Climate Change Impacts on Water Resources and Water Provision

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Facts – World Water Resources

- 97% Oceans Water
- 3% Fresh Water
  - 79% Ice caps & Glaciers
  - 20% Ground Water
- 1% Accessible Surface Fresh Water (high spatial variability)
- 52% Lakes
- 38% Soil Moisture
- 8% Atmospheric Water vapour
- 1% Water Within Living Organisms
- 0.6% Rivers

- Total Fresh Water = 35 000 000 Km³
- Total Water Flowing in the Rivers = 21 200 Km³
- Ration is = 0.06%
Climate Change is a Water Change

Floods vulnerability

Drought Vulnerability
Key Results Areas for WP6

1. Water basin boundaries defined and gaps in existing hydro-meteorological networks identified.

2. Baseline hydro-meteorological information established and hydrological models developed for target areas.

3. Predictive hydrological models under different land cover and climate change scenarios available for each target area.

4. Key areas for water provision, their management and uses identified and documented including future scenario.
5. Likely impacts of climate change on access to water and related health problems of vulnerable populations identified and documented.

6. Baseline study on impacts of climate change on livelihoods and relevant adaptation strategies by local communities completed in target areas.

7. Capacity for assessment of the impacts of climate change on water provision in selected African institutions upgraded.
Pangani River Basin-Kilimanjaro-Tanzania
Wundanyi catchment-Taita hills-Kenya
Key Research Output -1

- Water basin boundaries defined for Pangani catchment and Wundanyi catchment.
- Gaps in existing hydro-meteorological networks identified.
- 4 Automatic Weather Stations established in each transect.
Key Research Output -2

Baseline hydro-meteorological information established

Seasonal flow regime

Trends of mean monthly flows
Key Research Output - 3

Predictive hydrological models under different land cover available
Spatial variability of rainfall under present and future scenarios

Present (2011)  Future (2060)
Stream flows are expected to decrease by 5.3% due to climate change.

The annual demand on the other hand will increase from 1,879.73Mm³ at present (2011) to 3,249.69Mm³ in the future (2060).
Likely impacts of climate change on access to water and related health problems of vulnerable populations identified and documented.
Key Research Output - 6

- Baseline study on impacts of climate change on livelihoods and relevant adaptation strategies by local communities completed in Pangani catchment.
Key Research Output - 7

Capacity building

2 PhDs and 4 Masters degrees students

3 Msc Dissertations have been submitted for examinations

1. Assessment of Impacts of Landuse/Landcover Changes on Streamflows upstream Nyumba ya Mungu Reservoir by Ms. Mwajabu Bura.

2. Investigation of Surface Water Availability Dynamics by Using Coupled SWAT and WEAP Models in Upstream of Pangani River Basin by Mr. Peter Kishiwa.

3. Impact of climate variability on household water access in Moshi rural district in Tanzania by Mr. Samwel Mbuya.
Capacity building - cont...
Training workshops in Pangani Catchment
Opportunities in Pangani catchment
Opportunities – cont.
Challenges in Pangani catchment
Challenges – cont.
Training workshop in Taita hills
Opportunities in Taita hills: Ecosystem Services
Challenges in Taita hills: Water scarcity and Water pollution
Conclusion

• Rural communities in both study areas face serious climate-related challenges and have to adapt to spatial and temporal climate variability, with varying degrees of success.

• Traditional smallholder irrigated schemes used as adaptation strategies are characterized by low water use efficiency and high water losses.

• The potential implication of the current traditional irrigation systems is that if irrigation is managed properly, it will lead to sustainable increases in small farmer’s productivity and income, thus alleviating rural poverty and enhancing environmental management objectives.
CONCLUSION – cont...

• Integrated Water Resource Management (IWRM) is an internationally accepted approach for efficient, equitable and sustainable development and management of water resources and water demands.

• Successful IWRM include, among others: capturing society’s views, reshaping planning processes, coordinating land and water resources management, recognizing water quantity and quality linkages, conjunctive use of surface water and groundwater, protecting and restoring natural systems, and consideration of climate change.
Upstream

“I have no business with downstream users. All water is mine”

Downstream

“But remember your mother-in-law stays downstream. Water is a gift from God for all of us”