SOIL PHOSPHORUS STUDY ON LAND USE TYPES IN WONOSALAM DISTRICT, JOMBANG REGENCY

THESIS

Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Agriculture in the Agrotechnology Study Program.

PUTRI AURELIA SHAQUILLA

NPM. 21025010214

AGROTECHNOLOGY STUDY PROGRAM

FACULTY OF AGRICULTURE

UNIVERSITAS PEMBANGUNAN NASINAL "VETERAN" JAWA TIMUR

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By:

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Submitted on:
15 September 2025

This Thesis is Accepted As Part of The Requirements For Obtaining A Bachelor's Degree in Agriculture At "Veteran" National Development University of East Java.

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SOIL PHOSPHORUS STUDY ON LAND USE TYPES IN WONOSALAM DISTRICT, JOMBANG REGENCY

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ABSTRACT

Phosphorus (P) is an essential macronutrient for plant growth, where its availability in the soil is significantly influenced by land use practices. Different land use systems can alter soil chemical properties and directly impact the status of soil P. This study was conducted to analyze the effect of four distinct land use systems (monoculture, intercropping, agrosilviculture, and agrosilvopasture) on the status of soil phosphorus and its supporting chemical properties, such as pH, Cation Exchange Capacity (CEC), and C-Organic content in Wonosalam District, Jombang. Soil samples were collected through purposive random sampling from four different land use systems: monoculture, intercropping, agrosilviculture, and agrosilvopasture, each with three replications. Composite soil samples were taken from two depths, 0–30 cm and 30–60 cm. Key soil chemical properties were analyzed in the laboratory, including available P (Olsen), P-HCl 25%, pH, C-Organic, and Cation Exchange Capacity (CEC). The data were then analyzed using t-tests and linear regression to determine the differences and relationships among the variables.

The results showed that the land use system had a significant effect on soil phosphorus status. The agrosilvopasture system exhibited the highest average concentration of both available phosphorus (P-available) at 11.12 mg/100g and potential phosphorus (P-HCl 25%) at 86.47 mg/100g. These values were statistically significantly higher compared to the monoculture, intercropping, and agrosilviculture systems. In contrast, the monoculture system recorded the lowest levels of P-available (3.72 mg/100g). While variations were observed in other parameters like soil pH, C-Organic, and CEC, the differences among the land use systems were not statistically significant. Regression analysis confirmed a very strong positive correlation between potential P and available P ($R^2 = 0.7374$), indicating that P reserves are a dominant factor controlling phosphorus availability at the research site.

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The author recognizes that this thesis has several flaws, both in writing techniques and materials, considering the author's capabilities. The author sincerely apologizes to the readers. Hopefully, it can be beneficial to those in need.

Surabaya, July 2025

Writer

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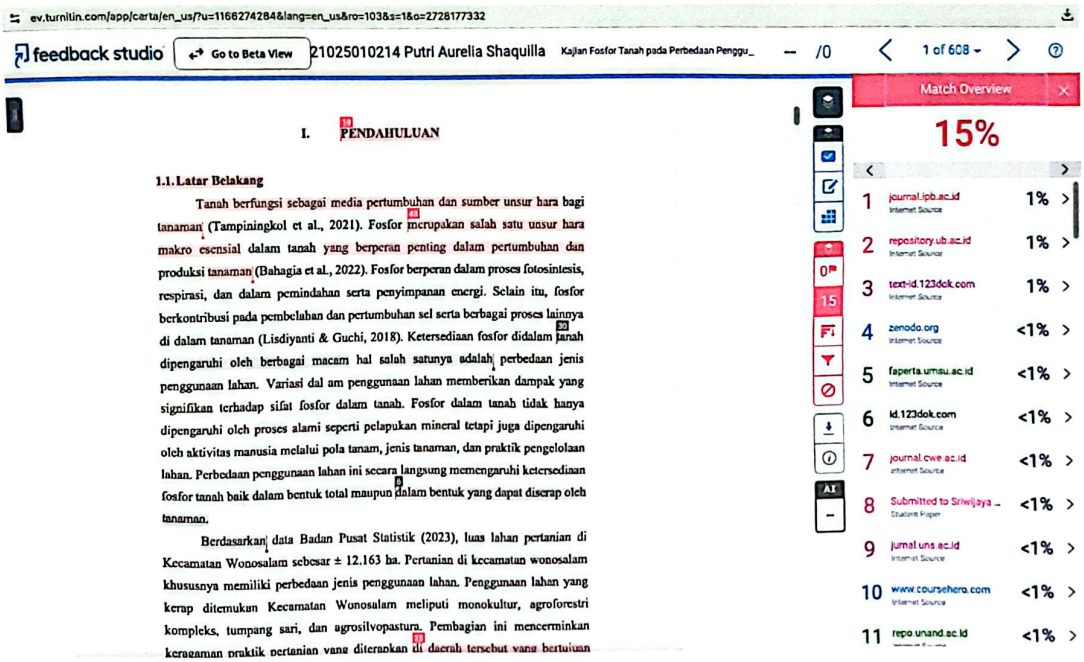
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I. PENDAHULUAN

1.1. Latar Belakang

Tanah berfungsi sebagai media pertumbuhan dan sumber unsur hara bagi tanaman (Tampiningkol et al., 2021). Fosfor merupakan salah satu unsur hara makro esensial dalam tanah yang berperan penting dalam pertumbuhan dan produksi tanaman (Bahagia et al., 2022). Fosfor berperan dalam proses fotosintesis, respirasi, dan dalam pemindahan serta penyimpanan energi. Selain itu, fosfor berkontribusi pada pembelahan dan pertumbuhan sel serta berbagai proses lainnya di dalam tanaman (Lisdiyanti & Guchi, 2018). Ketersediaan fosfor didalam tanah dipengaruhi oleh berbagai macam hal salah satunya adalah perbedaan jenis penggunaan lahan. Variasi dal am penggunaan lahan memberikan dampak yang signifikan terhadap sifat fosfor dalam tanah. Fosfor dalam tanah tidak hanya dipengaruhi oleh proses alami seperti pelapukan mineral tetapi juga dipengaruhi oleh aktivitas manusia melalui pola tanam, jenis tanaman, dan praktik pengelolaan lahan. Perbedaan penggunaan lahan ini secara langsung memengaruhi ketersediaan fosfor tanah baik dalam bentuk total maupun dalam bentuk yang dapat diserap oleh tanaman.

Berdasarkan data Badan Pusat Statistik (2023), luas lahan pertanian di Kecamatan Wonosalam sebesar ± 12.163 ha. Pertanian di kecamatan wonosalam khususnya memiliki perbedaan jenis penggunaan lahan. Penggunaan lahan yang kerap ditemukan Kecamatan Wonosalam meliputi monokultur, agroforestri kompleks, tumpang sari, dan agrosilvopastura. Pembagian ini mencerminkan keragaman praktik pertanian yang diterapkan di daerah tersebut yang bertujuan

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