# Mangrove forest cover change assessment of Sibuyan Island, Philippines (2010–2020) using Landsat remote sensing

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Mangrove forests are among the most productive coastal forest ecosystems, providing nature-based solutions for climate change mitigation, adaptation, and biodiversity conservation. Despite their value, these habitats are experiencing rapid loss, and research supporting their management remains limited. This study assessed mangrove forest cover change in Sibuyan Island, Philippines – a biodiversity hotspot often referred to as the "Galapagos of Asia" – between 2010 and 2020 using radiometrically corrected Landsat 7 and 8 images. NDVI analysis in ArcGIS classified mangrove areas by vegetation density (bare, sparse, dense), with classification accuracy evaluated through an error matrix showing high reliability.

Over the 10-year period, total mangrove area increased by 182.8 ha. Dense vegetation expanded at a rate of 6.0% $yr^{-1}$, while bare and sparse areas declined annually by 26.7% and 10.1%, respectively. The mangrove community is dominated by the genera *Avicennia*, *Rhizophora*, and *Sonneratia*. These trends suggest that rehabilitation initiatives and strict enforcement of mangrove protection policies are likely driving recovery. Sustaining these efforts, combined with fostering community engagement, supporting nature-based livelihoods, and strengthening research networks, is critical for conserving Sibuyan's mangrove forests and maintaining their ecological and climate benefits.

Table 1. Areal extent of Sibuyan mangroves in 2010 and 2020 based on vegetation density

| Vegetation density | Mangrove area and percentage | | | | Annual rate of change of forest cover (%) |
|---|---|---|---|---|---|
| | 2010 | | 2020 | | |
| | ha | % | ha | % | |
| Bare | 2.61 | 0.87 | 0.18 | 0.04 | -26.74 |
| Sparse | 41.46 | 13.83 | 15.13 | 3.14 | -10.08 |
| Dense | 255.76 | 85.30 | 467.31 | 96.83 | 6.03 |
| Total | 299.83 | 100.00 | 482.63 | 100.00 | - |