

MODEL PENDUGA PRODUKSI DAUN KAYU PUTIH PADA PEMANENAN PERDANA UMUR DUA TAHUN DI KESATUAN PEMANGKUAN HUTAN BOJONEGORO

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INTISARI

Pengelolaan hutan tanaman kayu putih saat ini menjadi isu terpenting di Kesatuan Pemangkuan Hutan (KPH) Bojonegoro karena berpotensi memberikan kontribusi untuk kelangsungan hidup perusahaan di masa depan. Namun, upaya pengelolaan berkelanjutan pada tanaman kayu putih membutuhkan penghitungan produksi daun yang akurat sebagai informasi pengaturan hasil. Penelitian ini bertujuan untuk mengembangkan model pendugaan produksi daun kayu putih terbaik di KPH Bojonegoro.

Pengumpulan data dilakukan di tiga lokasi prioritas pengembangan kayu putih, yaitu Bagian Kesatuan Pemangkuan Hutan (BKPH) Clangap, BKPH Tengger, dan BKPH Nglambangan. Dilakukan pemanenan daun kayu putih sebanyak 115 sampel pohon kayu putih pada pemanenan perdana umur 2 tahun yang tersebar secara proporsional di tiga lokasi tersebut. Berdasarkan sampel tersebut, 80 sampel pohon digunakan untuk menyusun model penduga dan 35 sampel pohon untuk uji validasi. Penelitian ini mengajukan empat model yang berbeda yaitu *Linier*, *Power*, *Logaritmik*, dan *Polinomial*. Model tersebut dikembangkan dengan menggunakan diameter pohon setinggi 30 cm di atas permukaan tanah ($d_{0,3}$) sebagai variabel bebas dan produksi daun per pohon sebagai variabel terikat. Kriteria untuk memilih model terbaik meliputi *Adjusted R²*, *Residual Standard Error* (RSE), Uji F, Uji T, dan *Akaike Information Criterion* (AIC). Sedangkan untuk pengujian validasi model menggunakan kriteria *Mean Absolute Percentage Errors* (MAPE) dan *Normalized Root Mean Square Error* (NRMSE).

Hasil penelitian menunjukkan model terbaik untuk pendugaan produksi daun kayu putih per pohon adalah model *Power* dengan persamaan produksi daun per pohon (kg/pohon) = $0,265 (d_{0,3})^{1,455}$ ($R^2=0,845$ dan $RSE=0,441$). Pengujian validasi model diperoleh nilai kriteria NRMSE sebesar 1,5% dan MAPE sebesar 45,3%. Hal ini menunjukkan bahwa model layak digunakan untuk memprediksi produksi daun kayu putih per pohon di KPH Bojonegoro pada pemanenan perdana umur dua tahun.

Kata kunci: Kayu Putih, Pemodelan Produksi Daun, Model *Power*, Validasi Model.

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PREDICTION MODEL FOR CAJUPUT LEAVES PRODUCTION AT PRELIMINARY HARVESTING AGED TWO YEARS IN BOJONEGORO FOREST MANAGEMENT UNIT

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ABSTRACT

Cajuput plantation management currently become the most important issue in Bojonegoro Forest Management Unit (FMU) since it has a potential contribution to maintaining the future viability of company. However, the effort of sustainable management in cajuput plantation requires the accurate quantification of leaves production as the basis information for yield regulation. This study aims to develop the best model for predicting cajuput leaves production in Bojonegoro FMU.

Data collection was conducted in three Sub-FMU as the priority locations for cajuput development, i.e. Clangap, Tengger, and Nglambangan. Data were collected at the preliminary harvesting aged in two years after planting. The harvest of cajuput leaves was carried out as many as 115 samples of cajuput trees at the first harvest of two years from three locations proportionally. Based on those samples, 80 tree samples were used to construct the prediction models and 35 tree samples for the validation test. This study proposes four different models, namely Linear, Power, Logarithmic, and Polynomial. These models were developed using tree diameter at 30 cm above the ground ($d_{0.3}$) as an independent variable and leaves production of each tree as a dependent variable. Criteria were used to select the best model, including Adjusted R^2 , Residual Standard Error (RSE), F-test, T-test, and Akaike Information Criterion (AIC). Meanwhile, the best model was validated using Mean Absolute Percentage Errors (MAPE) and Normalized Root Mean Square Error (NRMSE).

Results demonstrated the best model for predicting cajuput tree leaves production was the Power model with the equation of tree leaves production (kg/tree) = $0.265 (d_{0.3})^{1.455}$ ($R^2=0.845$ and $RSE=0.441$). The model validation test resulted the NRMSE criterion value of 1.5% and MAPE of 45.3%. It indicated that the best model was reliable to predict the production of cajuput tree leaves in FMU Bojonegoro at preliminary harvesting aged two years.

Keywords: Cajuput, Leaves Production Model, Power Model, Model Validation

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