clean water in the last 25 years, and about 1.4 billion gained basic access to sanitation since 2000. The U.N. member states sign on to the Sustainable Development Goals (SDGs) — successors to the MDGs, that promise clean water and sanitation for all by 2030.

Global Water Timeline 4/4

2018: U.N. Secretary-General António Guterres makes a global call to action for WASH in all healthcare facilities, citing how they're crucial for preventing and reducing diseases. Without basic WASH services, they can contribute to more infections and preventable deaths for mothers and newborns.

2020: About 1.8. billion patients and health workers face a higher risk of COVID-19 infection and other diseases due to the lack of basic water and sanitation services at health services, according to WHO and the U.N. Children's Fund (UNICEF).

Source: https://www.worldvision.com.au/global-water-crisis-facts

UN Sustainable Development Goals

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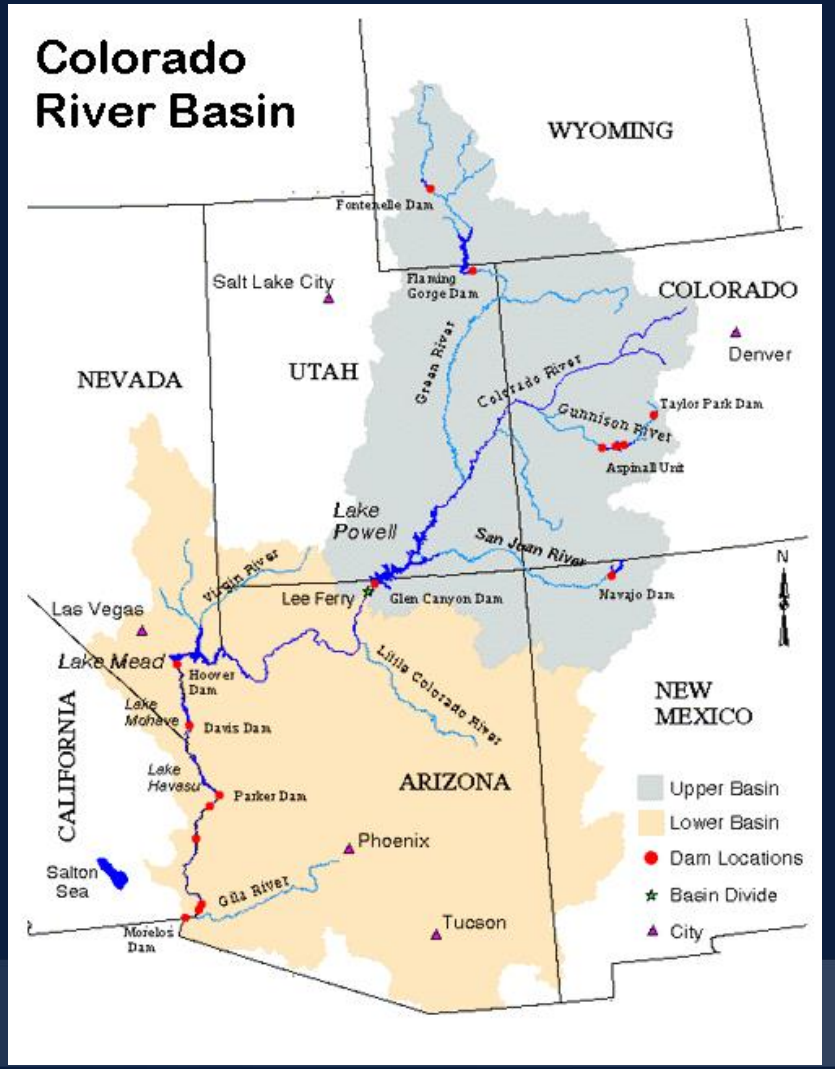
Close to Home: The Colorado River Basin

- Major diversions of Colorado River water began in California in the late 1800s
- Concerns about future access rights to the river water and equitable distribution led to the 1922 Colorado River Compact
- The basin was divided into the Upper Basin and the Lower Basin - and allocated 7.5 million acre-feet of water per year (MAFY) to each
- An international treaty singed in 1944 between the U.S. and Mexico granted access to 1.5 MAFY to Mexico
- There are 15 major dams on the main stem and hundreds on its tributaries



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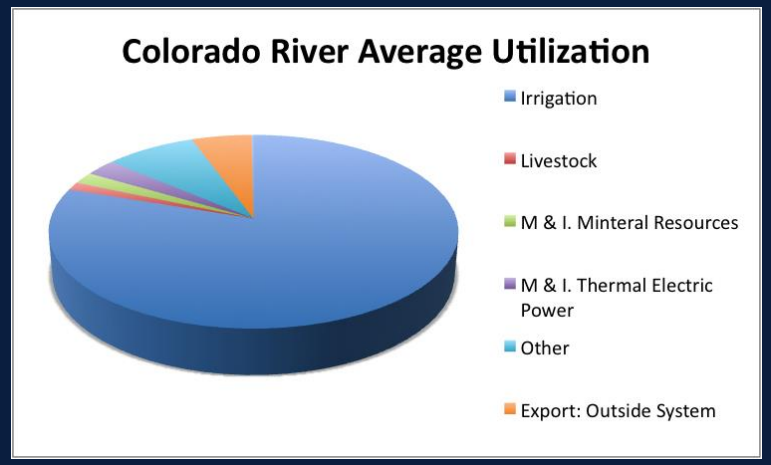
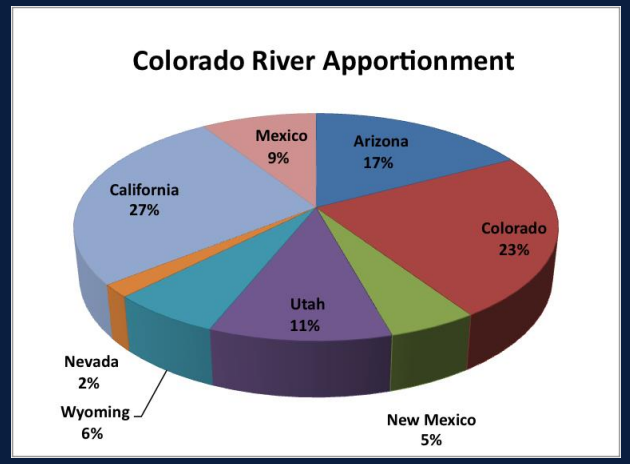
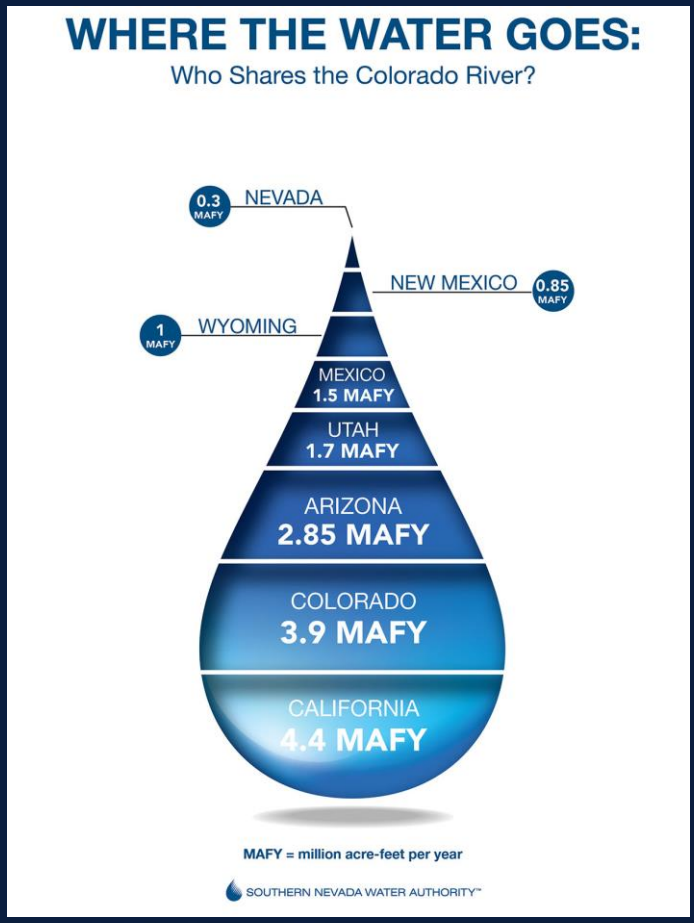
Source www.mit.edu

Colorado River Apportionment



Source: mit.edu





1 acre-foot of water = 325,861 gallons
1 maf = 325 billion gallons a flow of 890 million gallons per day

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To Learn More About the Colorado River

CBS 60 Minutes Sunday October 24, 2021
River Dry - Colorado River Drying

Since 2000, Lake Mead's water level, which is the country's largest reservoir, has dropped more than 130 feet. At that time, the lake's surface lapped at the spillway gates of the Hoover Dam.

Source Mark/ Henie/The Republic

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What about the Tribal Communities in the US and Canada?

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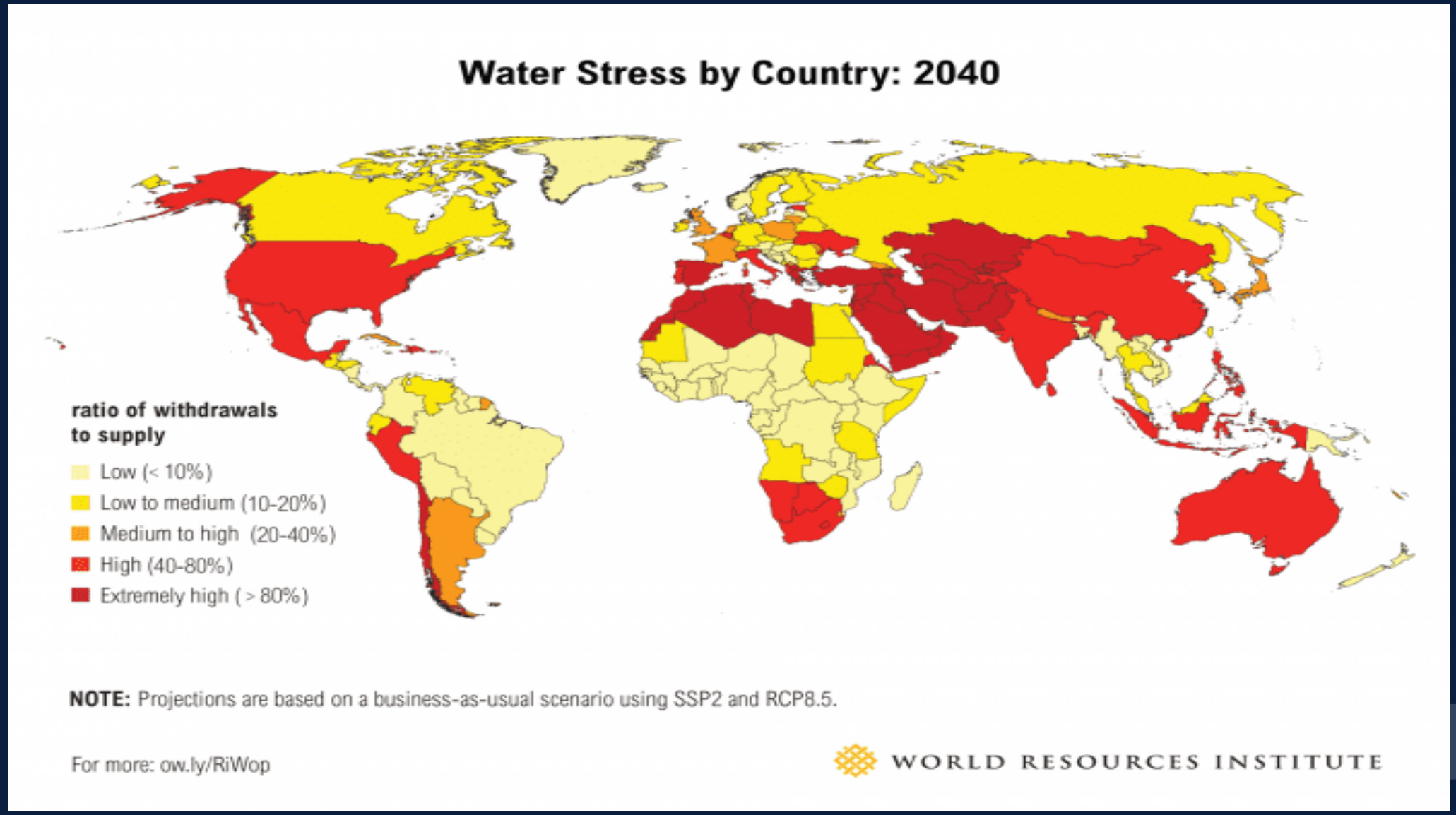
Source University of Montana

Global Water Stress



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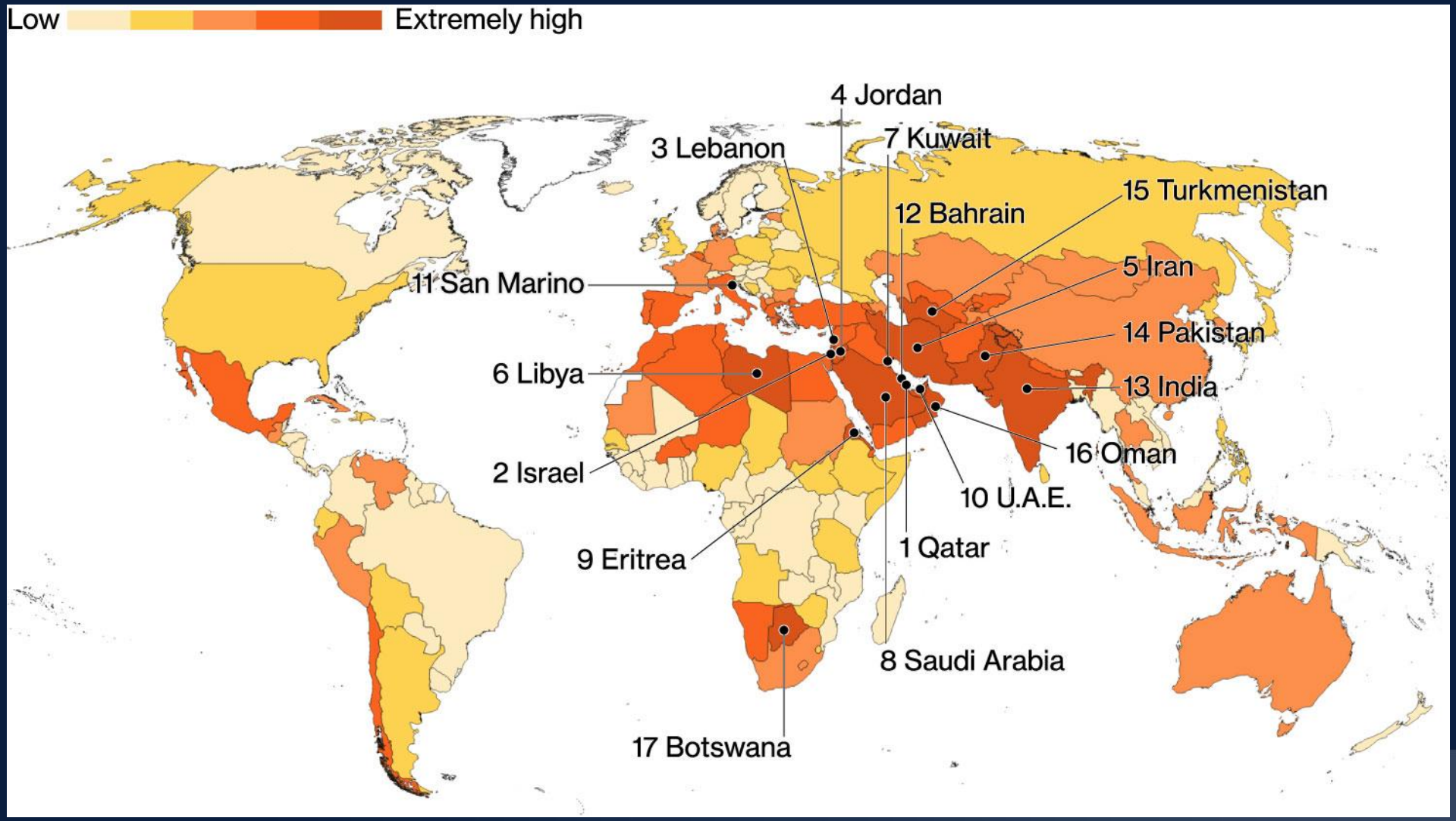
Countries Most at Risk for Water Crisis



https://www.bloomberg.com/graphics/2019-countries-facing-water-crisis/

Global Water Facts

- 785 million people lack access to clean water. That's one in 10 people on the planet.
- Women and girls spend an estimated 200 million hours hauling water every day.
- The average woman in rural Africa walks 6 kilometers every day to haul 40 pounds of water.
- Every day, more than 800 children under 5 die from diarrhea caused by contaminated water, poor sanitation, and unsafe hygiene practices.
- 2 billion people live without access to adequate sanitation.
- 673 million people defecate in the open.
- One of the United Nations' Sustainable Development Goals aims to provide universal access to clean water and sanitation by 2030.

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https://www.worldvision.org/clean-water-news-stories/global-water-crisis-facts

Global Water Facts

- 72% of all water withdrawals are used by agriculture, 16% by municipalities for households and services, and 12% by industries. (UN-Water 2021)
- When a territory withdraws 25% or more of its renewable freshwater resources it is said to be 'water-stressed'. Five out of 11 regions have water stress values above 25%, including two regions with high water stress and one with extreme water stress. (UN-Water 2021)
- 2.3 billion people live in water-stressed countries, of which 733 million live in high and critically water-stressed countries. (UN-Water 2021)
- 3.2 billion people live in agricultural areas with high to very high water shortages or scarcity, of whom 1.2 billion people – roughly one-sixth of the world's population – live in severely water-constrained agricultural areas. (FAO, 2020)
- Today, 1.42 billion people – including 450 million children – live in areas of high or extremely high water vulnerability. (UNICEF, 2021)
- About 4 billion people, representing nearly two-thirds of the global population, experience severe water scarcity during at least one month of the year (Mekonnen and Hoekstra, 2016)
- 700 million people worldwide could be displaced by intense water scarcity by 2030. (Global Water Institute, 2013)
- Nearly half the global population are already living in potential water scarce areas at least one month per year and this could increase to some 4.8–5.7 billion in 2050. About 73% of the affected people live in Asia (69% by 2050). (Burek et al., 2016)

"Among the many things I learnt as a president, was the centrality of water in social, political and economic affairs of the country, the continent and the world." *(*Nelson Mandela)

Source: http://geography.name/global-politics-and-africa

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Select Facts About Africa

- Africa is the **world´s second-driest continent** after Australia.
- About **66% of Africa is arid or semi-arid** and more than 300 of the 800 million people in sub-Saharan Africa live in a water-scarce environment – meaning that **they have less than 1,000 m3 per capita per year**.
- **115 people in Africa die every hour** from diseases linked to poor sanitation, poor hygiene and contaminated water.
- **35% of water and sanitation aid** commitment on MDG went to Africa with **Sub-Saharan receiving 27%** of the financial allocations.

Source UN.ORG

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Select Facts About Africa

- In Africa, especially sub-Saharan Africa, more than **a quarter of the population spends more than half an hour** per round trip to collect water.

- Africa's rising population is driving demand for water and accelerating the degradation of water resources. By **mid-2011, Africa's population was around 838 million** (excluding northern-most states) and its average natural rate of increase was 2.6% per year, compared to the world average of 1.2%. By one estimate its **population will grow to 1,2 billion by 2025 and to over 2 billion by 2050.**

- The **urban slum population** in sub-Saharan African countries is **expected to double to 400 million by 2020**.

Source UN.ORG

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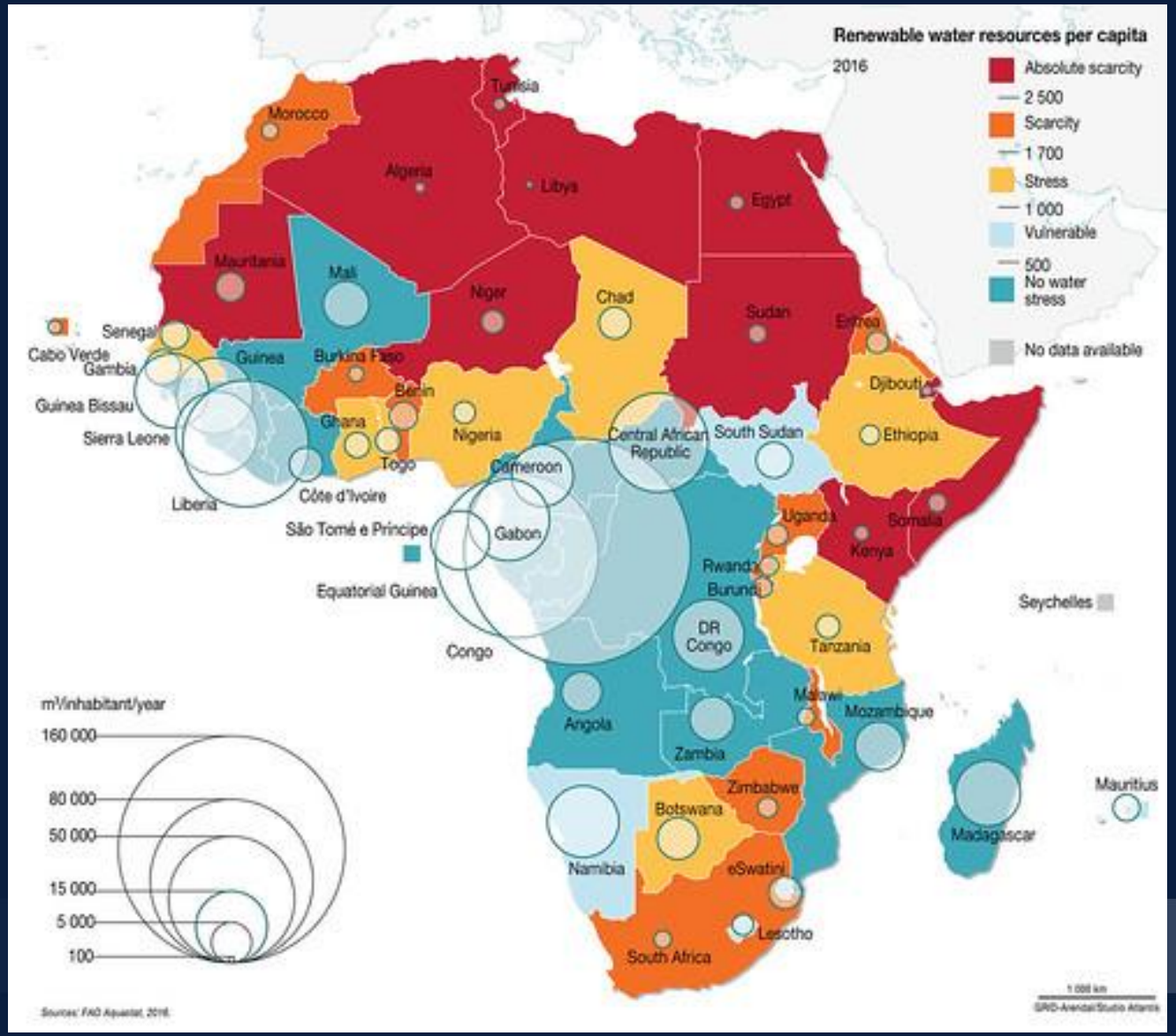
Africa Renewable Water Resources



Source: https://www.grida.no/resources/13689

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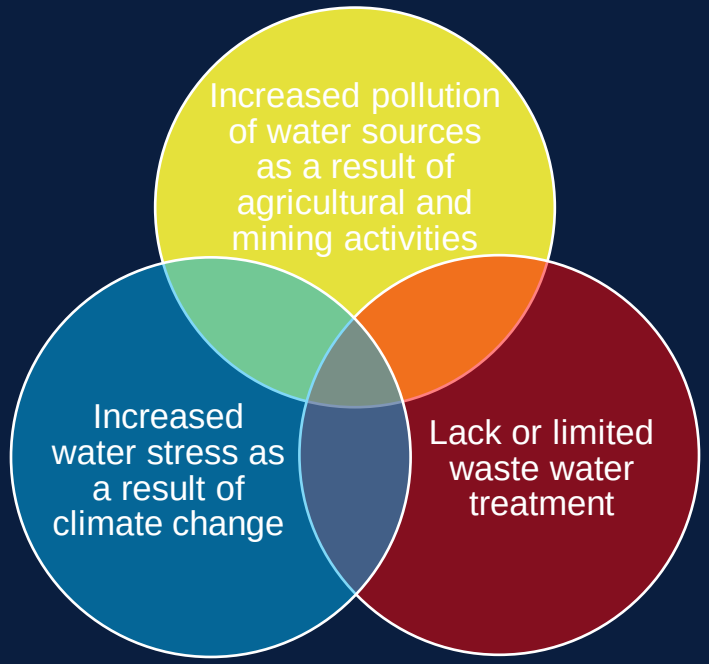
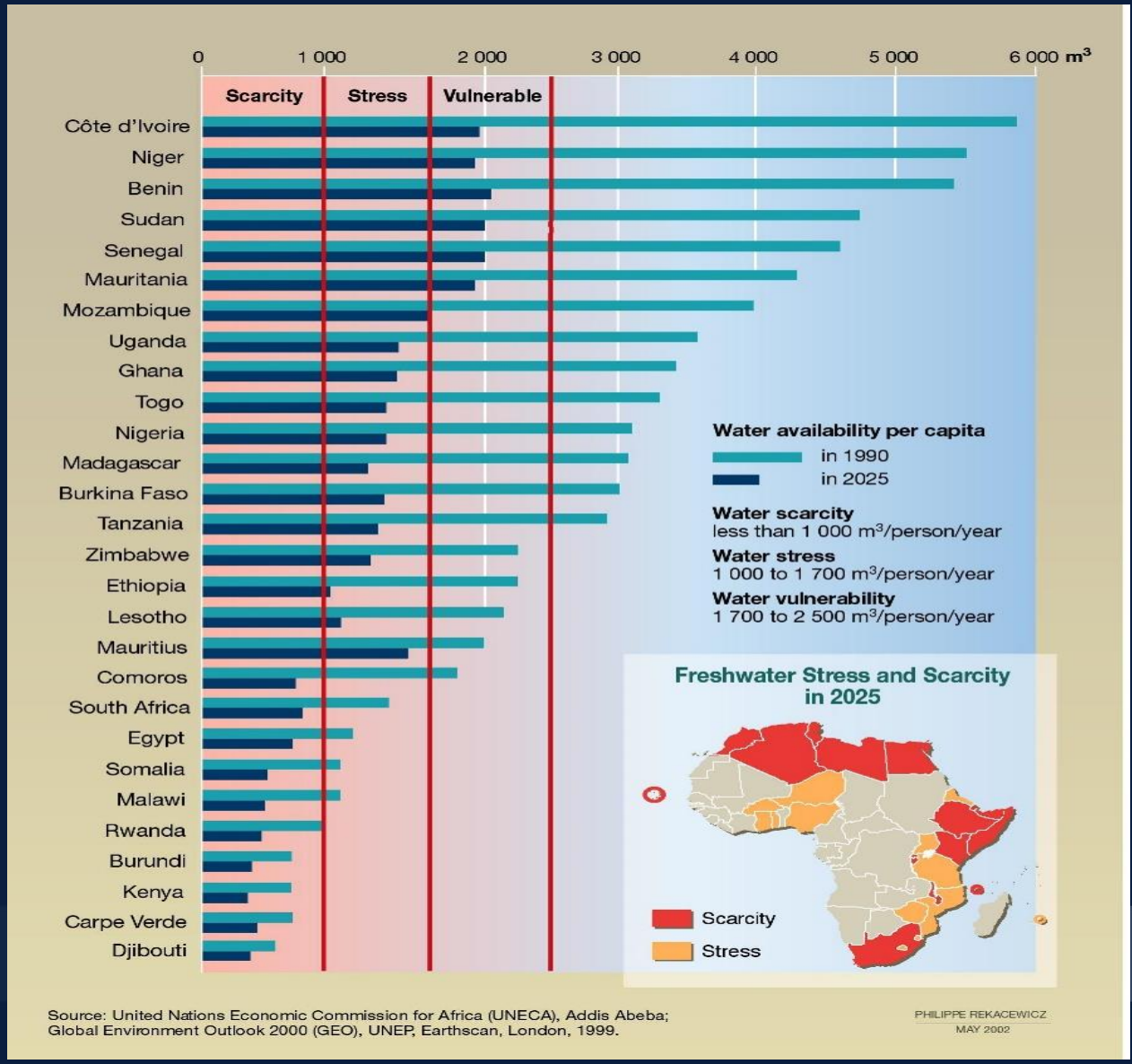
Water Resources Availability in Africa





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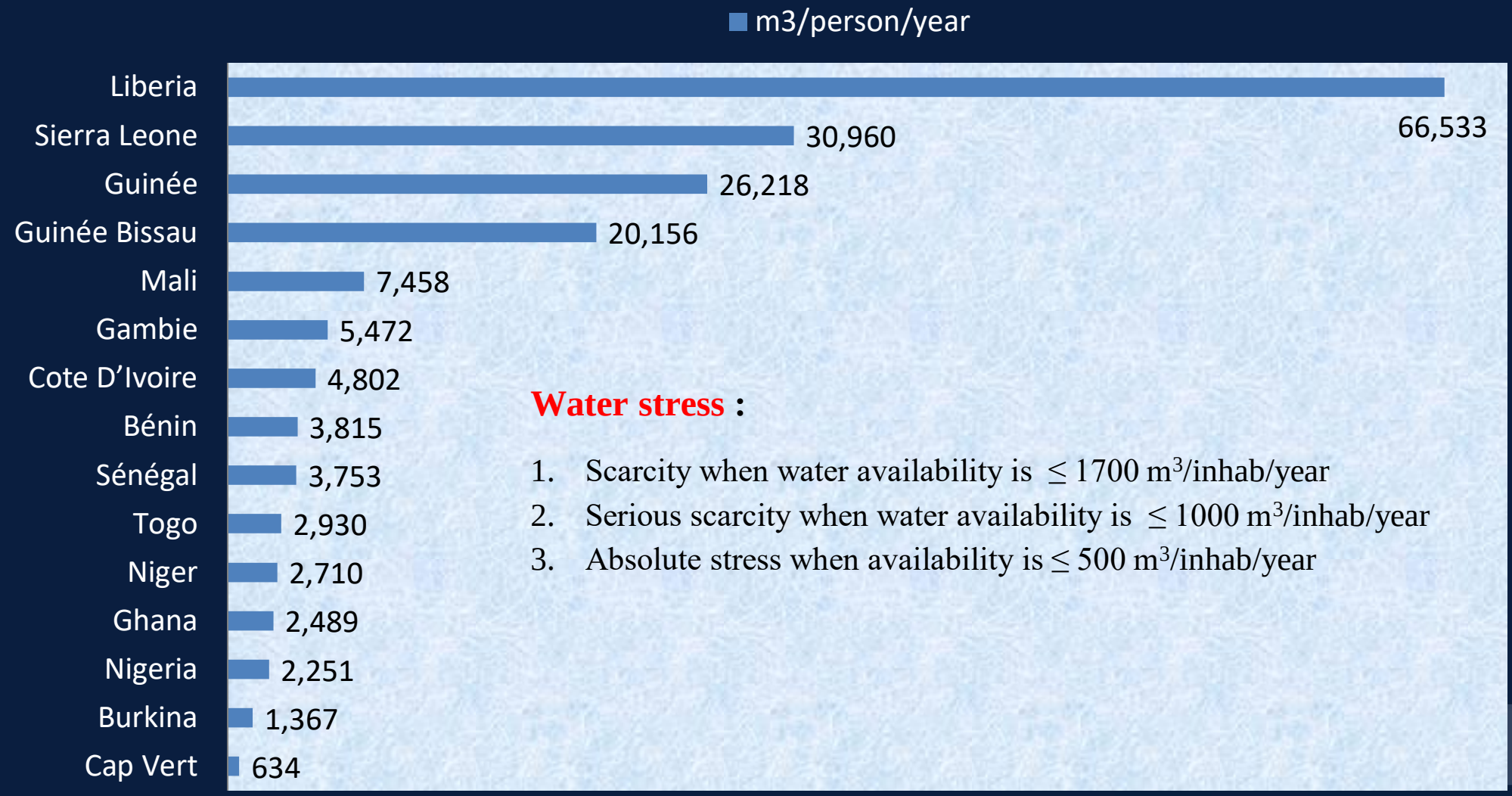
Water Resources Availability in West Africa



Water stress :

1. Scarcity when water availability is $\leq 1700\ m^3$/inhab/year
2. Serious scarcity when water availability is $\leq 1000\ m^3$/inhab/year
3. Absolute stress when availability is $\leq 500\ m^3$/inhab/year

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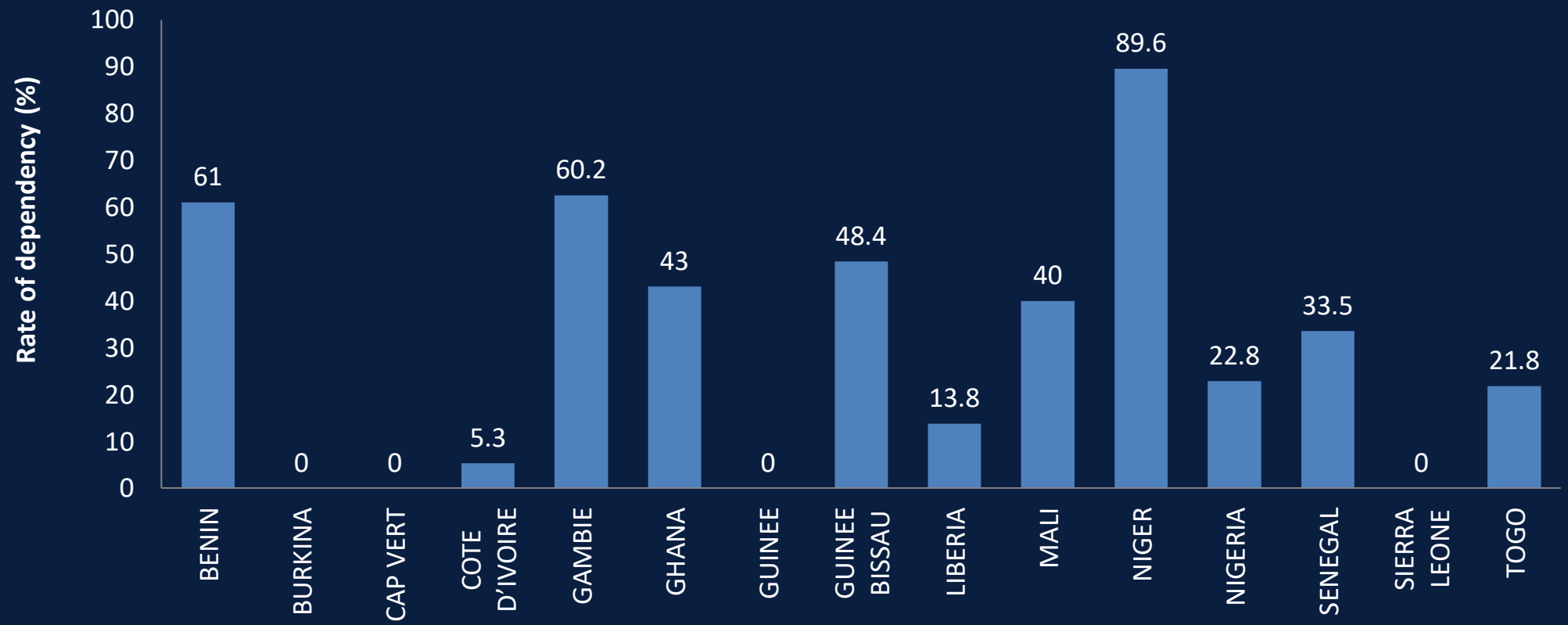
Water Dependency in West Africa



Source: Nwamaka Chigozie Odili, 2018

The dependency index represents the percentage of renewable water resources produced outside the country boundary

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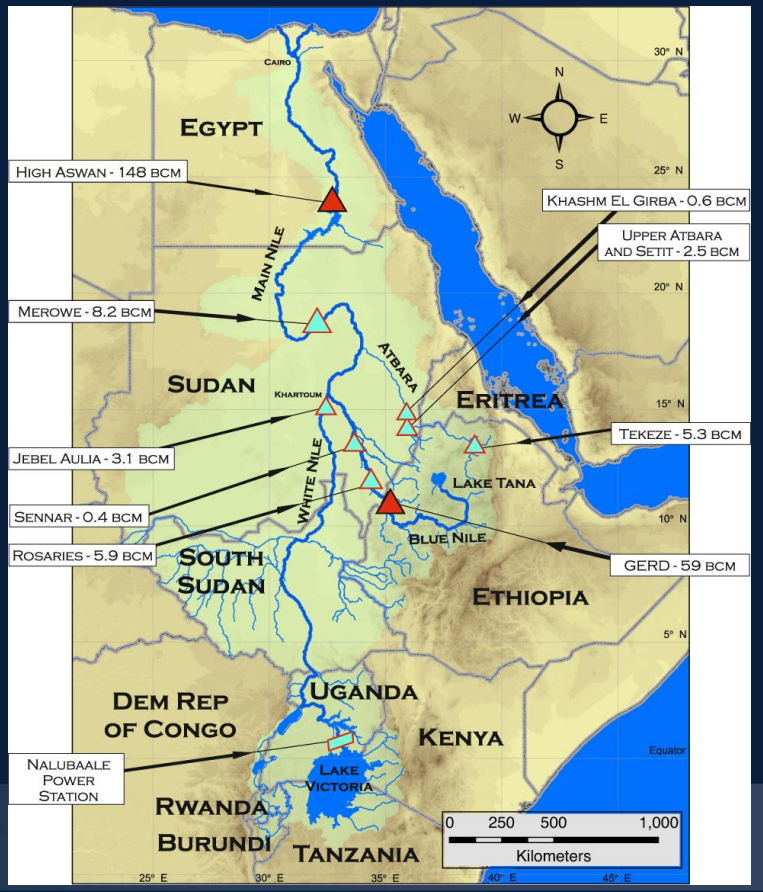
Grand Ethiopian Renaissance Dam: Controversy

- The 1959 agreement allocated all the Nile River's waters to Egypt and Sudan but no water to Ethiopia and other upstream countries
- Egypt granted veto power over future Nile river projects
- Ethiopia needs hydropower and water for its economic development
- The issue now is not the construction but the management of the water flow during dry conditions
- Eleven countries need to get involved in coming up with an agreement

Reference: www.brookings.edu

Source: R. Abd Eilah, 2020



Source: Wheeler et al, 2020

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USAID WA-WASH Link Between the Thematic Areas

Gender Mainstreaming

Context and Justifications

Water Sanitation and Hygiene

Food Security

Climate Change

Increased income leads to better health, better education, better livelihood

Integration of Capacity Building, Knowledge Management and Information Sharing

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USAID WA-WASH Program Implementation Context

ENSURE SUSTAINABILITY
We are not staying forever but we want our actions to last

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Do the Beneficiaries Have Something to Say?

- Introduction of drip irrigation in Cameroon

- https://youtu.be/3K6A2-prHEY

USAID WA-WASH Water Achievements as of December 31, 2015

Achievements	Burkina	Ghana	Niger
People with access to drinking water	42,954	10,367	12,370
Aquatab shops created	1,261	-	576
Aquatab tablets sold	3,293,400	1,200,000	5,091,000
Quantity of water treated (liters)	65,868,000	24,000,000	101,820,000
Sand dams constructed	4	-	-
Rain harvesting tanks constructed	18	-	-
Family water points built	197	9	2
Community water points built	-	18	43
Standpipes built	40	18	50
Length of pipes installed (kms)	64.5	-	-

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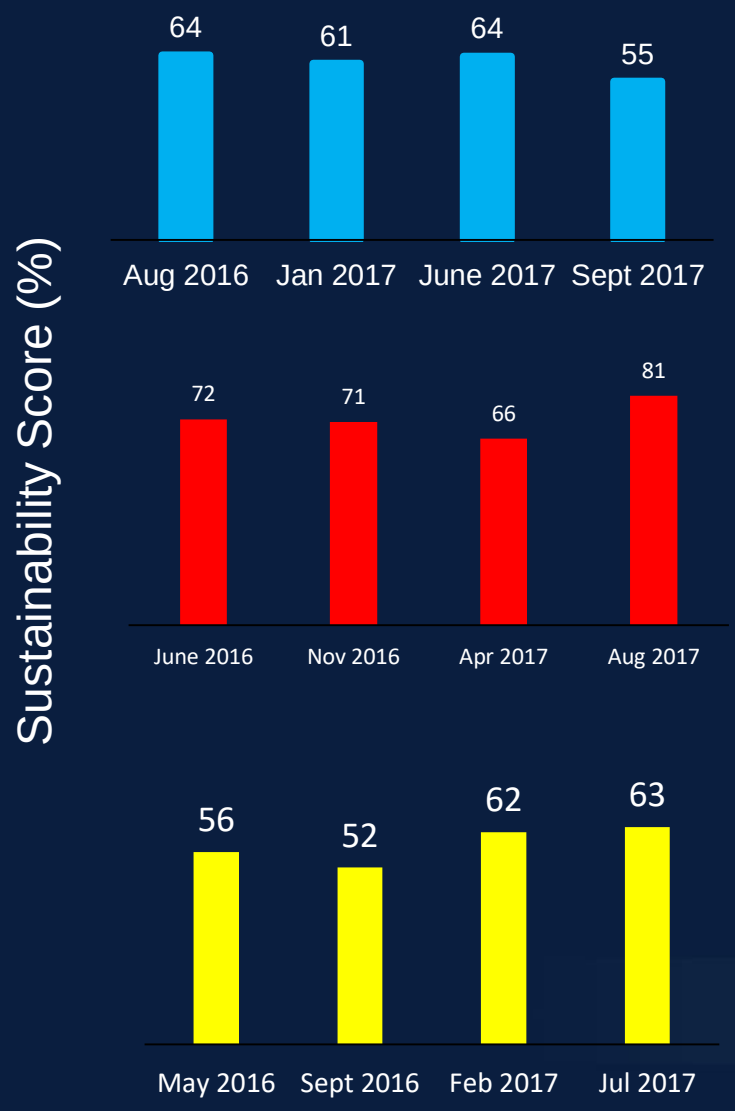
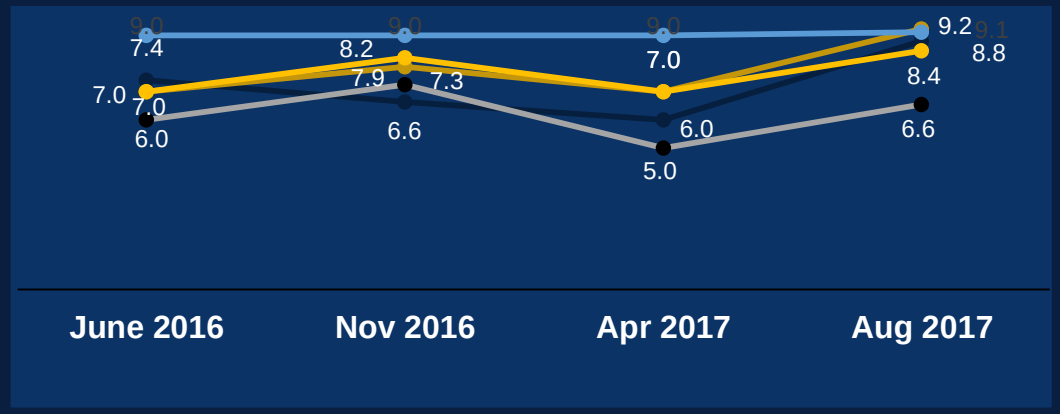
This project was funded by the people of the United States through the Agency for International Development (USAID) within the framework of the West Africa Water Supply, Sanitation, and Hygiene (USAID WA-WASH) Program.

Sustainability of Water Investments in Three Countries

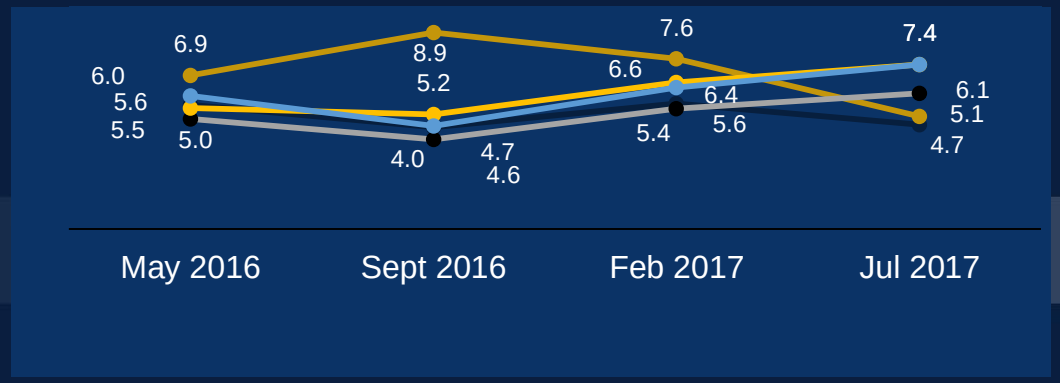


Burkina

Ghana



Niger



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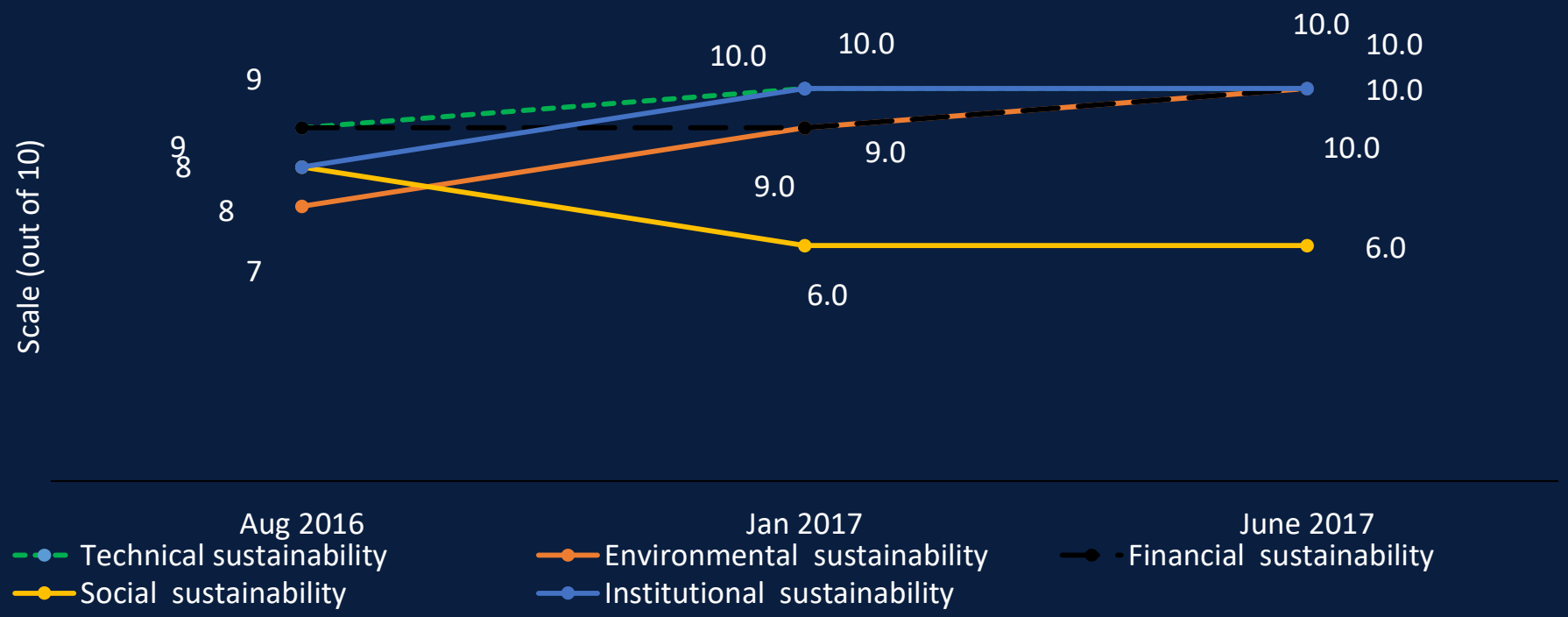
Water Treatment Sustainability Factors - Burkina



- **Financial sustainability [+]**: Water treatment products are affordable and accessible to households.
- **Institutional sustainability [+]**: Existence of trained community moblizers/animators.
- **Social sustainability [-]**: Household members do not frequently use water treatment products

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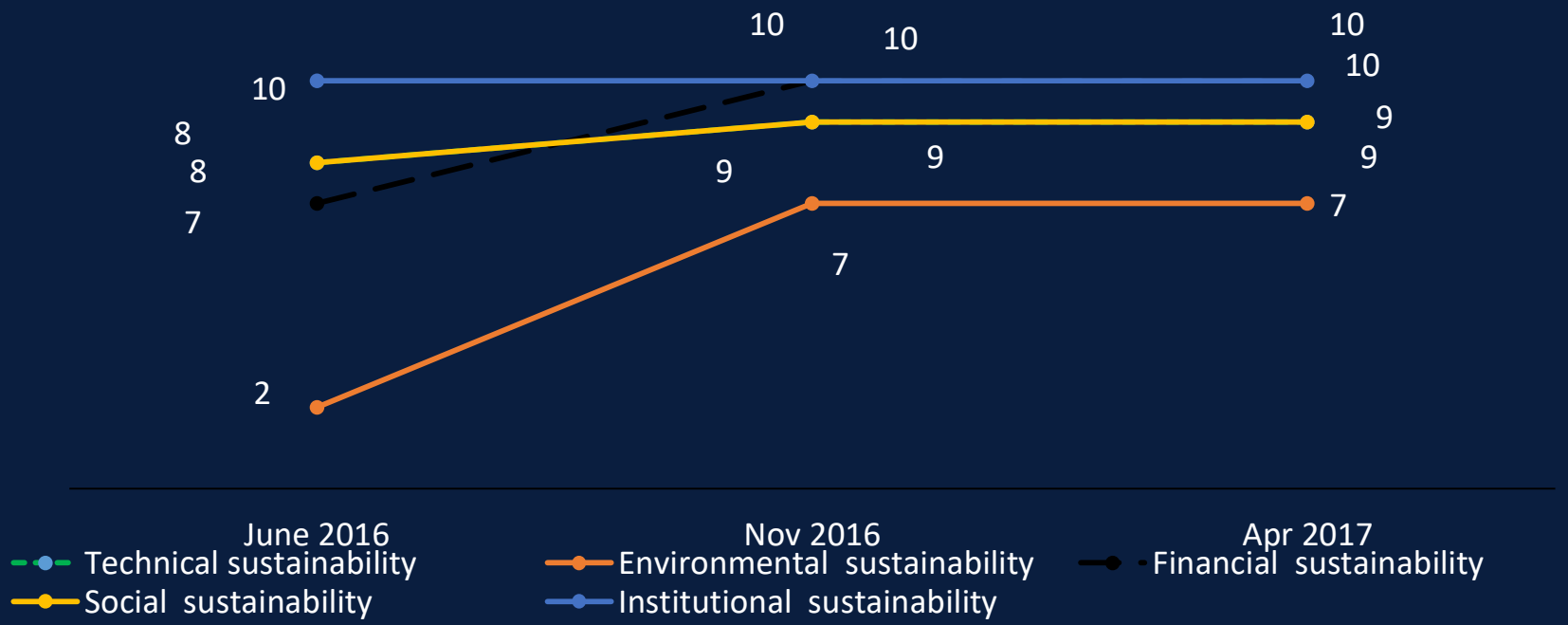
Water Treatment Sustainability Factors - Ghana



- **Financial sustainability [+]**: Water treatment products are affordable and accessible to households.
- **Institutional sustainability [+]**: Existence of community support to the promotion of water treatment products.
- **Social sustainability [+]**: Household members frequently use water treatment products and households understand the benefits of water treatment products.

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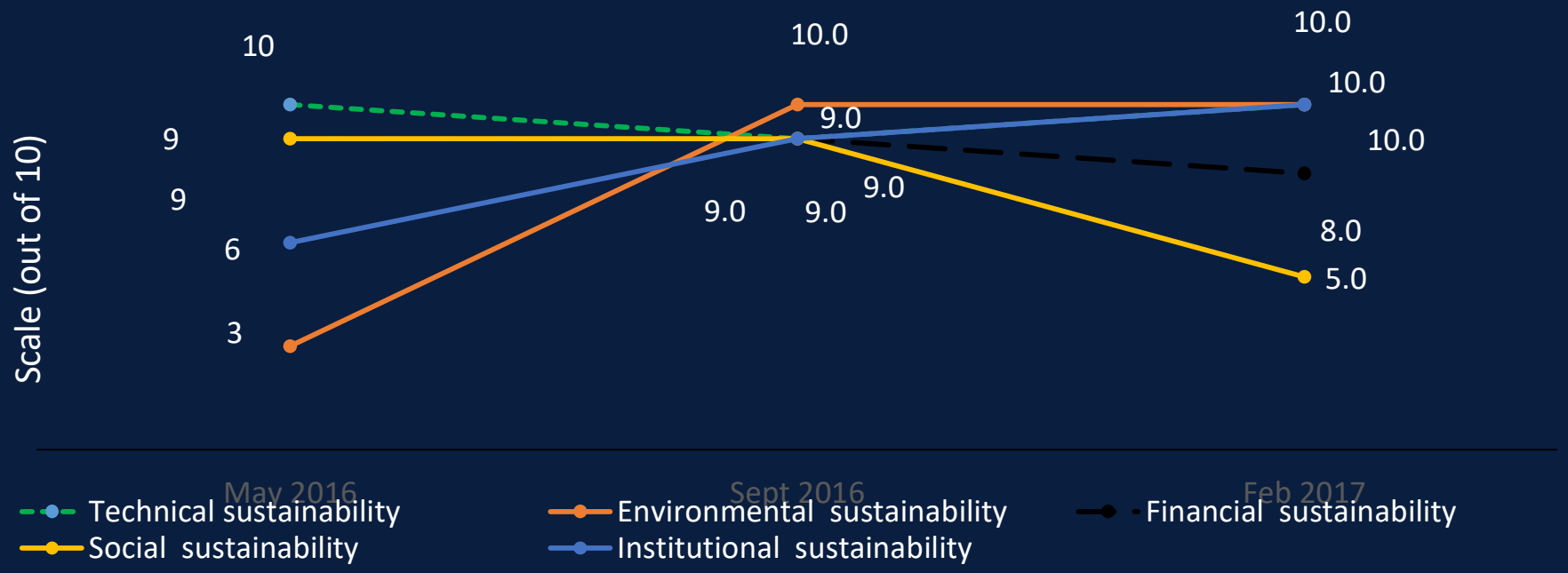
Water Treatment Sustainability Factors - Niger



- **Financial sustainability [+]**: Water treatment products are affordable and accessible to households.
- **Institutional sustainability [+]**: Existence of community support to the promotion of water treatment products.
- **Social sustainability [-]**: Not all the people in the household drink the treated water.

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African Water Challenges

1. Provide safe drinking water
2. Ensure access to adequate sanitation
3. Promote cooperation in transboundary water basins
4. Provide water for agriculture to ensure food security
5. Develop hydropower to enhance energy security
6. Prevent land degradation
7. Prevent water pollution
8. Meet growing water demand in the face of population growth
9. Manage water effectively given the threat of climate change
10. Enhance human capacity of the water sector stakeholders
11. Enhance the governance of the water sector
12. Develop effective institutional and financial capacity

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There are tremendous opportunities for Africa to overcome these and other water-related challenges. One of them is the huge opportunity to develop its untapped water resources.

African Water Vision 2025 Challenges

- ***High spatial and temporal variations in rainfall:*** *Mean annual rainfall figures are comparable to those of other continents but evaporation rates are much higher in Africa and rainfall there is highly variable and unreliable.*

•Growing water scarcity: 25 African countries will be water stressed by 2025 compared to 13 in 1995.

- ***Inadequate institutional and financing arrangements:*** There is an ongoing debate about the commercialization of water management and water as an economic good versus decentralized community management and water as a human right.
- ***Inadequate data and human capacity:*** The inadequate collection, analysis and dissemination of data on water resources for developing, planning and implementing projects is problematic.
- ***Inadequate development of water resources:*** Water scarcity in Africa is not due entirely to natural phenomena but also to low levels of development and exploitation of water resources. Only 3.8% of internal renewable resources are being withdrawn for the three major water uses, namely agriculture, community water supplies and industries.
- ***Depletion of water resources by human actions:*** The pollution of streams through industrial and agricultural activities, salinization due to overpumping, the drying out of wetlands, the eutrophication of lakes and the proliferation of invasive aquatic plants are all contributing to water shortages.

THANK YOU

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