FORECASTING TEA PRODUCTION IN MALAYSIA

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ABSTRACT

Forecasting is an inevitable part of production planning. Forecasting of future production is an essential input to decision making as knowledge of this has always promised advantages and opportunities of many kinds. The forecaster's goal is to find a useful way to express a time-structured relationship so that predictions of future production can be incorporated into the decision making process.

Fluctuations and variations in the production of tea in Malaysia is affected by uncontrollable and controllable factors. These factors cause fluctuations, trend, seasonality, cycles and irregular patterns in the yield series. These fluctuations create uncertainty and this makes decision making and planning for future a difficult task.

This research based on data for quarterly tea production and average hectareage in production in Peninsular Malaysia noted that over the years more highland tea has been produced. Although average hectareage in production showed a gradual decrease but production has increased. The time series of quarterly tea production per hectare (yield) is made up of a significant upward trend, seasonal and irregular components. The upward trend is mainly due to improvements in the agronomic practices while the seasonal pattern is due to a combination of climatic factors such as rainfall, sunshine hours and humidity.

Forecasting models were developed using Exponential Smoothing Method and Box-Jenkins Methodology. These models were used to generate quarterly forecast yield. Evaluation of these models revealed that

Holt-Winters Additive Seasonality Method is suitable for forecasting tea production in Peninsular Malaysia. Although Holt-Winters Method has performed better than ARIMA Models but forecasts generated by both these method do not differ greatly.

It is hoped that the forecasting models developed in this study may be used for a more effective future planning in the areas of production planning, marketing, scheduling of work plans and labour recruitment so as to ensure optimum use of resources. Furthermore, the generated forecasts may help in determining the total amount of tea that can be supplied by tea estates to meet local demand and hence, the amount that has to be imported in the future.

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Any errors of facts, observations and judgements are my sole responsibility.

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LIST OF ABBREVIATIONS

$AFLY_t$	Forecast from ARIMA$(0,1,1)(0,1,1)_4$ on LY_t
$AFY1_t$	Forecast from ARIMA$(0,1,1)(0,1,1)_4$ on $Y1_t$
$AFY2_t$	Forecast from ARIMA$(0,1,1)(0,1,1)_4$ on $Y2_t$
AIC	Akaike's Information Criterion
FLY_t	Forecast Log Transformed Series
$FY1_t$	Forecast Negative Square Root Reciprocal Transformed Series
$FY2_t$	Forecast Negative Reciprocal Transformed Series
FY_t	Forecast Yield Series
HWAS	Holt-Winters Additive Seasonality
HWMS	Holt-Winters Multiplicative Seasonality
L	Likelihood Function
Log L	Logarithm of Likelihood Function
LY_t	Log Transformed Series
MAPE	Mean Absolute Percentage Error
MSE	Mean Squared Error
PSFR	Post Sample Forecast Range: 1997:Q1-1997:Q4
RMSE	Root Mean Squared Error
SAC	Sample Autocorrelation Function
SFR	Sample Forecast Range : 1960:Q1 -1996:Q4
SPAC	Sample Partial Autocorrelation Function
$Y1_t$	Negative Square Root Reciprocal Transformed Series
$Y2_t$	Negative Reciprocal Transformed Series
Y_t	Quarterly Production Of Tea Per Hectare (Yield Series)