

MUHAMMAD HARIADI AHNAF. NIM. 21.03.4.1.1.00081. Perbandingan Stok Karbon Pada Berbagai Tipologi Lahan Mangrove di Kabupaten Bangkalan. Di bawah Bimbingan **Herlambang Aulia Rachman, M.Si.**

ABSTRAK

Hutan mangrove merupakan ekosistem pesisir vital dengan kapasitas penyimpanan karbon yang tinggi, namun terancam oleh degradasi dan alih fungsi lahan. Penelitian ini bertujuan untuk membandingkan stok karbon pada tiga tipologi lahan mangrove yang berbeda di Kabupaten Bangkalan: mangrove alami (Martajasah), mangrove bekas tambak (Lembung Paseser), dan mangrove terdegradasi (Tajungan). Metode penelitian melibatkan analisis struktur komunitas vegetasi dan pengukuran stok karbon pada biomassa di atas permukaan (AGB), biomassa di bawah permukaan (BGB), dan sedimen organik (SOC) pada plot 10x10 meter di setiap lokasi. Analisis data dilakukan menggunakan uji non-parametrik Kruskal-Wallis untuk membandingkan stok karbon antar tipologi. Hasil penelitian mengidentifikasi total 7 spesies mangrove, dengan mangrove alami dan bekas tambak masing-masing memiliki 5 spesies, sedangkan mangrove terdegradasi memiliki 4 spesies. Struktur komunitas menunjukkan bahwa mangrove alami ($H'=1.25$) adalah yang paling stabil dan matang, didominasi oleh *Sonneratia alba*. Mangrove bekas tambak menunjukkan keanekaragaman dan keseragaman tertinggi ($H'=1.366$), mengindikasikan proses suksesi yang sehat. Sebaliknya, mangrove terdegradasi memiliki keanekaragaman terendah ($H'=0.83$) dengan dominansi ekstrem *Rhizophora mucronata*. Terdapat perbedaan yang sangat signifikan ($p<0.001$) pada total stok karbon di antara ketiga tipologi. Mangrove alami menyimpan karbon tertinggi (515,00 ton C/ha), diikuti oleh mangrove bekas tambak (280,84 ton C/ha), dan mangrove terdegradasi (148,00 ton C/ha). Sedimen menjadi penyimpan karbon dominan di semua lokasi, terutama di lahan bekas tambak (94%) dan terdegradasi (99%). Temuan ini menegaskan bahwa degradasi secara signifikan menurunkan kapasitas penyimpanan karbon ekosistem mangrove.

Kata Kunci: Stok Karbon, Mangrove, Tipologi Lahan, Degradasi, Biomassa, Sedimen, Bangkalan.

Muhammad Hariadi Ahnaf. NIM. 21.03.4.1.1.00081. Comparison of Carbon Stock in Various Mangrove Land Typologies in Bangkalan Regency. Under the Guidance of **Herlambang Aulia Rachman, M.Si.**

ABSTRACT

Mangrove forests are vital coastal ecosystems with high carbon storage capacity, yet they are threatened by degradation and land-use change. This study aimed to compare carbon stocks across three different mangrove land typologies in Bangkalan Regency: natural mangrove (Martajasah), former shrimp pond mangrove (Lembung Paseser), and degraded mangrove (Tajungan). The research method involved analyzing vegetation community structure and measuring carbon stocks in above-ground biomass (AGB), below-ground biomass (BGB), and sedimentary organic carbon (SOC) within 10x10 meter plots at each location. Data analysis was performed using the non-parametric Kruskal-Wallis test to compare carbon stocks among the typologies. The results identified a total of 7 mangrove species, with the natural and former pond sites each hosting 5 species, while the degraded site had 4 species. Community structure analysis revealed that the natural mangrove ($H'=1.25$) was the most stable and mature, dominated by *Sonneratia alba*. The former pond mangrove exhibited the highest diversity and evenness ($H'=1.366$), indicating a healthy successional process. Conversely, the degraded mangrove had the lowest diversity ($H'=0.83$) with extreme dominance by *Rhizophora mucronata*. A highly significant difference ($p<0.001$) was found in the total carbon stock among the three typologies. The natural mangrove stored the highest amount of carbon (515.00 tons C/ha), followed by the former pond mangrove (280.84 tons C/ha), and the degraded mangrove (148.00 tons C/ha). Sediment was the dominant carbon pool in all locations, especially in the former pond (94%) and degraded (99%) sites. These findings confirm that degradation significantly reduces the carbon storage capacity of mangrove ecosystems.

Keywords: Carbon Stock, Mangrove, Land Typology, Degradation, Biomass, Sediment, Bangkalan.