

Carbon Stock Assessment of Temple Green Spaces for Urban Carbon Neutrality: A Case Study of Maejo Municipality, Chiang Mai

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Abstract

This study evaluated the carbon storage potential of trees in temple areas to aid Maejo Municipality's transition to a green city. Temple areas function as both religious sites and urban green spaces, contributing to climate-change mitigation and sustainable development. The research assessed aboveground carbon storage and carbon dioxide absorption by trees, developed a geo-informatics tree database, and proposed guidelines to enhance the carbon sequestration of temple landscapes. Employing both qualitative and quantitative methods, field surveys were conducted in nine temples. Data on tree location, species, height, circumference, and canopy were collected to calculate biomass and carbon storage using standard equations. A total of 504 trees were identified, comprising 486 general species and 18 palms. Wat Si Don Chai Pa Tueng Ngam had the highest number of trees, with 171. Trees in the nine temples stored an estimated 822.97 tons of carbon dioxide equivalent. The findings suggest that temple areas can significantly support urban carbon reduction and green space conservation. However, challenges such as trees surrounded by concrete, proximity to buildings, limited space, and inadequate maintenance were noted. The study recommends collaboration among Maejo Municipality, temples, and communities to conserve trees, expand green spaces, improve tree care, and utilize the geo-informatics database for urban environmental management and carbon neutrality.

Keywords: Temple green spaces, Carbon sequestration, CO₂ absorption; Geo-informatics database, Maejo Municipality, Carbon neutrality.