



Challenges and Opportunities in Mainstreaming and Implementing the Water and Energy Nexus: Case of East Africa

Michael Kiza,

The East African Centre of Excellence for
Renewable Energy and Energy Efficiency
(EACREEE)



Introduction

- The EAC region's water, food and energy sectors are under increasing pressure due to population growth and agricultural and industrial development.
 - Normally the same people who have no access to sustainable energy who have no access to potable (or running) water and have very poor food and nutrition security.
 - At the front lines of this battle are our mothers, wives and daughter!
 - Climate change is creating adverse impacts on the water, energy and food supply situation in the E African region.
 - Scattered settlements make nexus solution more complex.
-

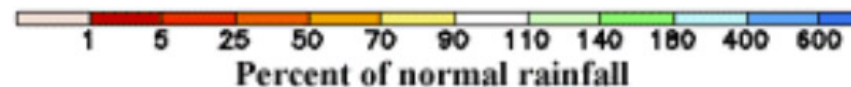
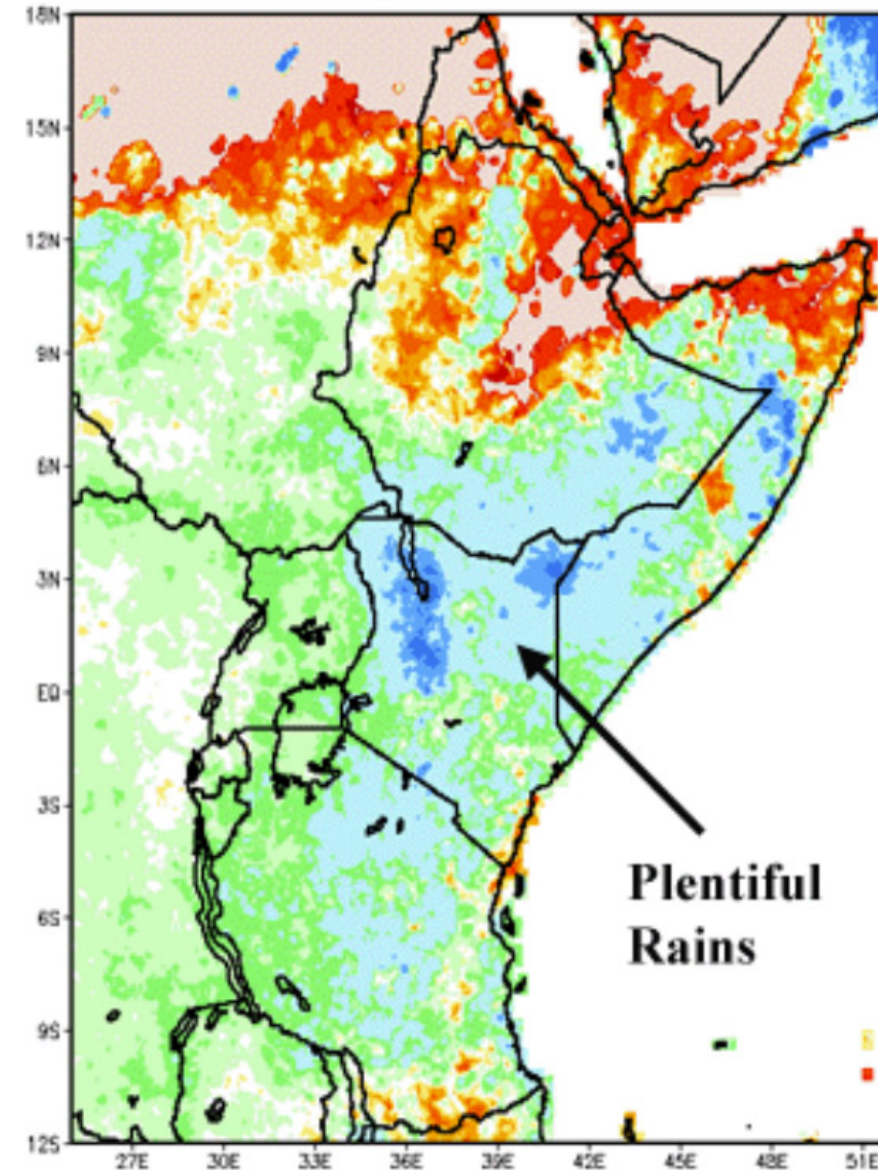
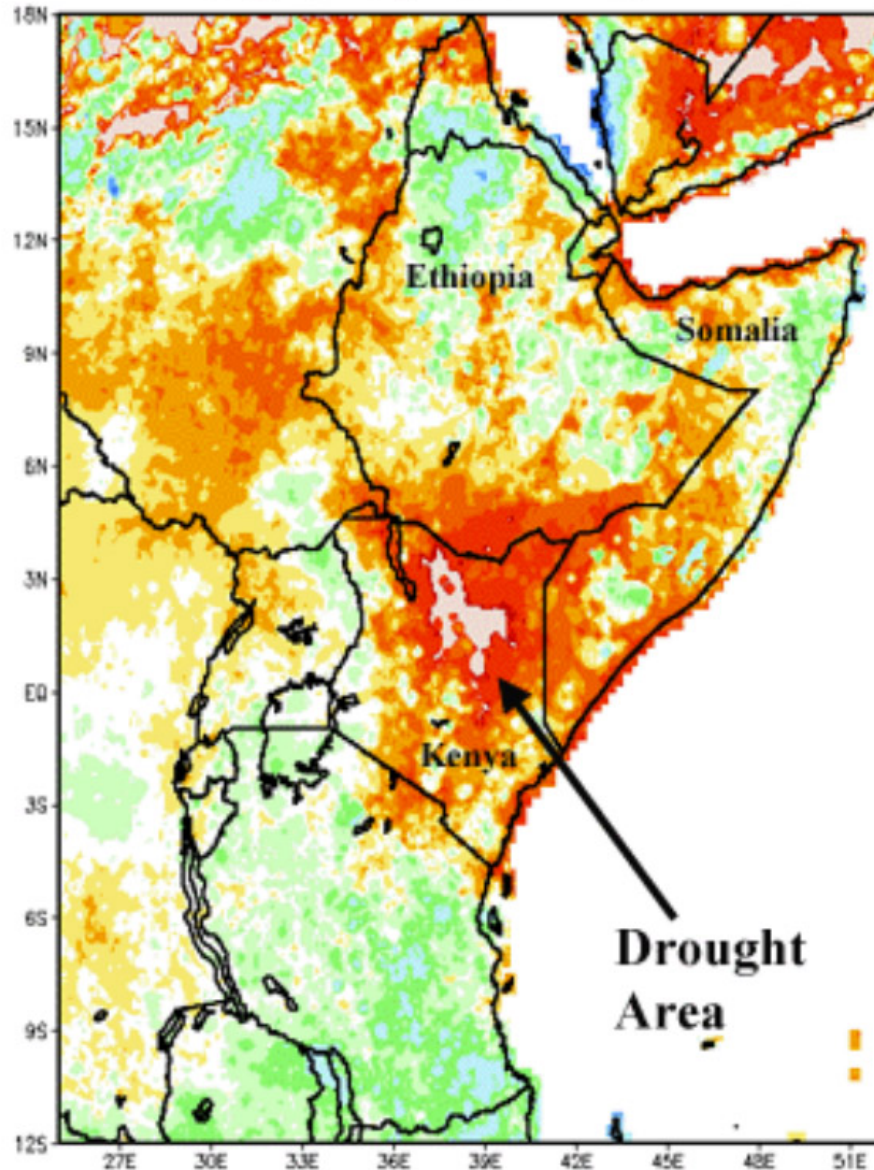
EAC Water Resources Status;

- The region has significant volumes of water, which could be enhanced by the preservation and restoration of the catchment areas.
 - The three most notable water bodies and systems are:
 - Lake Tanganyika - the greatest single reservoir of fresh water on the continent and second deepest in the world,
 - Lake Victoria - Africa's largest lake and the world's second-largest freshwater lake, and
 - The Nile River Basin - source of the Nile, the longest river in the world.
 - The distribution of water varies significantly within the region.
 - The western component of East Africa, including Burundi, Rwanda and Uganda along with the central part of the continent are considered to have a rain surplus, while large parts of Kenya, north eastern Uganda, and parts of Western Tanzania have a very large water deficit.
-

Percent of normal precipitation in East Africa, 2011

“Long Rains”, March - May 2011

“Short Rains”, October - December 2011



13 & 14 Março
2017, Guiné Bissau

EAC Energy Resources Status;

- The EAC energy situation is characterized by:
 - High reliance on solid biomass for cooking and heating,
 - the share of the population using solid fuels for cooking is more than 95% in all EAC partner states except Kenya, where it is 84%.
 - Low electrification rates,
 - Policy makers' focus on the power sector to improve electrification rates and
 - Increasing demand for transportation fuels.
-



Energy and Water Access Status (2017 Data)

Country	Access to Clean Water (% of population)	Access to electricity (% of population)
BURUNDI	72	7.6
KENYA	59	56
RWANDA	65	29.4
SOUTH SUDAN	55	8.9
TANZANIA	53	32.8
UGANDA	72	26.7



Water-dependent Energy vs. other Energy Sources:

Hydropower

- The region (excluding SS) has an estimated large-scale hydropower, potential of 13.4 GW, only 16% of which has been exploited.
- An estimated small hydropower potential of over 4GW, with only about 158MW installed capacity.
- All these could be exploited to provide both electricity and water (for household consumption, irrigation, food production and other industries) as well as flood control.



Small hydropower status and projections..

Technical and economic potential in EAC

Country	Technically & economically feasible potential	
	No. of plants	Total capacity in MW
Burundi	159	414
Kenya	n/a	3000
Rwanda	271	83
Tanzania	300	400
Uganda	37	200
Total		4,097

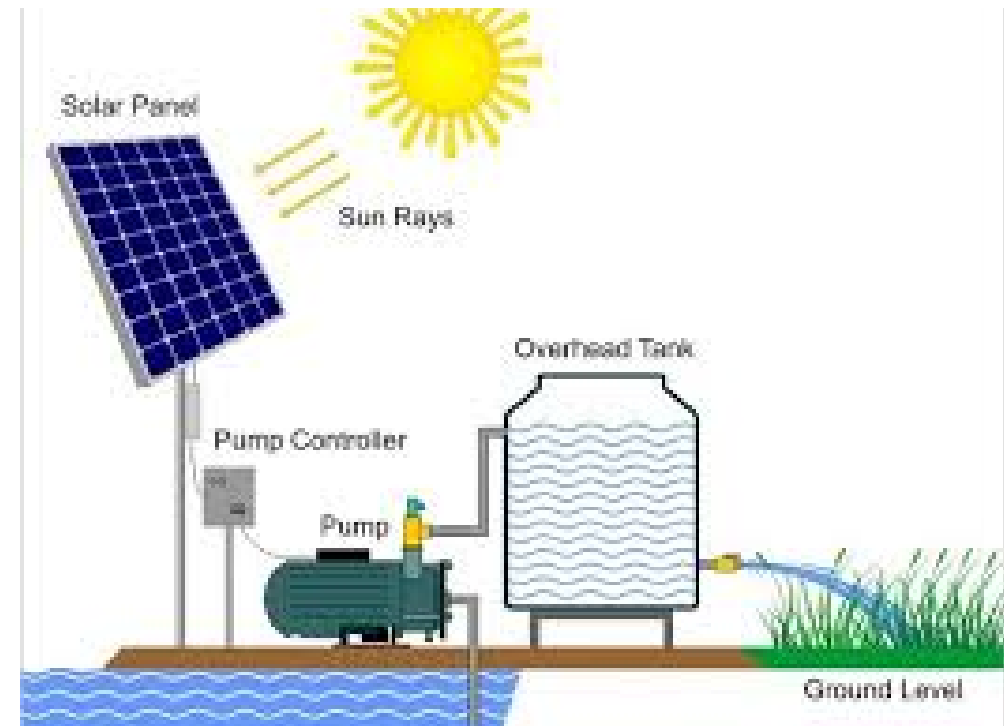
Estimated additional power plants by 2020

Country	Additional hydropower plants by 2020	
	No. of plants	Total capacity in MW
Burundi	12	19
Kenya	32	123.9
Rwanda	32	62
Tanzania	40	190
Uganda	24	123
Total	140	517.9



Solar Energy

- Solar PV plays an increasingly important role in providing basic energy access to populations in rural and peri-urban areas
- High potentials of solar also being exploited for and water pumping.





Wind

- EAC region is endowed with appreciable wind energy resources that could be used to generate electricity and supply water.
- Kenya and Tanzania(?) are currently the only EAC partner state that has grid-connected wind power, despite the vast wind energy potential in the region..
- This can be used also for water pumping





Policy and Planning

- All countries have policies on water and energy – but with very limited linkages.
 - It is very complex to develop integrated water and energy planning in all any of the EAC partner States.
 - water, energy and food supplies are not planned as a package – they are planned very differently with very limited (negligible) coordination/consultations between the line ministries and government agencies involved.
 - Even various departments and agencies within one line ministries have their own plans, most often without consultation with sister departments.
-



What can be Done (Some Recommendations)

- The Nexus Needs Assessment and planning
 - Data generally lacking in the region.
 - Strengthen technical capacity and financial resources for water-energy planning.
- Stronger and more coherent national policies and plans.
 - Various inter-sectoral coordinated processes can help align policies so as to provide for nexus solutions.
- Plan for comprehensive needs of the poor – live no one behind.
 - We should understand how each of these needs affect the poor.
 - We must ensure that women and vulnerable groups are included in development options and decision making processes, and that gender equity is addressed in integrated planning.



- Simplification and Harmonizing economic instruments in the region.
 - Accommodating all the actors WEF field under one roof would considerably simplify the implementation of integrated and well coordinated planning and implementation. But this is complex. Countries that are still under this kind of arrangements should not change.
 - Enhancing regional cooperation on the nexus approach
 - E.g. All countries to be in tandem in improving efficiency in water and energy use.
 - Transboundary nature of energy and water has to be addressed. Coordinated actions required.
-



Thanks



Contact details:
Michael KIZA (Mr)
Programme Management Expert
East African Centre of Excellence for Renewable Energy and Energy Efficiency (EACREEE)
CEDAT Building, Makerere University | Kampala, Uganda |
T: (+256) 787544141 / 752738990 |
E: m.kiza@eacreee.org; m.kiza@unido.org |
w: <http://www.eacreee.org> |
Twitter: @KizaMichael