Comparative study of univariate time series technique for forecasting of onion price

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ABSTRACT

Fluctuations of onion price are matter of concern among consumers, farmers, policy makers and the Government. So its accurate forecast is extremely important for efficient monitoring and planning. Thus, the purpose of this study was to compare the forecasting performances of Holt-Winters Exponential Smoothing and Seasonal ARIMA time series methodologies for forecasting onion prices in Bangalore market. The monthly average data of onion prices for the period of April, 1999 to November, 2010 were used to forecast the future price. The forecast accuracy criteria such as MSE, RMSE, MAE, MAPE and Theil's inequality coefficient (U-Statistic) were used as to determine the best forecasting model. The study revealed that the time series data were influenced by upward trend and existence of seasonal factors. Moreover, the Auto Correlation Function (ACF) and the Augmented Dickey-Fuller (ADF) tests have shown that the time series data were non-stationary in nature but became stationary after the first order of the difference process was carried out. The results showed that ARIMA model outperformed the Holt-Winters Exponential Smoothing model for forecasting onion price. Hence, Seasonal ARIMA model can be successfully used for modeling as well as forecasting of monthly price of onion in Bangalore.

O nion considered as the fourth most important commercial vegetable crop and India ranks second in area and production in the world next to China. In India, the major states producing onions are Maharashtra, Karnataka, Gujarat, Bihar and Madhya Pradesh. Maharashtra is the largest producer of onion in India followed by Karanataka and Gujarat.

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Fluctuations of onion price are matter of concern among farmers, consumers, policy makers and the Government. So, the accurate forecast is extremely important for efficient monitoring and planning. Forecasting involves making estimates of the future values of variables of interest using past and present information. In view of globalization, it is imperative to study the trend of price of different commodities by employing sound statistical modelling techniques that, in turn will be beneficial to the planners in formulating suitable policies to face the challenges ahead. Several attempts have been made in the past to develop price forecast models for various commodities. Chandran and Pandey (2007) have studied the seasonal fluctuation of potato price in Delhi, Rachana, *et al.* (2010) used ARIMA Model for forecasting pigeonpea production and Assis *et al.* (2010) have studied the comparison of univariate time series methods for forecasting cocoa bean prices. However, the application of these models for predicting prices of agricultural commodities are very few, especially vegetable prices. The price of onion fluctuates over seasons due to the variations in production and market arrivals. Thus, modelling and forecasting the monthly price behaviour over the years is of much practical importance.