Abstract

Appropriate water quality and quantity are critical problem greatly affecting significant proportion of the population particularly those living in semi-arid and arid areas. Rainfall characteristics, streamflow and reservoir levels are some of the key hydro-meteorological variables within a catchment in the determination of sufficiency of water quantity. Lake Naivasha reservoir level continues to be hit by anthropogenic stressors such as loss of wetlands, water abstraction and eutrophication. Also there has been a lot of fluctuation in flow discharge of Malewa River over the years where the tributaries (Turasha and Karati streams) usually dries up during dry season. This paper presents the results of a research to assess the time series trends of rainfall, streamflow and lake basin levels data in the catchment from 1980-2018 using Mann-Kendall trend test to assess water quantity status. Monthly stream flow, rainfall and reservoir level data in the catchment were obtained from Water Resources Management Authority (WRMA) and Kenya Meteorological Department (KMD) for the years 1980-2018. Non-parametric Mann-Kendall rank statistics test was used to examine the trend components of hydro-meteorological variables. The P-values were used to test whether the null hypotheses were statistically significant ($\alpha<0.05$) at a 5% level of significance. Rainfall values had an increasing trend from 2011 onwards but not statistically significant while annual streamflow values had no trend as P-value showed weak evidences to rejected the null hypothesis. Reservoir level had an upward trend in years 1981, 2001, 2003, 2012 and 2018 while downward trends in 1980, 1982, 1984, 1986, 1987, 2000, 2004, 2008 and 2014. From 2010 onwards, in monthly data, there have been upward water levels in the lake as shown by the trend. These show that the hydro-meteorological indicators in the catchment are independently trending, therefore some other factors such as land cover changes or climate changes were adversely affecting the hydrological cycle. These findings are helpful for planning and management in water resource systems such as forecasting water distribution and mitigate flood and drought.