ANALISIS KEMAMPUAN LAHAN PADA SISTEM AGROFORESTRI DAN MONOKULTUR DESA SAMBAK, KECAMATAN KAJORAN, KABUPATEN MAGELANG

INTISARI

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Kemampuan lahan merupakan indikator penting dalam menentukan kesesuaian pemanfaatan lahan secara berkelanjutan. Penelitian ini bertujuan untuk menganalisis karakteristik iklim dan hidrologi, sifat fisik tanah, serta dinamika hidrofisik tanah dalam menilai kemampuan lahan pada sistem agroforestri dan monokultur di Desa Sambak, Kecamatan Kajoran, Kabupaten Magelang. Penelitian dilaksanakan pada bulan September hingga November 2025 dengan pengambilan sampel tanah pada kedua sistem penggunaan lahan. Parameter yang dianalisis meliputi berat volume tanah, berat jenis tanah, porositas, dan kadar lengas tanah. Analisis mikroklimat dilakukan menggunakan data curah hujan, suhu udara, dan kelembaban tanah periode 2024–2025 dari dataset NASA POWER yang diolah dengan R-Studio untuk menghitung indeks Standardized Precipitation Evapotranspiration Index (SPEI-3) serta menganalisis keseimbangan air. Hasil menunjukkan bahwa variasi curah hujan dan suhu udara berpengaruh terhadap dinamika kelembaban tanah dan keseimbangan air. Sifat fisik tanah menunjukkan berat volume sebesar 0,7995–1,2107 g/cm³, berat jenis 1,3068–1,8149 g/cm³, porositas 31,46–49,12%, dan kadar lengas 35,53–63,39%. Sistem agroforestri memiliki berat volume rendah, berat jenis sangat rendah, porositas sedang, dan kadar lengas tinggi, sedangkan sistem monokultur memiliki porositas lebih rendah dan kadar lengas sangat tinggi.

Kata Kunci: kemampuan lahan, agroforestri, monokultur, sifat fisik tanah, keseimbangan air, SPEI-3.

LAND CAPABILITY ANALYSIS OF AGROFORESTRY AND MONOCULTURE SYSTEMS IN SAMBAK VILLAGE, KAJORAN DISTRICT, MAGELANG REGENCY

ABSTRACT

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Land capability is an important indicator in determining sustainable land use suitability. This study aimed to analyze climatic and hydrological characteristics, soil physical properties, and soil hydrophysical dynamics in assessing land capability under agroforestry and monoculture systems in Sambak Village, Kajoran District, Magelang Regency. The study was conducted from September to November 2025 through soil sampling in both land-use systems. The analyzed soil physical parameters included bulk density, particle density, porosity, and soil moisture content. Microclimate analysis was carried out using rainfall, air temperature, and soil moisture data for the 2024–2025 period obtained from the NASA POWER dataset. The data were processed using R-Studio to calculate the Standardized Precipitation Evapotranspiration Index (SPEI-3) and to analyze the water balance. The results showed that variations in rainfall and air temperature influenced soil moisture dynamics and water balance conditions. The soil physical properties ranged from 0.7995–1.2107 g/cm³ for bulk density, 1.3068–1.8149 g/cm³ for particle density, 31.46–49.12% for porosity, and 35.53–63.39% for soil moisture content. The agroforestry system was characterized by low bulk density, very low particle density, moderate porosity, and high soil moisture, whereas the monoculture system exhibited lower porosity and very high soil moisture.

Keywords*: land capability, agroforestry, monoculture, soil physical propertie, water balance, SPEI-3.*