Time Series Modelling of Monthly Rainfall in Kilinochchi District, Sri Lanka

S. Kirisanth, N. Varathan and S. Arumairajan

Department of Mathematics and Statistics, University of Jaffna, Jaffna, Sri Lanka

The amount of rainfall received over an area is an important factor in assessing availability of water to meet various demands for agriculture, industry and irrigation. Kilinochchi is one of districts in Sri Lanka and many people in Kilinochchi district are below the poverty line and mainly depend on the agriculture for their daily life. Rainfall is the main source of watering for agriculture in Kilinochchi. Forecasting rainfall in Kilinochchi district plays an important role in the planning and management of agriculture scheme and management of water resource systems. Therefore, it is essential to develop a time series model to analyze the amount of rainfall in Kilinochchi district. The main goal of this study is to find a suitable Auto Regressive Integrated Moving Average (ARIMA) model to the monthly rainfall data of Kilinochchi district. In this study, the monthly rainfall of Kilinochchi district under three different stations such as Iranamadu, Akkarayankulam, Kariyalanagapaduwan is modelled by using Box-Jenkins' time series approach. The monthly rainfall data under three different stations in Kilinochchi district was obtained from the department of meteorology, Sri Lanka during the period of January, 1986 to December, 2015. Further, three statistical criteria such as Akaike information criteria, Bayesian information criteria, mean squared error were used in order to select best the time series model. Through the modelling, it was found that Seasonal Auto Regressive Integrated Moving Average: SARIMA (0,1,1) (0,1,3)12 is the best fitting model for all three stations in Kilinochchi district. Moreover, the adequacy of the fitted best model has been tested using Ljung- Box chi-squared statistic. The identified best model can be used to forecast the monthly rainfall of Kilinochchi district in near future.

Keywords: Box-Jenkins Approach, Ljung- Box chi-squared statistic, Rainfall, Seasonal auto regressive integrated moving average