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Forecasting rainfall anomalies to minimize the risk in agriculture: A case study in Agalawatta

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Abstract

Rainfall anomaly has wide-ranging and substantial effects on the global economy, environment, industry, and communities. Forecasting rainfall anomalies aids in the implementation of drought mitigation methods and actions before they arise. An early assessment of drought conditions will be made possible by accurate rainfall prediction using time series data analysis. . The Standardized Precipitation Index (SPI) is a drought monitoring index that was created to identify rainfall anomalies in comparison to previous data in the same place for particular time intervals. Monthly rainfall data were collected from the meteorological station in the Rubber Research Institute of Sri Lanka for the period of 1980-2021. SPI values in 1, 2, 3, 5, 12 months' time scales were calculated representing monthly, Inter-monsoons, North East monsoon, South West monsoon and annual rainfall totals respectively. The slightly positive trends in January, August, September, and October They are significant at a 30%–50% confidence level. They are positive trends because their Sens' slope values were positive magnitude. The first Inter Monsoon season's slightly negative trends they were significant at a 30% to 50% confidence level. It is a negative magnitude since Sens' slope value is minus. February has moderately positive trends. It is significant at a 5%–30% confidence level, and Sens' slope value is positive. Also, April and July had a moderately negative trend. They have a negative Sens' slope value and significance at a 30% -5% confidence level. Other months have no trend, because they are not significant at any confidence level. Moreover, according to the findings of this research, Seasonal Auto Regressive Integrated Moving Average (SARIMA), (1,0,1) (1,0,1)[12] model is the most suitable time series model for forecasting rainfall anomalies in Agalawatta, Sri Lanka.

Keywords: Forecast, Rainfall anomalies, Seasonal Auto Regressive Moving Average (SARIMA), Standardized Precipitation Index (SPI)

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