

POTENSI SIMPANAN KARBON BIRU EKOSISTEM REHABILITASI MANGROVE DI DESA WEDUNG, KECAMATAN WEDUNG, KABUPATEN DEMAK

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INTISARI

Upaya pemerintah untuk menurunkan emisi gas rumah kaca dalam memitigasi perubahan iklim dengan penyerapan CO₂ dari atmosfer. Serapan CO₂ dari atmosfer terbesar di bumi berada pada biomassa vegetasi yang disimpan sebagai stok karbon di ekosistem pesisir. Hutan mangrove merupakan salah satu ekosistem dengan stok karbon tertinggi di bumi. Namun, Sebagian besar hutan mangrove di Kabupaten Demak mengalami penurunan luasan. Merehabilitasi hutan mangrove merupakan salah satu cara agar dapat menurunkan emisi gas rumah kaca. Tujuan penelitian ini adalah (1) Mengetahui struktur hutan mangrove hasil rehabilitasi antara umur tanam 14 dan 9 tahun Desa Wedung, Kabupaten Demak. (2) Mengetahui perbedaan simpanan karbon dan serapan karbondioksida ekosistem mangrove hasil rehabilitasi antara umur tanam 14 dan 9 tahun Desa Wedung, Kabupaten Demak.

Sepuluh petak ukur berukuran 10 m x 10 m dibuat secara *stratified random sampling* pada masing-masing umur tanam 14 dan 9 tahun. Struktur vegetasi yang diukur berupa kerapatan vegetasi dan nilai LBDs didapat dari data diameter, jumlah individu spesies, dan jenis spesies. Untuk estimasi biomassa karbon, pohon yang diukur adalah pohon dengan diameter >5 cm serta diidentifikasi jenisnya. Untuk mengetahui karbon dalam tanah diambil sampel tanah terusik dan tidak terusik. Metode pengukuran simpanan karbon di atas dan di bawah permukaan tanah menggunakan metode allometrik. Karbon dalam tanah dihitung berdasarkan nilai *bulk density*, C-organik, luas kawasan dan ketebalan lumpur. Serapan CO₂ dihitung dari jumlah serapan karbon dikalikan dengan konstanta 3,67.

Berdasarkan struktur vegetasinya (kerapatan vegetasi dan LBDs) tanaman *R. mucronata* merupakan tanaman yang paling berperan dalam menyimpan dan menyerap karbon di kedua umur tanam. Berdasarkan biomassa di atas permukaan tanah rata-rata densitas simpanan karbon dan serapan CO₂ adalah 89,698 ± 4,751 ton C/ha dan 64,983 ton CO₂ untuk umur tanam 14 tahun serta 41,566 ± 7,7 ton C/ha dan 60,012 ton CO₂ untuk umur tanam 9 tahun. Berdasarkan biomassa di bawah permukaan tanah rata-rata densitas simpanan karbon dan serapan CO₂ adalah 39,843 ± 2,062 ton C/ha dan 29,863 ton CO₂ untuk umur tanam 14 tahun serta 19,751 ± 3,115 ton C/ha dan 28,516 ton CO₂ untuk umur tanam 9 tahun. Rata-rata densitas simpanan karbon dan serapan CO₂ dalam substrat mangrove adalah 353,1105 ± 73,265 ton C/ha dan 255,814 ton CO₂ untuk umur tanam 14 tahun serta 223,746 ± 29,898 ton C/ha dan 414,637 ton untuk umur tanam 9 tahun. Estimasi simpanan dan serapan karbon ekosistem mangrove pada tegakan rehabilitasi umur 14 tahun lebih tinggi secara signifikan dibandingkan tegakan rehabilitasi umur 9 tahun.

Kata kunci: Mangrove, Simpanan karbon, serapan CO₂.

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**POTENTIAL FOR BLUE CARBON SAVINGS OF THE MANGROVE
REHABILITATION ECOSYSTEM IN WEDUNG VILLAGE, WEDUNG DISTRICT,
DEMAK DISTRICT**

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ABSTRACT

Governments work to mitigate climate change by reducing greenhouse gases by absorbing carbon dioxide from the atmosphere. The largest absorption of CO₂ from the atmosphere on earth is in vegetation biomass which is stored as carbon stocks in coastal ecosystems. Mangroves forest are among the most carbon-rich ecosystems on Earth. However, most mangrove areas in Demak District are declining. Restoring mangroves is one way to reduce greenhouse gases. The objectives of this study are: (1) To determine the structure of restored mangroves after planting between 14 and 9 years in Wedung Village, Demak Regency. (2) To understand the differences in carbon storage and carbon dioxide uptake in restored mangrove ecosystems between 14 and 9 years of planting in Wedung Village, Demak Regency.

Ten 10 m x 10 m study plots were established using stratified random sampling at 14 and 9 years of cultivation, respectively. Vegetation structure is measured in the form of vegetation density and LBDs values are obtained from data on diameter, number of individual species and type of species. To estimate carbon biomass, trees were measured with those > 5 cm in diameter and of a defined type. To determine soil carbon, disturbed and undisturbed soil samples were collected. The method used to measure carbon deposits above and below the soil surface is the allometric method. Carbon in soil was calculated based on values of bulk density, organic carbon, area and silt thickness. CO₂ absorption is calculated by multiplying the carbon absorption by the constant 3.67.

Based on its vegetation structure (vegetation density and LBDs), the *R. mucronata* plant is the plant that plays the most role in storing and absorbing carbon at both planting ages. Based on aboveground biomass, the average density of carbon storage and CO₂ uptake in a plant age of 14 years is 89,698 ± 4,751 tons C/ha and 64,983 tons CO₂, and at a plantation age of 9 years the average density of carbon storage and carbon dioxide consumption is 41,566 ± 7,7 tons C/ha and 60,012 tons CO₂. Based on the underground biomass, the average density of carbon storage and consumption of CO₂ at 14 years of plant age was 39,843 ± 2,062 tons C/ha and 29,863 tons CO₂, and at 9 years the average density is 19,751 ± 3,115 tons C/ha and 28,516 tons CO₂. The average density of carbon storage and carbon dioxide absorption in the mangrove substrate is 353.1105 ± 73.265 tons C/ha and 255,814 tons CO₂ for mangroves with a plant age of 14 years and 223,746 ± 29,898 tons C/ha and 414,637 tons CO₂ for a planting age of 9 years. The estimated carbon storage and uptake of mangrove ecosystems in rehabilitation stands aged 14 years is significantly higher than in rehabilitation stands aged 9 years.

Key word: Mangrove, Carbon storage, CO₂ uptake.

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