

ABSTRACT

Nur Siyam R. Djibu. 2026. *Optimization of the Adaptive Neuro-Fuzzy Inference System Model Using Adaptive Particle Swarm Optimization for Forecasting Cayenne Pepper Prices in Gorontalo Province.* **UNDERGRADUATE THESIS.** Gorontalo. Study Program of Statistics, Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo.

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Cayenne pepper prices are among the strategic food commodities characterized by high volatility and a significant contribution to food inflation, particularly in Gorontalo Province. The dynamic and nonlinear nature of cayenne pepper price patterns often complicates forecasting with conventional methods, requiring an approach that can capture complex data patterns more adaptively. Therefore, this study applies an Adaptive Neuro-Fuzzy Inference System (ANFIS) model optimized using Adaptive Particle Swarm Optimization (PSO) to improve forecasting accuracy of cayenne pepper prices. This study utilizes daily price data of cayenne pepper in Gorontalo Province from January 1, 2019, to October 31, 2025, obtained from the National Strategic Food Price Information Center (PIHPS). The ANFIS model is optimized using adaptive PSO to obtain optimal parameters that overcome local convergence issues and parameter sensitivity found in conventional ANFIS models. Model performance is evaluated using the Mean Absolute Percentage Error (MAPE) metric. The findings show that the adaptive ANFIS-PSO model achieves a very high level of forecasting accuracy, as indicated by a MAPE of 17.4487% on the training data, which decreases to 5.0741% on the testing data. A MAPE value below 10% in the testing data indicates that the model has excellent generalization capability in capturing fluctuations in cayenne pepper prices. These findings confirm that parameter optimization using adaptive PSO effectively improves ANFIS performance in modeling nonlinear, highly fluctuating time series.

Keywords: Cayenne Pepper Prices, Forecasting, ANFIS, Adaptive PSO, MAPE.



LEMBAR PENGESAHAN

Skripsi yang berjudul "**OPTIMASI MODEL ADAPTIVE NEURO-FUZZY
INFERENCE SYSTEM MENGGUNAKAN ADAPTIVE PARTICLE SWARM
OPTIMIZATION UNTUK PERAMALAN HARGA CABAI RAWIT DI PROVINSI
GORONTALO**"

Oleh

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