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**Pengaruh Biogeofisik Terhadap Simpanan Karbon Hutan Tanaman Pinus dan Hutan Rakyat Polikultur di
Desa Tegeswetan, Kabupaten Wonosobo, Jawa Tengah**
Muhammad Rizal Rafiif, Prof. Dr. Ir. Ris Hadi Purwanto, M.Agr.Sc., IPU.
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PENGARUH BIOGEOFISIK TERHADAP SIMPANAN KARBON HUTAN TANAMAN PINUS DAN HUTAN RAKYAT POLIKULTUR di DESA TEGESWETAN, KABUPATEN WONOSOBO, JAWA TENGAH

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INTISARI

Perubahan iklim global saat ini menjadi salah satu tantangan lingkungan utama akibat tingginya emisi gas CO_2. Upaya penurunan emisi gas CO_2 melalui sektor kehutanan perlu didukung oleh pengelolaan hutan pada tingkat tapak. Desa Tegeswetan memperlihatkan keberadaan hutan tanaman pinus dan hutan rakyat dalam satu bentang lahan yang sama. Penelitian ini bertujuan untuk mengetahui potensi biomassa, simpanan karbon, serapan CO_2 serta faktor biogeofisik apa saja yang mempengaruhi besarnya simpanan karbon hutan tanaman pinus dan hutan rakyat polikultur yang berada di Desa Tegeswetan, Kecamatan Kepil, Kabupaten Wonosobo.

Pendugaan biomassa dilakukan secara *non-destructive sampling* dengan menggunakan persamaan alometrik. Plot yang digunakan berbentuk persegi sebanyak 30 pada masing-masing tipe hutan. Kandungan karbon dihitung menggunakan fraksi karbon 47%, sedangkan serapan CO_2 dihitung dengan faktor konversi 3,67 sesuai SNI 7724: 2019. Sampel Tanah diambil pada kedalaman 0-30 cm. Analisis karbon organik tanah dilakukan dengan menggunakan metode *Loss on Ignition*. Analisis regresi linear berganda digunakan untuk menganalisis pengaruh biogeofisik terhadap simpanan karbon.

Hasil penelitian menunjukkan bahwa potensi biomassa, simpanan karbon tegakan, dan serapan CO_2, dan simpanan karbon organik tanah berturut-turut sebesar 419,341 ton/ha, 197,090 ton C/ha, 723,321 ton CO_2-eq/ha, dan 197,089 ton C/ha. Sedangkan potensi biomassa, simpanan karbon tegakan, serapan CO_2, dan simpanan karbon tanah pada hutan rakyat polikultur berturut-turut sebesar 165,405 ton/ha, 77,740 ton C/ha, 285,307 ton CO_2-eq/ha, dan 206,790 ton C/ha. Faktor biogeofisik yang berpengaruh terhadap simpanan karbon pada hutan tanaman pinus yaitu DBH, kerapatan, ketebalan serasah, dan C organik tanah. Sedangkan pada hutan rakyat polikultur yaitu DBH, kerapatan, kelerengan, ketebalan serasah, dan C organik tanah.

Kata kunci: Hutan Tanaman Pinus, Hutan Rakyat Polikultur, Biomassa, Karbon, Serapan CO_2, Biogeofisik

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BIOGEOPHYSICAL INFLUENCES ON CARBON STOCKS OF PINE PLANTATION FORESTS AND POLYCULTURE COMMUNITY FORESTS IN TEGESWETAN VILLAGE, WONOSOBO REGENCY, CENTRAL JAVA

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ABSTRACT

Global climate change is currently one of the main environmental challenges due to high CO_2 emissions. Efforts to reduce CO_2 emissions through the forestry sector need to be supported by forest management at site level. Tegeswetan Village contains both pine plantation forests and community forests within the same landscape. This study aims to determine the biomass potential, carbon stock, CO_2 sequestration, and biogeophysical factors affecting the amount of carbon stock in pine plantation forests and polyculture community forests located in Tegeswetan Village, Kepil District, Wonosobo Regency.

Biomass estimation was conducted using a non-destructive sampling method with allometric equations. A total of 30 square plots were used in each forest type. Carbon content was calculated using a carbon fraction of 47%, while CO_2 sequestration was calculated using a conversion factor of 3,67 in accordance with SNI 7724:2019. Soil samples were collected at a depth of 0-30 cm. Soil organic carbon analysis was performed using the Loss on Ignition method. Multiple linear regression analysis was used to analyze the effect of biogeophysical factors on carbon stock.

The results showed that the biomass potential, stand carbon stock, CO_2 sequestration, and soil organic carbon stock in the pine plantation forest were 419,341 tons/ha, 197,090 tons C/ha, 723,321 tons CO_2-eq/ha, and 197.089 tons C/ha, respectively. Meanwhile, the biomass potential, stand carbon stock, CO_2 sequestration, and soil organic carbon stock in the polyculture community forest were 165,405 tons/ha, 77,740 tons C/ha, 285,307 tons CO_2-eq/ha, and 206,790 tons C/ha, respectively. The biogeophysical factors affecting carbon stock in the pine plantation forest were DBH, stand density, litter thickness, and soil organic carbon. Meanwhile, in the polyculture community forest, they were DBH, stand density, slope, litter thickness, and soil organic carbon.

Keywords: *Pine Plantation Forest, Polyculture Community Forest, Biomass, Carbon, CO_2 Sequestration, Biogeophysical*

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