

INTISARI

Toko Bibit Tanaman Mulya Vana Agrindo masih mengelola persediaan dan penjualan bibit secara konvensional, sehingga rawan kesalahan pencatatan stok dan sulit menentukan kebutuhan penambahan stok secara objektif. Penelitian ini merancang dan membangun Sistem Informasi Persediaan Bibit Tanaman berbasis web menggunakan framework Laravel dengan metode *Rapid Application Development* (RAD), yang mengintegrasikan algoritma *Random Forest* dengan pendekatan *Random Forest Regression* untuk memprediksi penjualan bulanan berdasarkan data historis 20 bulan (Januari 2025–Agustus 2026) pada 55 jenis bibit. Hasil prediksi digunakan sebagai dasar Sistem Pendukung Keputusan untuk menghasilkan rekomendasi penambahan stok dengan mempertimbangkan stok fisik, safety stock, dan batas aman penjualan. Evaluasi model dengan skema walk-forward validation menghasilkan *MAE* 4,37, *RMSE* 6,10, *MAPE* 21,31%, dan R^2 0,8207,. Pengujian *Black Box Testing* menunjukkan seluruh fungsi sistem berjalan sesuai kebutuhan, sedangkan *User Acceptance Testing* memperoleh persentase kepuasan pengguna sebesar 91,74%, termasuk kategori sangat layak digunakan.

Kata Kunci: Sistem Informasi Persediaan, Bibit Tanaman, *Random Forest Regression*, Prediksi Penjualan, Sistem Pendukung Keputusan, *Rapid Application Development*.

ABSTRACT

Mulya Vana Agrindo Plant Seedling Store still manages its inventory and sales conventionally, making it prone to stock-recording errors and making it difficult to objectively determine the need for stock replenishment. This study designs and builds a web-based Plant Seedling Inventory Information System using the Laravel framework with the Rapid Application Development (RAD) method, which integrates the Random Forest Regression algorithm to predict monthly sales based on 20 months of historical data (January 2025-August 2026) for 55 types of seedlings. The prediction results are used as the basis for a Decision Support System to generate stock replenishment recommendations by taking into account physical stock, safety stock, and safe sales limits. Model evaluation using a walk-forward validation scheme produced an MAE of 4.37, RMSE of 6.10, MAPE of 21.31%, and R^2 of 0.8207, which is categorized as reasonable/feasible. Black Box Testing showed that all system functions ran as required, while User Acceptance Testing obtained a user-satisfaction percentage of 91.74%, included in the very feasible category.

Keywords: Information System, Plant Seedling Inventory, Random Forest Regression, Sales Prediction, Decision Support System, Rapid Application Development.