ABSTRACT

Garlic is one of the strategic horticultural commodities in Indonesia that has an important role as the main ingredient in various dishes. Along with population growth and changes in consumption patterns, the demand for garlic continues to increase. However, domestic production has not been able to fulfill the national needs optimally, one of the reasons is due to problems in the import process that causes unstable supply. This instability in supply has a direct impact on fluctuations in the price of garlic in the domestic market, including in Surakarta City. Based on the Consumer Price Survey by the Badan Pusat Statistik (BPS) Surakarta City, the price of garlic shows an increasing trend. A deeper understanding of the pattern of garlic price fluctuations is needed to support more informed decision-making. This study uses data on the price of cating type garlic in Surakarta City for the period January 2020 to December 2024. Two forecasting methods will be implemented, which are Double Exponential Smoothing Holt and Fuzzy Time Series (FTS) Chen Higher Order, using the R programming language. The Holt method was chosen because it is suitable for data that shows trend patterns, while FTS Chen is able to capture more complex fluctuating patterns, especially at higher orders. Model evaluation was performed using symmetric Mean Absolute Percentage Error (sMAPE). The analysis results show that the Holt method produces an sMAPE value of 6.744%, first-order Chen FTS of 7.117%, second-order of 5.402%, and third-order of 4.843%. The third-order Chen FTS method provides the best forecasting results because it has the lowest sMAPE value among the compared methods.

Keywords: Garlic, Time Series, Forecasting, Holt's Double Exponential Smoothing, High Order Fuzzy Time Series Chen, sMAPE