

Abstract

Rainfall is the meteorological phenomenon that is useful for human activities. Majority of population depend on rainfall water for agriculture and domestic use. Since Meru and Embu regions are agricultural zones relying heavily on rainfed agriculture, it is important for farmers to know rainfall patterns prevailing in their regions. The main objective of this study was to model rainfall patterns in Meru and Embu regions. Stationarity and unit root for data were tested, time series model was developed and fitted to the historical data using Box- Jenkins (BJ) Methodology and rainfall in the regions were forecasted for five years. Monthly and yearly rainfall and temperature data obtained from Kenya meteorological department for the period 1976-2015 was used in the study. This information can be used in planning and management of water for domestic and agricultural use in the regions. Rainfall data was found to be seasonally and non-stationary and hence differencing and seasonal differencing was applied to achieve stationarity. Rainfall in both regions has short rains in the months of October to December (OND) and long rains in the months of March to May (MAM). The model that best fitted rainfall data was ARIMA (1,1,1)(0,1,1)₁₂. This model was used to forecast monthly rainfall patterns for five years and found that future rainfall patterns will not change with time. Negative binomial model was found to be the best model since it had a lower Akaike Information Criterion (AIC). After fitting the data to this model the mean amount of rainfall was found to change with slight change in the temperature in both regions. It was recommended that, future researchers should consider zoning regions and apply developed ARIMA model and negative binomial to homogeneous zones.