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**The Characteristics and Impacts of Streamflow Variation: A Review of
The Influence of Climate Change and Anthropogenic Activities**

Johanna A. Wanjala^{a,b}, Bartholomew T. Kuria^b, Arthur W. Sichangi^b, David N. Kuria^b,
Charles N. Mundia^b and Andreas Rienow^c

^aRemote Sensing Research Group, Institute of Geomatics, GIS and Remote Sensing,
Dedan Kimathi University of Technology, Private Bag 10143, Nyeri, Kenya

^bInstitute of Geomatics, GIS and Remote Sensing, Dedan Kimathi University of Technology, Private Bag 10143, Nyeri, Kenya.

^cRuhr University Bochum: Ruhr-Universität Bochum, Universitätsstraße 150 44801 Bochum, Germany.

Email: johannawanjala@gmail.com

Abstract

The unpredictable climate change and increased anthropogenic activities cause continuous streamflow variations, impacting the socioeconomic characteristics of many regions relying on stream water for sustenance. This paper extensively reviewed the literature on streamflow variation in the Upper Tana River Basin (UTRN) in Kenya, highlighting the characteristics, causes and impacts of streamflow variability. The review also looked at proposed resilience and coping strategies and stakeholders' engagement in Kenya towards reducing streamflow variability. Twenty studies on streamflow characteristics in the UTRB were reviewed following a systematic search using the google scholar engine. Six of the identified studies looked at the impact of climate change, three at water abstraction, and three at land use changes, while eight analysed the combined effects of climate change and anthropogenic activities on streamflow variations. The studies showed a positive correlation between climate change and streamflow and a negative correlation between water abstraction and streamflow. An overall gradual decrease in streamflow was identified. Based on the studies reviewed, climate change and anthropogenic activities govern streamflow characteristics in the UTRB. Analysis, however, showed in-situ data gaps and the paucity of scientific knowledge on the actual measurements, monitoring and prediction of streamflow variation. Future research should consider combining land use and hydrological models to evaluate better the effects of land use changes on streamflow variation. Satellite and reanalysis datasets should complement the scarce in-situ meteorological data and regionalisation of hydrological model parameters employed in ungauged river basins to increase the efforts geared towards monitoring and managing streamflow variations.

Keywords: Streamflow Variability, Climate Change, Water Abstraction, Land Use Changes, Upper Tana River Basin