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【因應2050淨零排放之減碳、生態系統與農業永續及永續社會治理】

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Fighting Climate Change with Bamboo: Feasibility Assessment for Taiwan

計劃簡介：

This project focuses on evaluating the carbon sequestration potential of bamboo forests in Taiwan. It spans from 2023 to 2025 and aims to **deliver a cross-scale from plot to regional bamboo biomass estimation** that can directly contribute to (1) assess bamboo's potential as a carbon sink to National 2050 net-zero pathway and (2) provide policy suggestion for scenarios to maximize bamboo carbon sink via national land management.

The project is structured around four main work packages (WPs), each addressing different aspects of the bamboo biomass estimation and ecosystem service values:

1. **WP1: In situ Bamboo Growth and Biomass Estimation** - This work package focuses on in situ surveys of bamboo growth characteristics and the estimation of above-ground biomass for major species in Taiwan. The annual carbon sequestration of bamboo forests has been found to be significantly higher than that of coniferous and broadleaf forests, making bamboo a viable option for carbon storage initiatives.
2. **WP2: Remote Sensing and Biomass Mapping** – This work package utilizes satellite imagery and LiDAR data to develop models for estimating bamboo biomass across Taiwan. This work package aims to create accurate maps of bamboo forest distribution and assess their carbon sequestration potential. The integration of ground-based surveys with remote sensing technologies is crucial first step for scaling the biomass estimation from plot to regional levels.
3. **WP3: Numerical Simulation of Bamboo Productivity under Management and Climate Change** - This package models the impact of historical and future climate scenarios on bamboo productivity and carbon sequestration. Using dynamic vegetation models, the research explores various management strategies and their implications for carbon accumulation in bamboo ecosystems.
4. **WP4: Ecosystem Services and Governance** - This package assesses the ecosystem services provided by bamboo forests and explores governance strategies to optimize these services. This involves evaluating the socioeconomic and environmental benefits of bamboo, and the perceptions and willingness of local communities to engage in bamboo forest management and conservation.

The project underscores the importance of bamboo in Taiwan's climate strategy, particularly due to its rapid growth rate and significant carbon sequestration capacity. It also highlights the need for sustainable management practices to maximize bamboo's ecological and economic benefits. Through this integrated approach, the project aims to develop a methodology that can delivery a cross scale bamboo forest biomass estimation to support upscale management.

Delivery

Upscaled bamboo above ground biomass estim.
Strategies/infos for bamboo carbon sink

Cross-Scale

Plot to regional upscale → Optimization

Method