Drought forecasting under climate change scenarios using artificial neural networks for sustainable water resources management in upper Tana river basin, Kenya

Climate change has continued to impact negatively on water resources globally. For instance, extreme weather conditions especially the drought phenomena have become frequent in Africa. This has prompted water engineers and hydrologists to formulate mitigation and adaptation measures to address these challenges. The frequency of drought event of a defined severity for a defined return period is fundamental in planning, designing, operating and managing water resources systems within a basin. This paper presents an analysis of the hydrological drought frequency for the upper Tana River basin in Kenya using the absolute Stream flow Drought Index (SDI) and modified Gumbel technique. The study used a 41-year (1970-2010) stream flow data and forecasted hydrological droughts for 2, 5, 10, 20, 50, 100, 200, 500 and 1000-year return periods in relation to the selected stream flows. The results provide an overview of drought trends within the river basin and therefore would be very useful in applying drought adaptation policies by water resource managers.