

## ABSTRACT

**Nasywa Ikhlasul Haura. 24020120130122.** Estimation of Carbon Stock in the Mangrove Ecosystem at Pantai Alam Indah, Tegal, Central Java (**Jumari and Riche Hariyati**)

Global warming due to the increasing concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere has become a serious environmental issue. One of the efforts to mitigate its impact is by utilizing the ability of plants, including mangroves, to absorb CO<sub>2</sub> through photosynthesis and store it as organic carbon. This study aims to determine the density and estimate the carbon stock in the mangrove ecosystem of Pantai Alam Indah, Tegal, by analyzing mangrove density, carbon stock from vegetation, litter, surface sediment, and total carbon stock. The mangrove community structure was analyzed using the plot method, with specific plot sizes for different strata: 10 cm × 10 cm for trees, 5 cm × 5 cm for saplings, and 1 cm × 1 cm for seedlings. A non-destructive method was used for mangrove stand analysis by measuring tree DBH (Diameter at Breast Height) and analyzing it using allometric equations, while litter and sediment were analyzed using a destructive method by collecting samples from each research plot and processing them in the laboratory. The results showed that the species with the highest Importance Value Index (IVI) was *Casuarina equisetifolia* due to its high adaptability to the environmental conditions of the area. The largest carbon stock was found in mangrove stem biomass, reflecting optimal growth and a significant role in carbon absorption. The potential CO<sub>2</sub> absorption at the study site was higher than the potential carbon storage. These findings highlight the importance of mangrove ecosystems as significant carbon sinks in the Tegal region and provide fundamental information to support sustainable mangrove conservation and management efforts.

**Keywords:** Carbon, Mangrove, Stand, Litter, Sediment