

Ecosystems for water, food and economic development in the Central Rift Valley, Ethiopia: First conclusions

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Main characteristics of the Central Rift Valley (CRV)

The CRV is a closed basin consisting of Lake Ziway, Langanu and Abijata. Lake Ziway acts as a large water buffer in the catchment. The lake only discharges water to downstream portions of the catchment once the water level has reached a certain level. Impacts from land and water interventions become mostly manifest in the downstream portions of the catchment, along the Bulbula River and in the terminal Lake Abyata.

Planned interventions

The area with irrigated agriculture in the CRV has increased from about 100 ha in the early 1970's to 10.000 ha in 2006. Current water use by irrigated agriculture is in the order of 150 million m³ per year. This volume is of the same order of magnitude as the natural fluctuation in the inflow from the Meki and Ketar rivers into Lake Ziway. Although the volume of irrigation water is small compared to the total amount of rainfall in the CRV (9 billion m³) there are strong indications that even small reductions in water supply have major impacts on the regional hydrology and future resource use options. For example, the size of Lake Abijata has decreased significantly during the past 30 years which has three main causes:

- Extraction of lake water for the production of soda ash.
- Water extraction along the Bulbula river for agricultural purposes. This river is the major water supplier of Lake Abijata. The last decennia significantly (10-15% per year) less water has reached Lake Abijata.
- Decreased discharge by the Bulbula River due to land developments in the catchment of Lake Ziway. The Bulbula river is an outflow from Lake Ziway. In recent years the level of Lake Ziway dropped almost 0.5 meter more than in previous years (during the dry season), which indicates a water abstraction of 100-200 million m³. If the level of Lake Ziway decreases more during the dry season it obviously takes more time before water is discharged through the Bulbula River after the rains start, and the annual discharge by the Bulbula has therefore, decreased from approximately 250 million m³ per year to less than 50 million m³ per year.

Further reduction in discharge by the Bulbula may turn Lake Ziway into a terminal lake with the risk that this lake becomes saline (just as Lake Abijata in the past). Given the relatively shallow depth critical salinity levels may be reached within 5-10 years. This will have serious repercussions for the recent floriculture development and the local population depending on lake water for domestic and other uses.

Non-planned interventions

Deforestation and overgrazing result in erosion and increased surface run-off. Consequently, water will accumulate around the lakes causing additional evaporation during the wet season. At the same time evapotranspiration in the catchment will decrease. The net effect cannot be quantified with the available data and requires further study.

Climate variability and change

Temperature has increased with about 1.5°C around Ziway over the past 30 years. A rise in temperature of 1°C will result in an increase of the potential evapotranspiration of approximately 2.4%, while 2°C result in an increase of 4.9%. The volume of rainfall in the CRV decreased about 15% during 1996-2005. In the catchment of Lake Ziway this represents a volume of approximately 1 billion m³. The expected decrease in river discharge will be approximately 100-120 million m³, which is of the same order of magnitude as the current annual abstractions for irrigated agriculture.

Need for collaboration and new policies

Any land intervention, either planned or not planned will have repercussions on water resources. Recent reductions in water levels of lakes and rivers indicate the over-exploitation of water resources in the CRV. Further uncoordinated exploitation of resources may have dramatic consequences for the local population and development options. Therefore, policy development and integrated use and management of water, land and related resources is imperative to ensure the sustainable development of the CRV, i.e. without compromising the resource base and potential livelihoods of the local population.

