

ABSTRAK

Prediksi produksi buah merupakan aspek penting dalam mendukung perencanaan dan pengelolaan sektor pertanian. Penelitian ini membandingkan performa dua *algoritma Machine Learning*, yaitu *Random Forest* dan *Support Vector Machine (SVM)*, dalam memprediksi produksi buah di Provinsi Aceh menggunakan data produksi dari Badan Pusat Statistik (BPS) periode 2018–2023. Data telah melalui proses *Preprocessing* termasuk penanganan *missing values*, *outliers*, serta transformasi variabel kategori. Evaluasi model menggunakan metrik *Mean Squared Error (MSE)*, *Mean Absolute Error (MAE)*, dan *R² Score* menunjukkan bahwa *Random Forest* memberikan hasil prediksi yang lebih akurat dibandingkan SVM. Penambahan fitur eksternal seperti curah hujan, jenis pupuk, dan metode budidaya yang disimulasikan tidak memberikan peningkatan signifikan pada performa model. Penelitian ini merekomendasikan penggunaan *Random Forest* untuk prediksi produksi buah di Aceh dan menyarankan pengumpulan data eksternal yang lebih lengkap untuk meningkatkan akurasi prediksi di masa depan.

Kata Kunci : Prediksi Produksi Buah, *Random Forest*, *Support Vector Machine*, *Machine Learning*, *Preprocessing* Data, Aceh, Evaluasi Model



ABSTRACT

Fruit production prediction is a crucial aspect in supporting the planning and management of the agricultural sector. This study compares the performance of two Machine Learning algorithms, namely Random Forest and Support Vector Machine (SVM), in predicting fruit production in Aceh Province using production data from the Central Bureau of Statistics (BPS) for the period 2018–2023. The data underwent Preprocessing, including handling of missing values, outliers, and transformation of categorical variables. Model evaluation using Mean Squared Error (MSE), Mean Absolute Error (MAE), and R^2 Score metrics showed that Random Forest produced more accurate predictions compared to SVM. The addition of simulated external features such as rainfall, fertilizer type, and cultivation methods did not significantly improve model performance. This study recommends the use of Random Forest for fruit production prediction in Aceh and suggests collecting more comprehensive external data to enhance future prediction accuracy.

Keywords: *Fruit Production Prediction, Random Forest, Support Vector Machine, Machine Learning, Data Preprocessing, Aceh, Model Evaluation*

