

## Abstract

Upper Njoro River catchment (UNRiC) falls within the Eastern Mau forest situated along the western escarpment of the Rift Valley. It serves as the head water for Njoro River which is the major river draining its water in Lake Nakuru. The main economic activity within the area is farming and the main crops grown include maize and potatoes which are among main crops in the flagship projects of the big four Agendas to enhance food security and nutrition. The area receives a trimodal pattern of rainfall having peaks in April, August and November with. Heavy downpour usually comes after the dry and hot months of January February and March. The heavy rainfall lead to unexpected floods which results to food security of people. To enhance the realization of the agenda for food security, farmers need to produce throughout the year. The high runoff rates that are being experienced within the area can be harnessed to be used for agricultural production. There was therefore need for the knowledge on the characteristics of extreme surface flows within the catchment in terms of magnitude, frequency and duration for design of water storage structures and also to anticipate flood occurrence. The objective of the study was to characterize annual peak discharges for Njoro River based on probability distribution functions within the Easy fit software. The key findings from the study included the best fitting probability distribution model being Generalized Pareto. Peak flow discharges estimated for 50, 100 and 200 year return periods using the best fitting model included 8.1 m<sup>3</sup> /s, 10.1 m<sup>3</sup> /s and 12.3 m<sup>3</sup> /s respectively. The study recommends the use of Generalized Pareto probability distribution function in the anticipation of extreme flows and in design of water storage structures for use in agricultural production hence improved food security and nutrition.