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Modeling and Forecasting Monthly National Coconut Production in Sri Lanka using Time Series Analysis

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Coconut is a perennial crop that contributes to the growth of the Sri Lankan economy and plays a major role in determining national development. Sri Lanka is the fourth-largest coconut exporter to the world and the annual production of coconut in Sri Lanka varies around 3000 million nuts. According to the Coconut Development Authority of Sri Lanka, there is a shortage of 250 million coconuts in annual production by 2020. As a consequence of the high reduction of annual coconut yield, coconut prices in the local market have been increased rapidly. The main focus of this study was to model and forecast the monthly national coconut production in Sri Lanka using a univariate time series model. Monthly data on national coconut production from January 2000 to May 2020 collected from the official website of Central Bank was considered for the analysis. The series was tested for stationary using unit root tests. Webel-Ollech overall (WO) test indicated the presence of seasonality. Therefore, the seasonal and non-seasonal differencing techniques were applied to transform the non-stationary series into a stationary series. The assumptions of heteroscedasticity, autocorrelation, and normality for the residuals of the selected model were examined using the Autoregressive Conditional Heteroscedasticity (ARCH) test, correlogram of residuals, and Jarque-Bera test respectively. ARIMA(1,1,1)(3,1,1) was selected as the best fit with the minimum Akaike Information Criterion (AIC) which satisfies all the assumptions except normality. The Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE) of the aforementioned model were 11.5469 and 4.0913 respectively.

Key words: *Coconut production, Time series analysis, Seasonal Autoregressive Integrated Moving Average*

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