Climate change, water resources of Africa and essential interventions

Seleshi B. Awualchew (ACPC), Matthew McCartney (IWMI), Seydou Traore (ACPC), Michael Menker (ACPC), Solomon Seyoum (IWMI)
Outline

• Global Drivers of Change
• Africa’s Water Challenges
• Development & CC Related Water Challenges
• Responses and Major Interventions
• Key Messages
Global Drivers of Change:
We are living in a fast changing world

9 billion people by 2050

- Food crises
- Climate change
- Energy crises
- Water scarcity
- Urbanization
- Dietary change

Collapsing fish stocks
Pollution

Global food chains disadvantage smallholders

2 Billion by 2050

Deforestation, soil erosion and exhaustion

Economies of scale

Growth of private sector

Strength of BRICs

E-Comms

Networked science

increasing challenges – increasing opportunities
Africa’s Water Challenges

Managing water under climate change ➔ complex problem

Gap exists:

- Data, Science base and analytical capacity

- Adequate development ➔ adequately responding to CV and CC

- Policy and institutional instruments eg. in TB management
Development & CC Related Water Challenges

- **Knowledge gaps**
  - Uncertainty, knowledge management

- **Resource base related**
  - Water scarcity, quality, degradation

- **Extreme events & aggravation**
  - Flood, drought, variability, health, .

- **Use efficiency**
  - Inadequate use, low productivity,

- **Poor control & management**
  - Capacity, infrastructure, finance, institutions, policy

**Adaptation in water to meet the challenges**
Scientific Consensus on Climate Change

• The climate system is driven by solar radiation from the Sun

• Phenomena that affect the energy balance of the climate system would ultimately alter the climate

• Global warming is caused by the emission of GHG & their increasing concentration in the atmosphere due to human activities

• Concentration of the major GHG has increased since 1750
  – Carbon dioxide (CO₂) increased by 32%
  – Methane (CH₄) increased by 150%
  – Nitrous Oxide (N₂O) increased by 17%
  – The increase in atmospheric CO₂: fossil-fuel burning and land use change including deforestation
  – The increase in CH₄ & N₂O: emissions from energy use, livestock, rice agriculture, and landfill.

• Earth’s climate results from interactions of many processes in the components of the climate system: Anthropogenic system (human activities) disturb the balance

• The climate system and hydrological balance change as a result
Response: Knowledge and capacity

Reduce uncertainty through research and capacity building
- Africa’s climate change and water nexus is largely uncertain

Significantly improve Africa's modeling and scientific base
- The most common method of developing climate scenarios for quantitative impact assessments is to use results from Global Climate Model (GCM) experiments
- Negligible institutions are able to run such models in Africa

Low Resolution
~ 300 km
Month, season, year

High Resolution
1 Km
Day, hour, minute
Responses: Enhance sustainable resources use

Resources summary

- Rainfall = 670 mm/year providing = 20,100 km³
- IRW = 3,931km³ (20% of RF)
- 13 major river basins
- 63 TB, 63% land area, 93% total surface water, home for 77% of population
- GW is 15% of IRW
- 38 major TB aquifers

- Water management is critical for resilience and development
- Transform development & management of water
Response: sector water resources use efficiency

- Water use about 4% IRW
- Water supply– 64%
- Agriculture about 185M ha; 7% irrigation
- Hydropower
  - 283,000 MW potential
  - 8.3% use (2009)
  - 32% of energy source
### Response: Water Storage Continuum for Adaptation

<table>
<thead>
<tr>
<th>Present climate vulnerability</th>
<th>Water storage (adaptation strategy)</th>
<th>Increased availability and access to water</th>
<th>Increased adaptive capacity</th>
<th>Increased agricultural productivity</th>
<th>Increased water security</th>
<th>Future climate vulnerability (post adaptation)</th>
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</thead>
<tbody>
<tr>
<td>Pre-adaptation</td>
<td></td>
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<td>Future climate vulnerability &lt; Present climate vulnerability</td>
</tr>
</tbody>
</table>

**Maximize benefit through multi-purpose development**
Response: Finance, investment, policy

- Accessing adaptation funds to support WRD pays off and lead to ‘Concrete adaptation activity’ in Africa
- Enhance policy and governance mechanisms

Physical-infrastructural capital for Africa is high return on investment and resilience
Key Messages: Adaptation in water

Knowledge:
– Reduce uncertainty and knowledge gaps

Enhance WRD
– Leapfrog in development, and water is one of the crucial path for LCD

Use efficiency and sustainability
– Adopt critical interventions and technologies that are sustainable
– Increase land and water productivity, efficiency and value per unit of resources

Technology
– Technology transfers and access

Increase finance, investment and governance
– Accessing adaptation funds to support WRD pays of and lead to ‘Concrete adaptation activity’ in Africa
– Enhance policy and governance mechanisms
Thank you

Contact
sbekele@uneca.org