



**THE WORLD ACADEMY OF SCIENCES**

*for the advancement of science in developing countries*

**TWAS Science Diplomacy  
Workshop on Sustainable Water Management  
30 Nov – 4 Dec 2015, Trieste-Italy**

**Breakout Group Session I:  
DEPLOYMENT**

Team Members

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# Case Studies

# Droughts, Floods =>Climate Change Impacts



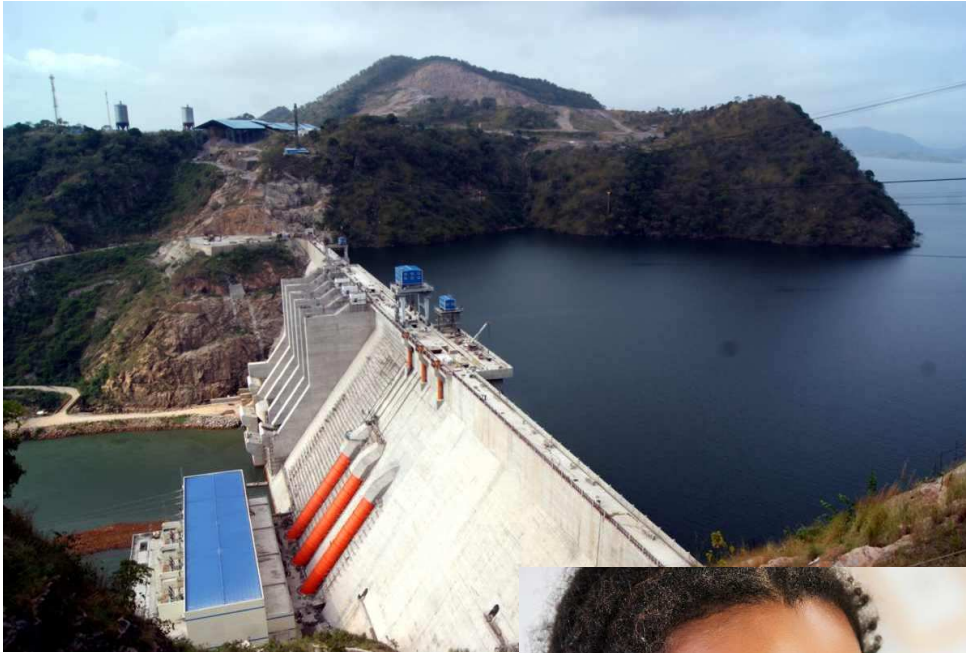
# Water Availability



[filtercon.wordpress.com](http://filtercon.wordpress.com)

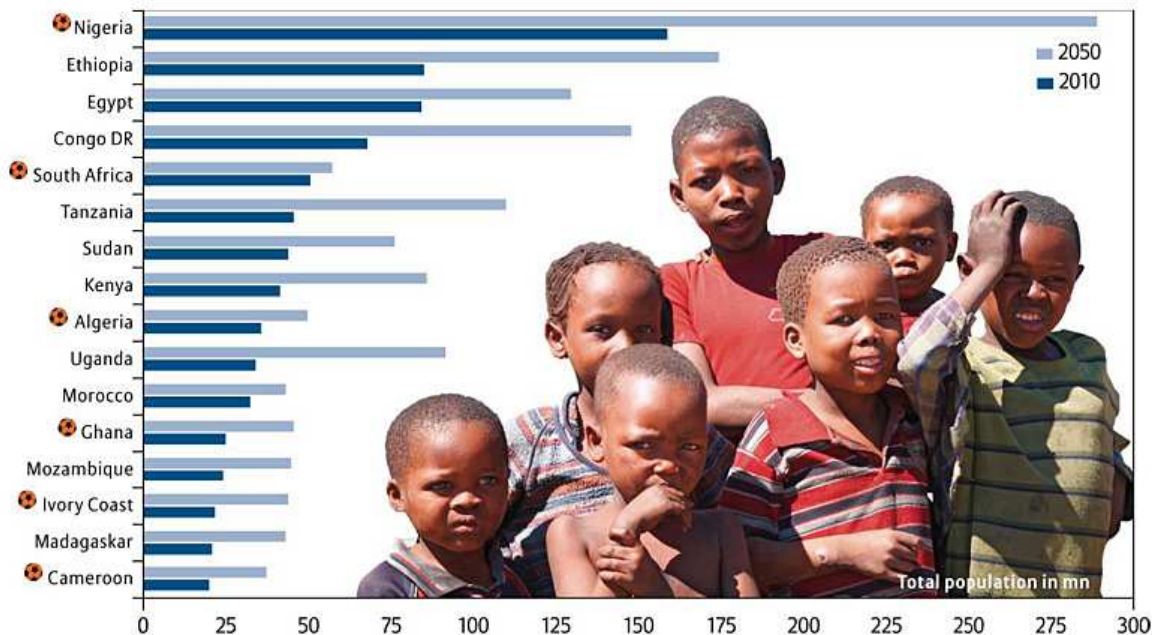


# Water-Energy-Food Nexus



# Industrial Growth/Population Growth

2050: one fifth of the global population lives in Africa



Source: Allianz/UN Department of Economic and Social Affairs, Population Division, World Population Prospects. 2008 revision

The most populous countries of Africa.

Forecast 2050: Africa will have 2 billion inhabitants.

 Countries represented in the World Cup



# Role of Gender/Water Scarcity



[www.peterdicampo.com](http://www.peterdicampo.com)



OR/AND



# Disputes over shared water resources



E.g. Kariba Dam –  
Hydropower  
energy  
generation  
and Tourism



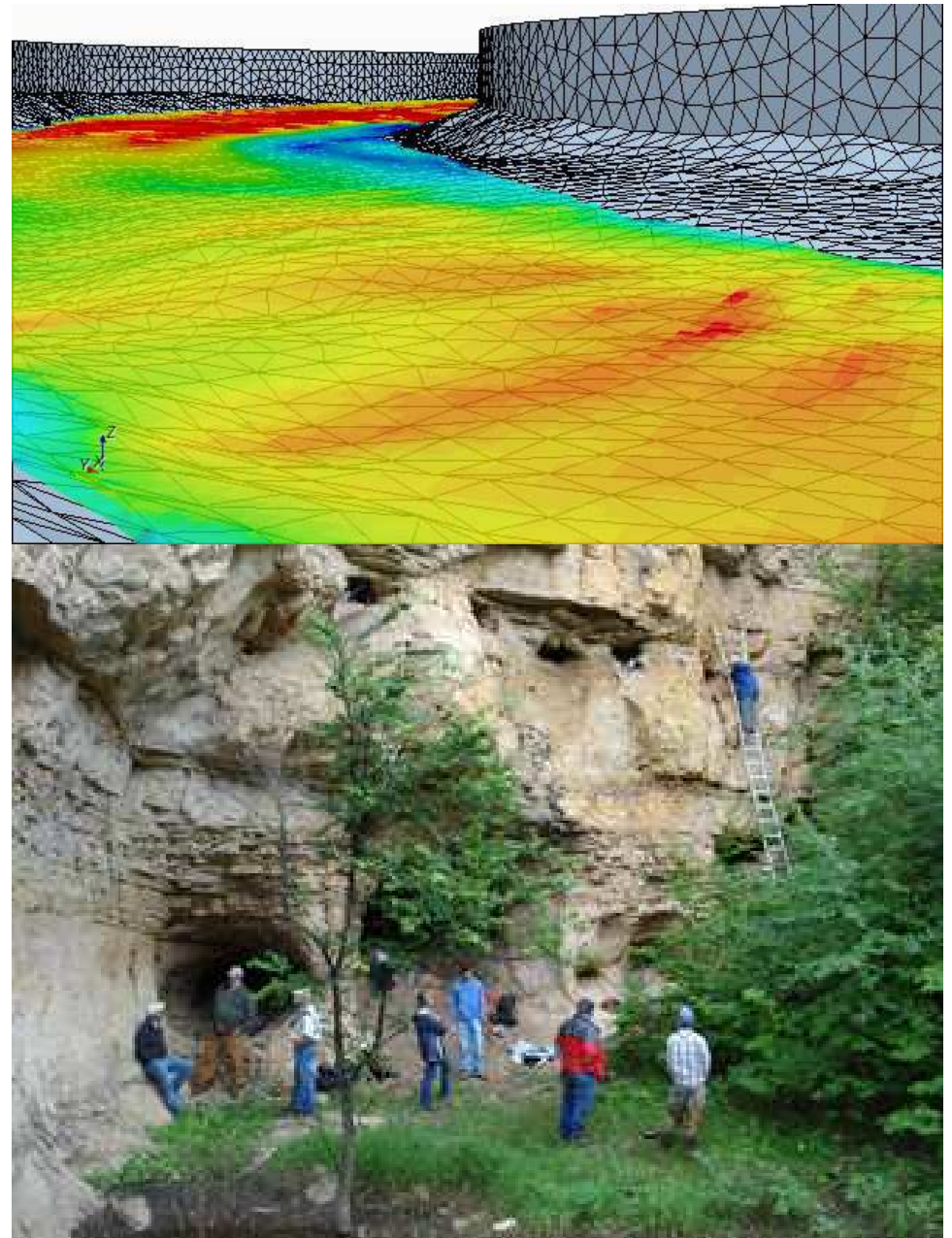
# Goal

Deploy of affordable technologies that result in reliable access, secure and safe supply of water for all sectors

Technologies/Techniques -> to be  
deployed

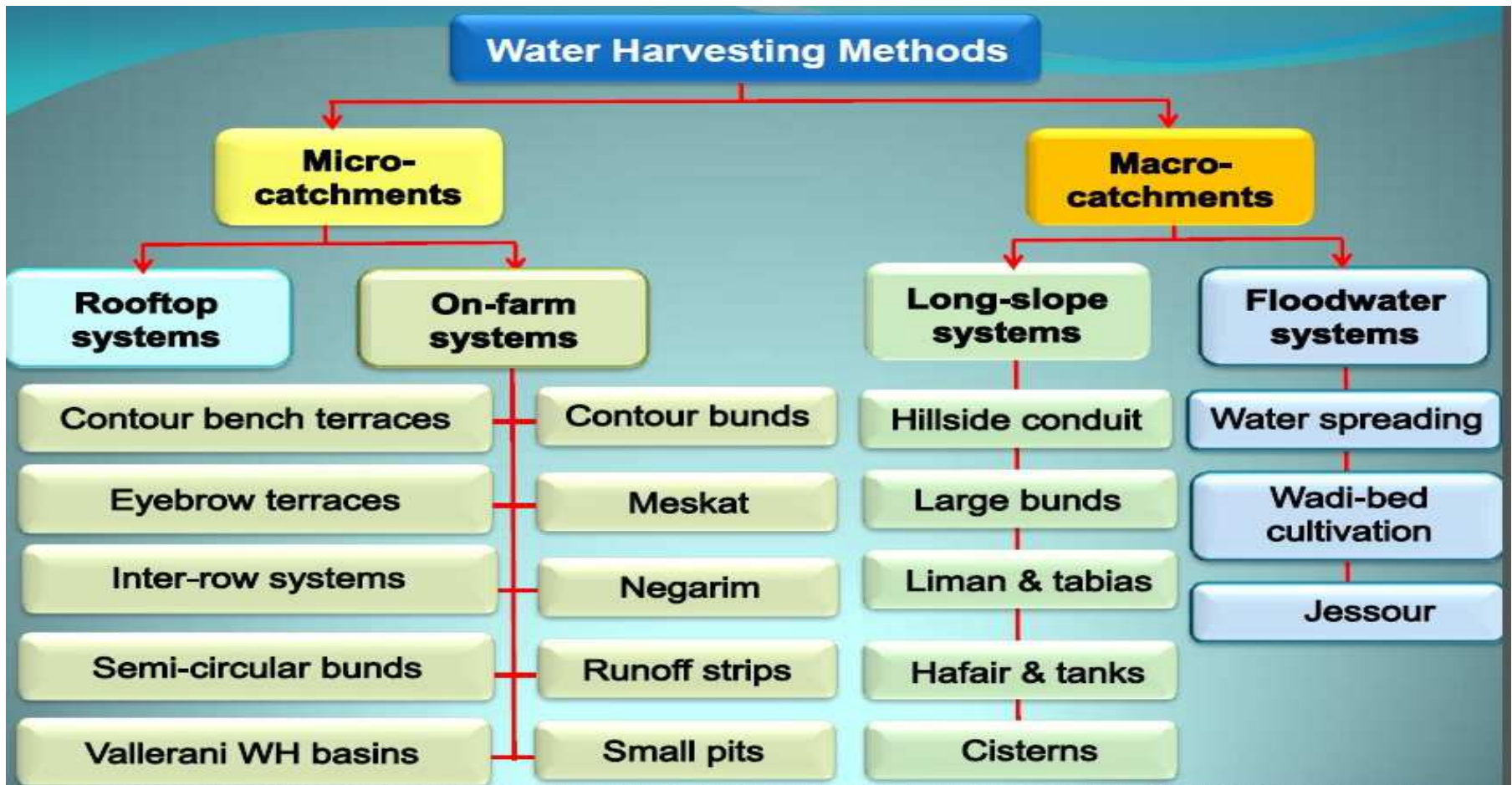
# Flooding

- Build dams to control flooding and store water
- Adoption of spate irrigation to control flooding
- Conduct Paleoflood studies
- Delineating of flood risk zones



# Drought/Water Scarcity

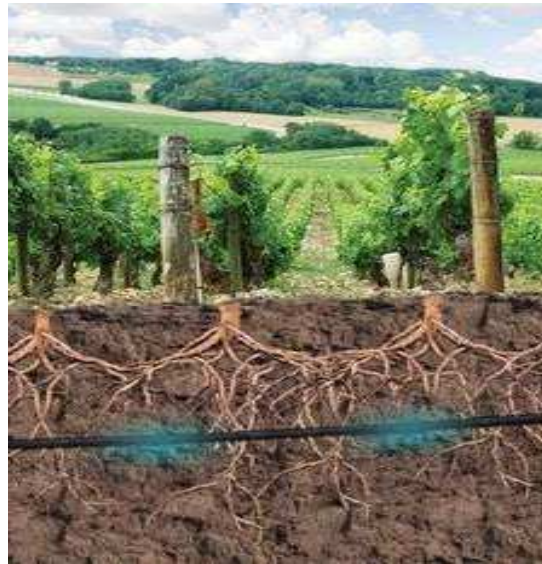
- Rainwater Harvesting Seen as Solution for Drought



- Efficient and effective irrigation systems such as Drip Irrigation, Subsurface Drip Irrigation, and Sprinkler Irrigation



**Drip Irrigation**

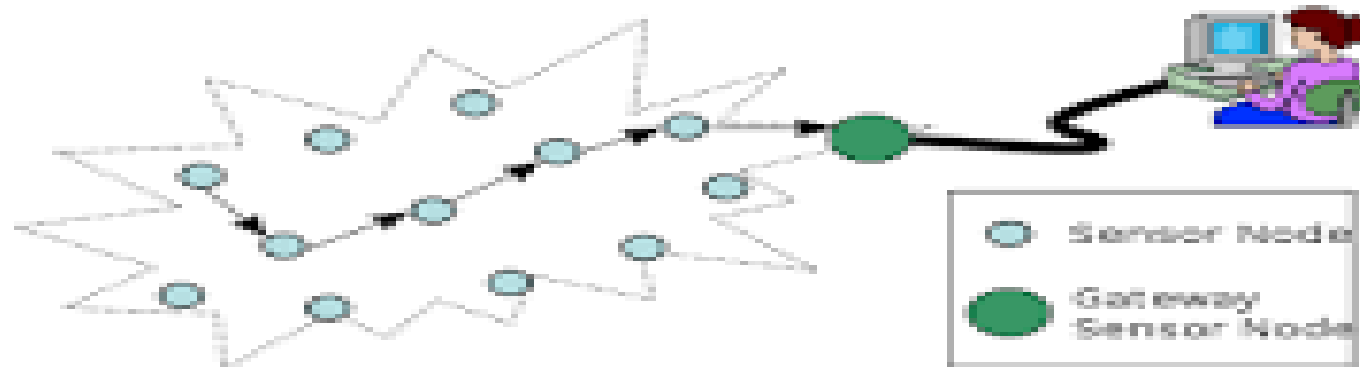


**Subsurface Drip Irrigation**



**Sprinkler Irrigation**

- Use of wireless sensors network to control and schedule irrigation

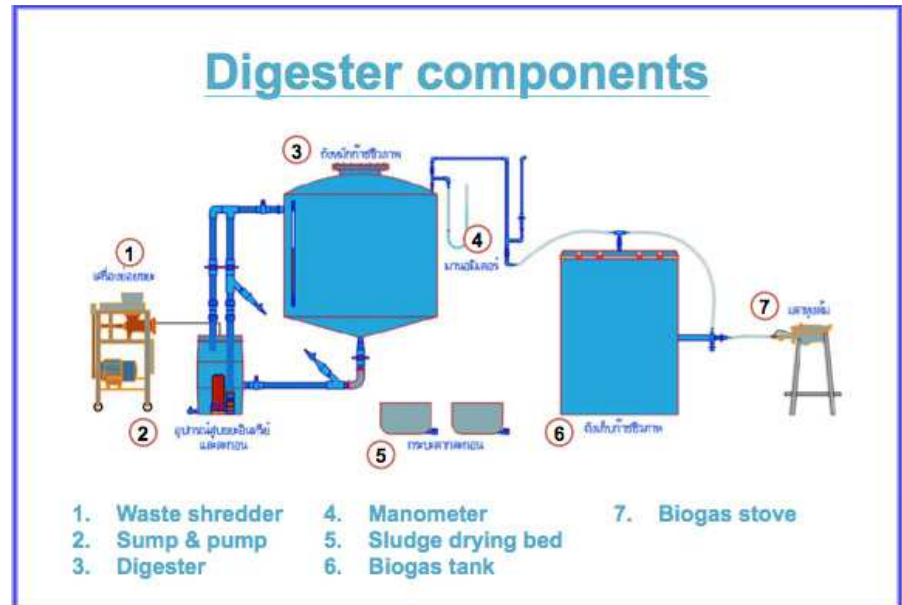
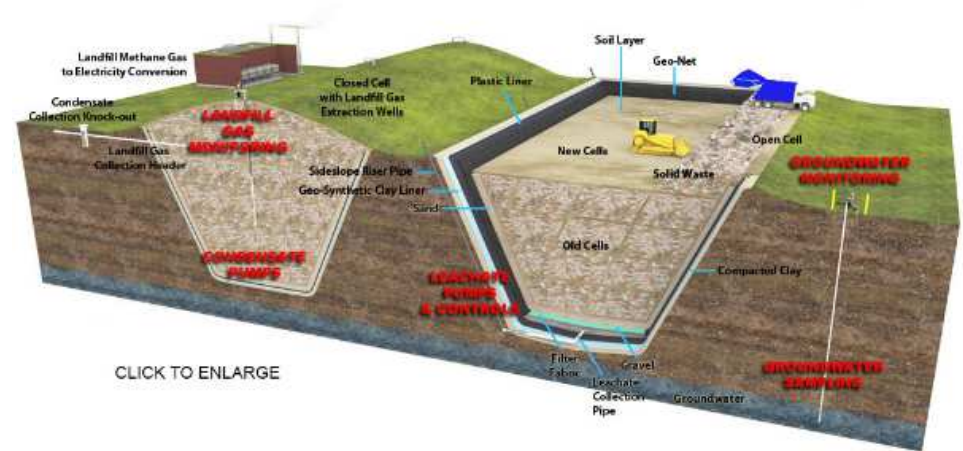


- Use of smart sensors in water related equipment



# Pollution

- Effective waste management – convert especially solid-waste to biogas
- Construction of adequate landfills for communities



# Water-Energy-Food Nexus

- Establishing and strengthening international governance to deal with shared water resources rights e.g. Senegal Basin,
- Using renewable energy technologies for sea water desalination
- Adoption dry cooling in power plant to minimise the consumption of water
- Use of computational fluid dynamics in hydropower station to optimise water usage



# Water Supply and Demand

- Control population growth because water resources may not sustain the growth of population in next 25-30 years
  - Provide incentives for couples to have fewer children
  - Adoption of contraceptives to control unwanted child-birth
  - Maybe ban polygamy!!

# Public-Private Partnerships



# Earth Observation Techniques

- Application of GIS and Remote Sensing
- Adoption of initiatives such as **Soil Moisture and Ocean Salinity (SMOS)**, Gravity Recovery and Climate Experiment (**GRACE**), **SENTINEL-1 (Global Monitoring of the Environment for Security & Africa – GMES-Africa)** to improve assessment, prediction and forecasting of water resources in terms of quality & quantity



# Research, Education & Training

- Promote effective and efficient Water management at all levels e.g. In **primary schools** to tertiary levels
- Encourage and finance research for **drought resistant crops/salinity**
- **Establish tariffs** that encourage water use efficiency
- Promote the use of **sand filters** in rural communities
- The promotion of **renewable energy technologies** for sea water desalination facilities e.g. forward Osmosis
- Use of **ultra-filtration** for recycling water
- **Use of organisms** for purification of water e.g. Water hyacinth, earth worms etc.
- ETC.



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**DEPLOYMENT GROUP  
say THANK YOU**

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