

Measuring Carbon Stock of Urban Green Spaces using *i-Tree Eco*

A Case Study of IPB University Dramaga

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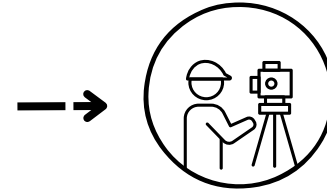
BACKGROUND

1. **Universities play key role** in climate action, which urges campuses to reduce emissions, and support the 1.5°C climate goal (Nature Positive University, 2022)
2. Accurate baseline data is **needed to plan and monitor ecological efforts**. *i-Tree Eco* can measure tree carbon storage, but it is still rarely used at the university scale (Aulia et al. 2023).
3. IPB Dramaga, as a green campus, is an important site to assess carbon stock and support stronger ecological-based campus planning (Mustari, 2021).

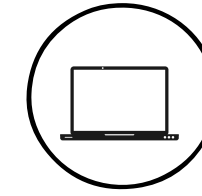
METHODOLOGY



Plot Determination:
A total of 100 plots with each plot covering an area of 400 m².



Field Survey:
species, tree height, Diameter at Breast Height, etc.



Data Processing:
The collected data were entered into the *i-Tree Eco*.



RESULT

- **Carbon Storage** reflects the total carbon retained in tree. conserving large tree is essential to maintain existing carbon stocks.
- **Carbon Sequestration** indicates the annual rate of carbon uptake;
- **Highest sequestration** is Raintree spp shows the (~0.30 tons/year)
- **Prioritizing** high-sequestration species in landscape planning can strengthen the campus's climate mitigation strategy

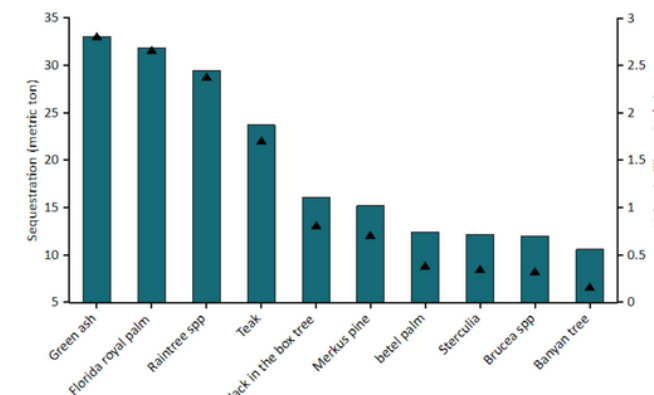


Figure 2. Carbon Sequestration

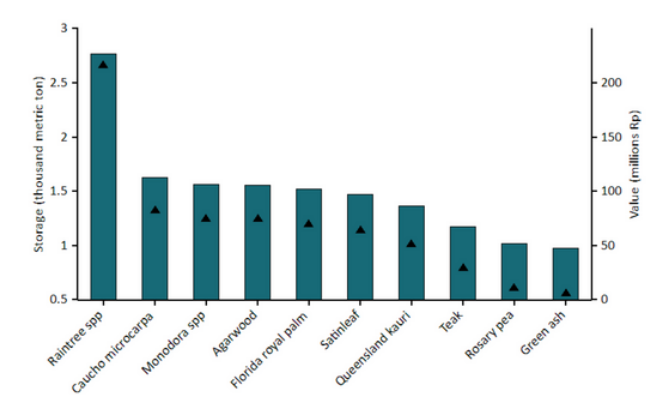


Figure 3. Carbon Stock

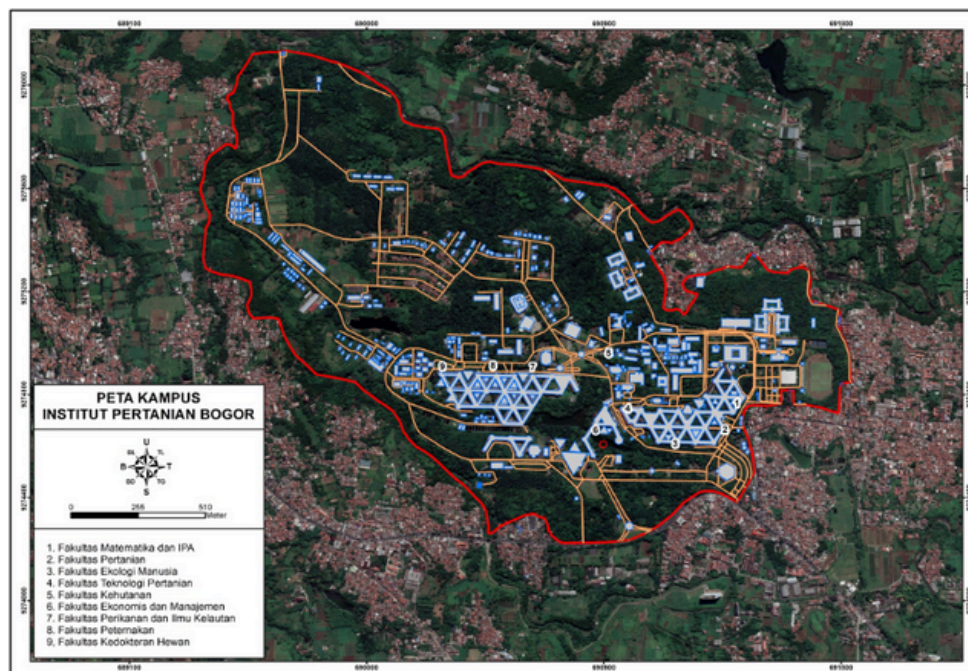


Figure 1. Study Area

Abbr.	Description	Amount (kg)	±SE	Value (IDR)	±SE
CO	Carbon Monoxide removed annually	152.64	±4.16	4,086,108 Rp	±111,391
NO2	Nitrogen Dioxide removed annually	840.17	±22.90	3,985,240 Rp	±108,641
O3	Ozone removed annually	5,221.88	±142.35	98,812,198 Rp	±2,693,714
SO2	Sulfur Dioxide removed annually	492.24	±13.42	561,512 Rp	±15,307
PM2.5	Particulate Matter less than 2.5 microns removed annually	286.76	±7.82	202,087,641 Rp	±5,509,101
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	2,052.30	±55.95	262,920,980 Rp	±7,167,475
Total		9,045.99	±246.60	572,453,678 Rp	±15,605,630

Figure 4. Economic Benefits

DISCUSSION

Trees that **absorb the most carbon** are large, fast-growing, healthy, have wide crowns, and are in their active growth phase. Even **low-carbon species** remain important for ecosystem resilience, landscape aesthetics, and biodiversity habitat. Trees at IPB also provide **economic value**, with an estimated benefit of ¥5.000.000 per year.