

ESTIMASI SERAPAN KARBON EKOSISTEM MANGROVE PADA LAHAN BEKAS TAMBAK DESA GERONGAN KABUPATEN PASURUAN

Oleh:

Titan Anggia Nursanti¹

Ni Putu Diana Mahayani²

INTISARI

Vegetasi mangrove menyimpan karbon empat kali lebih banyak dibandingkan hutan terrestrial dan hutan hujan tropis lainnya. Desa Gerongan memiliki bentang lahan berupa tambak yang beberapa diantaranya telah terbengkalai dan ditumbuhi mangrove. Saat ini, belum ada upaya pemanfaatan lestari terhadap potensi mangrove yang besar pada desa ini. Salah satu upaya yang dapat dilakukan adalah dengan memanfaatkan skema pembayaran jasa lingkungan agar memberikan keuntungan secara ekologis dan ekonomis. Penelitian ini bertujuan untuk mengidentifikasi struktur vegetasi mangrove, serta mengestimasi nilai simpanan dan serapan karbon mangrove Desa Gerongan.

Pengukuran vegetasi dan pengambilan sampel sedimen dilakukan pada petak ukur 10 x 10 m sebanyak 18 plot. Pengambilan data vegetasi dilakukan secara *non-destructive sampling* terhadap komunitas pohon dengan DBH ≥ 5 cm, sementara pengambilan sampel tanah dilakukan secara *destructive sampling*. Estimasi biomassa tegakan dilakukan dengan persamaan alometrik yang selanjutnya dikonversi ke dalam simpanan dan serapan karbon. Karbon organik sedimen diketahui dengan analisis *bulk density* dan C organik dengan metode *Loss on Ignition* (LOI) terhadap sampel sedimen.

Berdasarkan Indeks Nilai Pentingnya, vegetasi mangrove di Desa Gerongan didominasi oleh spesies *Avicennia marina* (54,46), *Rhizophora mucronata* (53,06), dan *Excoecaria agallocha* (47,74). Indeks diversitas Simpson pada vegetasi ini sebesar 0,852. Rata-rata densitas biomassa mangrove di atas dan di bawah permukaan tanah masing-masing sebesar $180 \pm 52,25$ ton/ha dan $75,63 \pm 19,81$ ton/ha. Rata-rata simpanan karbon di atas dan di bawah permukaan tanah sebesar $84,85 \pm 24,55$ tonC/ha dan $35,55 \pm 9,31$ ton/ha, serta simpanan karbon sedimen sebesar $425,17 \pm 40,00$ tonC/ha. Rata-rata serapan CO₂ ekosistem sebesar $2002,03 \pm 778,49$ ton CO₂/ha. Jumlah simpanan karbon mangrove Desa Gerongan berada pada rentang yang serupa dengan hutan mangrove alami Nguling Pasuruan dan Tongas Probolinggo.

Kata kunci: biomassa mangrove, ekosistem mangrove, simpanan karbon, struktur tegakan

¹ Mahasiswa Fakultas Kehutanan UGM

² Staff Pengajar Fakultas Kehutanan UGM

*CARBON SEQUESTRATION ESTIMATION OF MANGROVE ECOSYSTEMS ON
ABANDONED POND LANDS IN GERONGAN VILLAGE, PASURUAN REGENCY*

By:

Titan Anggia Nursanti¹

Ni Putu Diana Mahayani²

ABSTRACT

The capacity of mangrove forest in absorbing and storing carbon is four times higher than terrestrial forests. The mangrove forest of Desa Gerongan represents a naturally regrown mangrove from abandoned ponds. In order to obtain some ecological and financial benefits from the existing mangrove mangrove, the local community has initiative to implement an environmental services payment system. Therefore, this study aims to identify the mangrove vegetation structure in Gerongan Village and to estimate the amount of carbon stored and sequestered by the mangrove ecosystem.

Vegetation and sediment sampling were conducted by establishing 18 plots of 10 x 10 m. Stand biomass was estimated with non-destructive sampling, measuring trees with a diameter at breast height (DBH) ≥ 5 cm; individual tree biomass was estimated using allometric equations. The amount of carbon stored and sequestered by each individual was calculated based on its biomass. Using the Loss on Ignition (LOI) method, soil samples were analyzed its bulk density and its organic carbon content to determine the amount of carbon stored in the soil.

*Based on its Importance Value Index (IVI), the dominant mangrove species were *Avicennia marina* (54.46), *Rhizophora mucronata* (53.06), and *Excoecaria agallocha* (47.74). The Simpson's diversity index of the vegetation was 0.852. The average density of above-ground and below-ground biomass was $180 \pm 52,25$ ton/ha and $75,63 \pm 19,81$ ton/ha, respectively. The average of above-ground, below-ground, and sediment carbon stock was $84,85 \pm 24,55$ tonC/ha, $35,55 \pm 9,31$ ton/ha, and $425,17 \pm 40,00$ 5 tons C/ha, respectively. The average CO₂ sequestration was estimated at 2002.03 ± 778.49 tons CO₂e/ha. The mangrove carbon stock in Gerongan falls within a similar range to the natural mangrove forests in Nguling Pasuruan and Tongas Probolinggo.*

Keywords: mangrove biomass, mangrove ecosystem, carbon stock, vegetation structure

¹ Student of Faculty of Forestry, Universitas Gadjah Mada

² Lecturer of Faculty of Forestry, Universitas Gadjah Mada