Modeling the Impact of Development and Management Options on Future Water Resource Use in the Nyangores Sub-Catchment of the Mara Basin in Kenya

Paul Omonge[1]; Mathew Herrnegger[2]; Josef Fürst[2] & **Luke Olang[3]***
[1] Kenyatta University, Nairobi, Kenya; [2]University of Natural Resources and Life Sciences (BOKU), Vienna, Austria & **[3]*Department of Biosystems and Environmental Engineering, Technical University of Kenya**

ABSTRACT
Despite the increasing water insecurity consequent of competing uses, the Nyangores sub-catchment of Kenya is yet to develop an inclusive water use and allocation plan for its water resource systems. As a step towards achieving this, this contribution employed the Water Evaluation and Planning (WEAP) system to evaluate selected policy based water development and management options for future planning purposes. Major water resources of the region were mapped and quantified to establish the current demand versus supply status. To define a reference scenario for subsequent model projections, additional data on urban and rural water consumption, water demand for crop types, daily water use for existing factories and industries were also collated through a rigorous fieldwork procedure. The model was calibrated using the parameter estimation tool (PEST) and validated against observed
Stream flow data, and subsequently used to simulate feasible management options. Due to lack of up-to-date data for the current year, the year 2000 was selected as the base year for the scenario simulations up to the year 2030, which has been set by the country for realizing most flagship development projects. From the results obtained, the current annual water demand within the sub-catchment is estimated to be around 27.2 million m3 of which 24% is being met through improved and protected water sources including springs, wells and boreholes, while 76% is met through informal and unprotected sources which are insufficient to cater for future increases in demand. Under there ference scenario, the WEAP model predicted an annual total inadequate supply of 8.1 million m3 mostly in the dry season by the year 2030. The current annual unmet water demand is 1.3 million m3 and is noteworthy in the dry seasons of December through February at the irrigation demand site. The monthly unmet domestic demand under High Population Growth (HPG) was projected to be 1.06 million m3 by the year 2030. However, within the
Improved Water Conservation Scenario (WCS), the total water demand is projected to decline by 24.2% in the same period.
Key words: Nyangores catchment, Water Resources, WEAP, Scenario Analysis, Kenya

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