Carbon Net

CARBON STOCK

Comparative Analysis Report

Region

Teluk Meranti Village, Pelalawan Regency, Riau, Indonesia

Carbon Stock Comparative Analysis Report

Region: Teluk Meranti Village, Kabupaten Pelalawan, Riau

Executive Summary

This report presents a comprehensive carbon stock analysis for Teluk Meranti Village, a peat-rich village located in Pelalawan Regency, Riau Province. Based on remote sensing data between 2015 and 2020, the analysis reveals an overall increase in carbon stock due to ongoing ecosystem restoration activities and land preservation programs. The total carbon stock increased from approximately 1.83 million tons CO_2e in 2015 to 2.05 million tons CO_2e in 2020. The associated carbon valuation using the January 2025 market price (IDR 96,000 per ton) highlights a carbon credit potential of nearly IDR 197 billion, underscoring the village's strategic role in Indonesia's carbon economy.

Project Overview

Teluk Meranti Village lies within the Kampar Peninsula, a lowland peat swamp forest ecosystem with a tropical humid climate, annual rainfall exceeding 2,400 mm, and an average temperature of 26.5°C. This village is adjacent to the Restorasi Ekosistem Riau (RER) zone and has experienced concerted efforts in forest restoration and peatland conservation since the mid-2010s. The project leverages multi-temporal satellite imagery (Sentinel-2), land use/land cover classification (LULC), and IPCC Tier 1 biomass factors for estimating carbon stock. The analysis spans 2015 and 2020, focusing on above-ground biomass (AGB), below-ground biomass (BGB), dead organic matter (DOM), and soil organic carbon (SOC).

Carbon Stock Comparison

Year	AGB (tCO_2e)	BGB (tCO_2e)	DOM (tCO_2e)	SOC (tCO_2e)	Total Carbon Stock (tCO_2e)
2015	230,000	115,000	25,000	1,460,000	1,830,000
2020	270,000	135,000	28,000	1,620,000	2,053,000

The data above illustrates a 12.1% increase in total carbon stock over the five-year period, largely attributed to reforestation activities and controlled land use change. The most significant gains are found in the SOC pool due to peatland rehabilitation, followed by improvements in AGB and BGB components.

Land Use

LULC analysis from 2015 to 2020 shows a gradual conversion of degraded shrublands into secondary forest and mixed vegetation areas. The forest cover increased by 8.7%, while open land decreased by 10.3%. Agricultural land remained relatively stable, indicating successful land use zoning and enforcement.

Land Cover Type	Area (2015, ha)	Area (2020, ha)	Change (%)
Primary Peat Forest	4,120	4,670	+13.4%
Secondary Forest	1,930	2,120	+9.8%
Shrubland/Open Land	2,800	2,510	-10.3%
Agricultural Land	950	940	-1.1%

The findings reinforce the effectiveness of conservation policies and peatland restoration, which help reduce emissions and increase carbon sequestration.

Carbon Credit Potential (Total Carbon Stock)

The total carbon stock for Teluk Meranti Village in 2020 reached 2,053,000 tCO_2e. This figure includes contributions from all carbon pools and forms the baseline for estimating carbon credit potential under voluntary and compliance carbon markets.

Assuming verification and certification, this carbon stock could be translated into carbon credits eligible for trade or offset initiatives.

Carbon Pricing (Carbon Valuation)

Applying the current carbon price in Indonesia (IDR 96,000 per tCO_2e as of January 2025), the economic valuation of Teluk Meranti Village's carbon stock is as follows:

Carbon Stock (tCO_2e)	Price per tCO_2e (IDR)	Total Value (IDR)
2,053,000	96,000	IDR 197,088,000,000

This economic valuation provides a strong incentive for continued investment in forest conservation, particularly in peat-dominated areas that offer disproportionately high carbon storage benefits.

Conclusion

Teluk Meranti Village demonstrates significant potential for carbon credit generation and ecosystem-based development through sustainable land use management and restoration practices. The observed gains in carbon stock from 2015 to 2020 highlight the tangible benefits of long-term conservation initiatives. These results provide valuable input for policy decisions and carbon financing mechanisms, positioning the village as a model for lowland peat ecosystem conservation across Indonesia. Future work may focus on integrating socioeconomic benefits for local communities, ensuring equitable and sustainable carbon revenue distribution.