

**TIME SERIES MODELLING AND FORECASTING OF DENGUE INCIDENCE IN
JAFFNA DISTRICT, SRI LANKA**

T. Thanusika^{1*} and S.P. Abeysundara^{1,2}

¹*Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka*

²*Department of Statistics and Computer Science, Faculty of Science, University of Peradeniya,
Peradeniya, Sri Lanka*

**thanutharma9@gmail.com*

Dengue hemorrhagic fever is one of the frequently chronicled epidemiological scenarios worldwide in the past and ongoing time frame. The number of cases of the recent outbreaks seems partially deviate compared to the existing pattern. Moreover, the dengue incidence has been more marked in the Northern Province, where among the five districts of the Northern Province, a significant increase has been recorded in Jaffna. Hence, forecasting dengue incidence is an essential aspect. Studies have shown that the number of dengue incidences depends on the weather factors such as rainfall and the number of rainy days. This study aimed to find an appropriate time series forecasting model for the number of dengue incidence recorded in Jaffna district Sri Lanka by using Seasonal Auto-Regressive Integrated Moving Average (SARIMA) and SARIMA with rainfall an exogenous variable (SARIMAX) model. The secondary time series data were collected with the period of January 2010 to December 2020. Further, forecasting accuracy measures, Akaike Information Criterion, Root Mean Square Error and Mean Absolute Error were used to identify the best forecasting model based on the lowest measure of accuracy. According to the data, the highest dengue incidence (2763) was reported in December 2019, and the lowest reported dengue incidence (10) occurred in May 2011. Moreover, the average monthly dengue incidence was 242. The SARIMA (2,1,1)(0,1,1)₁₂ and SARIMAX (2,1,1)(0,1,1)₁₂ were selected as the best models to forecast the Dengue incidence in Jaffna district. Overall, the SARIMAX model outperforms the SARIMA model. The outcomes of the analysis would be useful to the health authorities when taking preventive measures to minimise the dengue outbreak during a season.

Keywords: Dengue Forecasting, SARIMA, SARIMAX