

**BIOTIC AND ABIOTIC FACTORS AFFECTING CARBON STOCK  
POTENTIAL OF TEAK (*Tectona grandis*) IN PERUM PERHUTANI BKPH  
TANGEN, KPH SURAKARTA**

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**ABSTRACT**

Climate change is a global threat that continues to occur today. One effort to mitigate climate change is to optimize the role of teak forests in absorbing carbon dioxide in the atmosphere. Teak forests often experience changes in biomass and carbon cycles caused by biotic and abiotic factors such as plant age, plant density, plant proliferation, anthropogenic activities, climate and the quality of the growing area. Seeing the changes in teak forests, there needs to be research into the carbon deposits contained in teak forests, one of which is at BKPH Tangen, because teak forest management at BKPH Tangen is still focused on wood production. Meanwhile, research on the potential for carbon storage and analysis of the influence of biotic and abiotic factors is still minimal. Thus, this research was conducted to estimate the potential and analyze the factors that influence carbon storage in teak forests in KPH Surakarta sustainably.

This research was conducted using a combination method. Estimation of carbon stocks is carried out using a non-destructive method using allometric equations. Analysis of the influence of biotic and abiotic factors was carried out using multiple linear regression analysis methods and analysis of the impact of anthropogenic activities was carried out using qualitative descriptive methods.

The average potential biomass, carbon storage and carbon dioxide absorption of teak forests in BKPH Tangen, KPH Surakarta is 123,16 tonnes/ha; 66,45 tonnes/ha; and 243,89 tonnes/ha. Biotic and abiotic factors that influence the carbon storage potential of teak forests in BKPH Tangen, KPH Surakarta are diameter (DBH), slope, stand density, and anthropogenic activities in the form of management of land understands (PLDT) and illegal logging.

**Keywords:** *Teak forest, biomass, carbon storage, carbon dioxide absorption, biotic, abiotic factor*

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## FAKTOR BIOTIK DAN ABIOTIK YANG MEMPENGARUHI POTENSI SIMPANAN KARBON HUTAN JATI (*Tectona grandis*) DI PERUM PERHUTANI BKPH TANGEN, KPH SURAKARTA

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### INTISARI

Perubahan iklim menjadi ancaman global yang terus menerus terjadi hingga saat ini. Salah satu upaya mitigasi perubahan iklim yaitu mengoptimalkan peran hutan jati dalam upaya menyerap karbon dioksida di atmosfer. Hutan jati seringkali mengalami perubahan biomassa dan siklus karbon yang disebabkan oleh faktor biotik dan faktor abiotik seperti umur tanaman, kerapatan tanaman, perkembangbiakan tanaman, aktivitas antropogenik, iklim, dan kualitas tempat tumbuh. Melihat perubahan hutan jati tersebut perlu ada penelitian mengenai simpanan karbon yang terkandung dalam hutan jati salah satunya di BKPH Tangen, dikarenakan pengelolaan hutan jati di BKPH Tangen masih terfokus pada produksi kayu. Sementara, penelitian mengenai potensi simpanan karbon bersamaan dengan analisis pengaruh faktor biotik dan abiotik masih minim. Dengan demikian, penelitian ini dilakukan untuk mengestimasi potensi dan menganalisis faktor-faktor yang mempengaruhi simpanan karbon pada hutan jati di KPH Surakarta secara berkelanjutan.

Penelitian ini dilakukan dengan menggunakan metode kombinasi (*mixed methode*). Estimasi simpanan karbon dilakukan dengan metode *non-destruktif* melalui persamaan alometrik. Analisis pengaruh faktor biotik dan abiotik dilakukan dengan metode analisis regresi linier berganda dan analisis pengaruh aktivitas antropogenik dilakukan dengan metode deskriptif kualitatif.

Rerata potensi biomassa, simpanan karbon, dan serapan karbon dioksida hutan jati di BKPH Tangen, KPH Surakarta yaitu sebesar 126,16 ton/ha; 66,45 ton/ha; dan 243,89 ton/ha. Faktor biotik dan abiotik yang mempengaruhi potensi simpanan karbon hutan jati di BKPH Tangen, KPH Surakarta yaitu diameter (DBH), kemiringan, kerapatan tegakan, dan aktivitas antropogenik berupa pengelolaan lahan di bawah tegakan (PLDT) dan *illegal logging*.

Kata kunci: Hutan jati, biomassa, simpanan karbon, serapan karbon dioksida, faktor biotik, faktor abiotik.

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