Forecasting paddy production in matara district of Sri Lanka using time series analysis

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Paddy production in the Matara district of Sri Lanka holds significant agricultural importance within the region. The main objective of this study is to model the paddy production of the Matara district of Sri Lanka and forecast paddy production. In this study, the secondary data on total paddy production in the Yala and Maha seasons in the Matara district during the period from the year 1979 to 2021 are taken from the Department of Census and Statistics of Sri Lanka. These data are analyzed to fit an appropriate time series model for forecasting paddy production in the Matara district. According to the Augmented Dickey-Fuller test, the time series is stationary at 5% significance level. Further, the results of the Kruskal-Wallis test conclude the existence of seasonality. Therefore, the data set is fitted with the Seasonal Autoregressive Integrated Moving Average (SARIMA) model. SARIMA (0, 0, 0) (1, 0, 1)[2] is selected as the best model as it has the lowest values of both the Akaike Information Criterion and Bayesian Information Criterion. According to the residual analysis done for the SARIMA (0, 0, 0) (1, 0, 1)[2] model normal Q-Q plot and the Ljung-Box test indicate the residuals are normally distributed and independent respectively. Forecasted values for the Maha and Yala seasons of the years 2022 and 2023 are 37.000, 35.093, 37.011, 35.218, 37.02, 35.336 ('000 Metric Tons), respectively. Under the statistical methods to validate the developed models Mean Absolute Percentage Error is considered. Researchers and policy makers can use this model to forecast the paddy production in the Matara district of Sri Lanka.

Keywords: Forecast, Paddy production, SARIMA, Time series

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