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Modelling and forecasting the income of pepper exports in Sri Lanka

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Pepper is the most significant and widely used spice in the world. Currently about 60% of pepper production of Sri Lanka is exported while the remainder is consumed domestically. Sri Lanka is the fifth largest exporter of pepper in the world where India buys 62% of pepper exports from Sri Lanka. In 2018 Sri Lanka exported a total pepper crop which had brought in earnings to the tune of Rs.11.5 billion. Fluctuations in export income of different commodities are a matter of concern for consumers, farmers and policymakers in a country. Hence an accurate forecast is extremely important for efficient monitoring and planning of export commodities. The demand for Sri Lankan pepper is increasing rapidly due to its richer piperine content which is two to six times higher than in the other pepper producing countries. Thus, Sri Lanka has the potential to become a key player in the high value export markets. There is no existing literature about forecasting the pepper export income of Sri Lanka. This study presents a statistical time series model for forecasting the income of pepper exports in Sri Lanka by using Seasonal Auto Regressive Integrated Moving Average (SARIMA) model. The data used in this study are monthly export income of pepper in Sri Lanka from January 2000 to December 2018 that were obtained from Sri Lanka Exports Development Board. 80% and 20% of data was used in model building and model validation respectively. ARIMA(4,1,4)(1,1,1)₁₂ was selected as the best model with the lowest Akaike Information Criterion (AIC) for forecasting the income of pepper exports in Sri Lanka among many candidate models that were evaluated by the investigation of Auto Correlation Function(ACF) and Partial Auto Correlation Function (PACF) of the differenced series. Forecasting accuracy of the model was evaluated with error metrics, Root Mean Square Error(RMSE) and Mean Absolute Error(MAE) which are equal to 5.70 and 4.76 and it suggests that the ARIMA(4,1,4)(1,1,1)₁₂ model has a strong potential in forecasting the income of pepper exports in Sri Lanka. As the forecasts from the model shows an increasing pepper export market which will need a higher production of pepper, the government can improve the awareness of farmers about the requirements of pepper in export market by providing infra-structure facilities. Forecasts also depicts an important piece of information for Sri Lankan pepper exporters and potential investors to consider about long term investment decisions in the pepper export market.

Keywords: Export value, SARIMA, AIC, RMSE, MAE