

topic: Groundwater

Interlinkage Between Global Environmental Changes, Water Resources Availability and Quality in the East African Rift: Preliminary Analyses and Some Cases: The MaWARi Project (Kenya, Ethiopia, Djibouti, France)

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Abstract: The East African Rift extending across Djibouti, Ethiopia and Kenya is characterized by low level of economic development, high level of poverty, increasing population, scarce natural resources (land, water, and environment), complex and rich ecosystems, increasing desertification and degrading biodiversity, underdeveloped regional trade and market, water resources mainly stored in groundwater and scarce surface water resources, energy mostly relying on non renewable biomass. The inhabitants are mostly pastoral communities. All these ingredients are responsible for high vulnerability and fast deterioration of natural resources and socio economic conditions (health, sanitation, peace and security, productive agriculture) to global environmental changes. In this region, there is a complex linkage and feedback between the global climate change (rainfall variation and seasonality, desertification, anthropogenic forcing) and socio economic sectors. Climate change is likely to have a significant impact on the prospects for economic growth. For example decline in agricultural productivity in some countries is attributed to climate change. Declining groundwater availability leads to conflict of water use in the region. The socio economy of the rift valley of eastern Africa is largely dependent on land resources exploitation (agriculture, horticulture, cattle rearing) and therefore strongly dependent on water resources, likely to be impacted by global change, such as biodiversity, ecosystems and health situation. At broader scale climate change also impacts sectors such as energy, trade, peace and security, migration etc. The region can serve as the best example where linkage between global change impacts and socio economics and environment can be examined. Surface waters are scarce in East African Rift. Like in any Sub Saharan African countries, groundwater resource is the pillar of socio economic activity and environment functions in the East African Rift shared between Ethiopia, Kenya and Djibouti. Unlike in most part of Africa where groundwater is stored in extensive continental scale groundwater reservoirs, the groundwater resources of Eastern Africa are known for their low storage and shallow circulation (UNESCO, 2000). Therefore the water resources availability of the region is highly vulnerable to even minor variations in global climate. Therefore, the full attainment of guaranteeing food and water security and sustainable development under global environmental change largely depends on a) the capacity of the water system to buffer the impact of global environmental change and b) the degree of dependence of the socio-economic and environmental systems on water resources availability. *Although this is evident qualitatively, the details of the complex linkage between these systems is yet to be examined and fragmented knowledge yet to integrated and appropriate institutions (capacity, structure, knowledge base and flow) to monitor, address, and provide coping strategy is yet to be made available.* There is a need to holistically examine the linkages, feedbacks and dynamics between global change system, the water system and the socio-economic and environmental system in the East African Rift. This requires a regional collaboration of scientific community. This presentation is aimed at presenting some case studies on the complex interlinkages of global environmental changes, water resources availability and their impact on sustainable livelihood. Emphasis will be given on storage of the resources. The results of this preliminary investigation particularly related to water quality have been obtained from a regional multi lateral project (www.mawari.net) sponsored by the French government and implemented by Ethiopia, Kenya, and Djibouti.

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