

ABSTRACT

West Java Province is the primary producer of red chili commodities in Indonesia. Curly red chili is a high value horticultural commodity and serves as a staple ingredient for Indonesian society. The price of curly red chili often fluctuates due to various factors such as seasonal patterns, weather conditions, and market demand, impacting both producers and consumers. High price fluctuations complicate accurate forecasting. ANFIS is a method that integrates fuzzy logic and artificial neural networks to forecast high fluctuation data. The selection process ANFIS model consists of several steps: input selection, determination the number of membership functions, and fuzzy rule generation. Based on the partial autocorrelation function (PACF) plot, the input lags expected to influence the data are evaluated using the Lagrange Multiplier Test (LM-test). This research applies ANFIS input selection using the LM-test to conduct a hypothesis test on the addition of a lag input variable. The lag input variable with the highest partial autocorrelation value with Z_t is selected as the first ANFIS input and subsequent inputs are determined using the LM-test hypothesis testing. The LM-test results indicate that the optimal input variables consist of four lags: lag-1, lag-2, lag-3, and lag-4. The best ANFIS model using the selected inputs, the Fuzzy C-Means (FCM) technique, gaussian membership functions, and two clusters, it obtained MAPE in-sample 2.0066% and MAPE out-sample 1.5847%. These results demonstrate that the forecasting accuracy is highly effective in the prediction of curly red chili prices.

Keywords: Curly Red Chili, ANFIS, Input, LM-Test, Prediction of Curly Red Chili Prices