

PENJADWALAN PEMUPUKAN KELAPA SAWIT DENGAN MENGUNAKAN METODE *RANDOM FOREST REGRESSION*

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ABSTRACT

Fertilization is a crucial factor in improving oil palm productivity, particularly on peatland soils characterized by high acidity and sensitivity to improper fertilization timing. A common problem faced by farmers is the determination of fertilization schedules, which is still carried out conventionally by relying on experience and memory without adequately considering plant conditions, soil characteristics, and environmental factors, potentially reducing fertilization efficiency and increasing operational costs. This study proposes a novel approach by integrating the Random Forest Regression method into a mobile application to automatically generate data-driven and consistent fertilization schedules. The objective of this study is to design and develop a mobile-based oil palm fertilization scheduling application using the Random Forest Regression method to accurately predict fertilization timing. The research methodology includes field data collection from farmers, data preprocessing, modeling using Random Forest Regression, and evaluation of predictive model performance using variables such as plant age, soil pH value, fertilization history, annual fertilization frequency, and rainfall. The results demonstrate that the predictive model performs well, achieving a Mean Absolute Error of 4.07 days, a Root Mean Squared Error of 14.89 days, and an R^2 value of 0.75. The model is subsequently integrated into a mobile application equipped with a notification feature as a fertilization reminder, which is expected to assist farmers in implementing timely, well-organized, and data-driven fertilization practices.

Keywords: *Oil Palm, Fertilization Scheduling, Random Forest Regression, Time Prediction, Mobile Application*