

## Behaviour of Rainfall Patterns in the Trincomalee District: A Time Series Modelling Approach

B. Yogarajah<sup>1†</sup>, C. Elankumaran<sup>2</sup> and R. Vigneswaran<sup>3</sup>

<sup>1</sup>Department of Physical Science, Vavuniya Campus, University of Jaffna, Sri Lanka

<sup>2</sup>Department of Economics, University of Jaffna, Sri Lanka

<sup>3</sup>Department of Mathematics and Statistics, University of Jaffna, Sri Lanka

<sup>†</sup>yoganbala@vau.jfn.ac.lk

**Abstract:** With the advent of rapid developmental activities in the Eastern province of Sri Lanka in the post-war scenario, the government's mandates focus on reviving plans for the agricultural sector to meet the growing demands of the nation. Understanding the behavior of the climatic parameters of a geographical area is a prerequisite for any effort towards developing the agriculture sector. Climatic variability, especially the unpredictability of rainfall regimes is a major constraint for agricultural planners when it comes to deciding the time of planting in the Trincomalee district. The aim of this paper is to explain and analyze the temporal behavior of long-term monthly retrospective rainfall data of the district using ARIMA technique. This paper focuses on a time-series modeling approach to understand the behavior of rainfall patterns for the period from January 1952 to December 2009. The ARIMA model analysis proved to be a very valuable technique in forecasting climatic trends for Agro-environmental planning (Sabita Madhvi Singh, 2012). Rainfall time series data are analyzed using ARIMA statistical techniques to study the annual and seasonal trend of climates, fluctuation and variability. Various seasonal ARIMA models were tried in this respect. Key findings indicate that the rainfall patterns in the study area modeled as  $ARIMA(1,0,0)(1,1,1)_{12}$ , as such the rainfall predominantly depending on nonlinear trend and seasonal pattern of order 12 with the autoregressive of order one combined with lag12 process. This indicates that comprehensive forecasting model for rainfall in Trincomalee district is arrived. Further research is needed to focus on the influences of non-endemic and regional-to-global climatic phenomena.

**Keywords:** ARIMA, Rainfall, Time-series, Uni-variate Autoregressive Model