

## Potensi Serapan Gas Karbon Dioksida Pada Ruang Terbuka Hijau di Kawasan Universitas Gadjah Mada

Eva Hanafia Azzahro<sup>1</sup>, Ris Hadi Purwanto<sup>2</sup>

### INTISARI

Peningkatan emisi gas karbon dioksida menjadi penyebab utama perubahan iklim. RTH berperan penting dalam mitigasi perubahan iklim melalui penyerapan CO<sub>2</sub>. Penelitian ini bertujuan untuk mengidentifikasi jenis dan luas penggunaan lahan di kawasan Universitas Gadjah Mada (UGM), mengestimasi potensi biomassa, simpanan C, dan serapan CO<sub>2</sub> dari RTH, serta membandingkan kemampuan serapan CO<sub>2</sub> antara pohon berfilosofis budaya dan pohon non filosofi.

Pemetaan jenis penggunaan lahan dan RTH dilakukan dengan interpretasi visual foto udara, metode sampling untuk pengambilan data yaitu *stratified random sampling*, pengukuran vegetasi untuk estimasi simpanan karbon dengan *non-destructive sampling* dan analisis biomassa menggunakan persamaan alometrik. Hasil penelitian menunjukkan bahwa kawasan kampus UGM terdiri dari 12 jenis penggunaan lahan, meliputi bangunan (53,70 ha), hutan kota (3,15 ha), taman kota (5,30 ha), jalur hijau (7,55 ha), kebun (1,05 ha), lahan perkerasan (42,48 ha), lahan tidur (0,55 ha), lapangan olahraga (4,25 ha), taman parkir (4,30 ha), taman pekarangan (34,97 ha), tubuh air (1,62 ha) dan sempadan sungai (3,67 ha). Jenis RTH meliputi RTH Taman dan Hutan Kota (8,45 ha), RTH Jalur Hijau (7,55 ha), RTH Pekarangan (45,11 ha), dan RTH Fungsi Tertentu (3,67 ha). Jenis RTH Jalur Hijau mampu memiliki potensi tertinggi dengan nilai biomassa 333,05 ton/ha; simpanan karbon 156,53 ton/ha; dan serapan gas CO<sub>2</sub> 574,48 ton/ha. Total potensi simpanan karbon oleh RTH UGM sebesar 86,27 ton/ha yang termasuk kategori sedang. Potensi biomassa, simpanan karbon, dan serapan gas CO<sub>2</sub> dari pohon berfilosofi lebih rendah dibandingkan pohon biasa, masing-masing sebesar 37,65 ton/ha; 17,70 ton/ha; dan 64,95 ton/ha.

Temuan ini menegaskan peran strategis RTH kampus UGM dalam mendukung konsep *green campus* sekaligus melestarikan nilai budaya. Potensi RTH perlu dioptimalkan melalui berbagai upaya, salah satunya dengan pengayaan jenis pohon berdaya serap CO<sub>2</sub> tinggi dan pohon bernilai filosofis.

Kata Kunci: Ruang Terbuka Hijau, serapan karbon, biomassa, *green campus*, nilai filosofis budaya

---

<sup>1</sup> Mahasiswa Fakultas Kehutanan UGM

<sup>2</sup> Staff Pengajar Fakultas Kehutanan UGM

## Carbon Dioxide Sequestration Potential in Green Open Spaces at Gadjah

### Mada University

Eva Hanafia Azzahro<sup>1</sup>, Ris Hadi Purwanto<sup>2</sup>

### ABSTRACT

*The increase in carbon dioxide emissions is a major contributor to climate change. Green Open Spaces (GOS) play a crucial role in mitigating climate change by absorbing CO<sub>2</sub>. This study aims to identify the types and areas of land use at Universitas Gadjah Mada (UGM), estimate the biomass potential, carbon storage, and CO<sub>2</sub> absorption capacity of GOS, and compare the CO<sub>2</sub> absorption ability between culturally symbolic trees and non-symbolic trees.*

*Land use and GOS types were mapped using visual interpretation of aerial photographs. Stratified random sampling was employed for data collection, and non-destructive sampling was used for vegetation measurement to estimate carbon storage, with biomass analysis conducted using allometric equations. The results show that the UGM campus comprises 12 types of land use: buildings (53.70 ha), urban forests (3.15 ha), city parks (5.30 ha), green paths (7.55 ha), gardens (1.05 ha), paved land (42.48 ha), idle land (0.55 ha), sports fields (4.25 ha), parking areas (4.30 ha), yard parks (34.97 ha), water bodies (1.62 ha), and riverbanks (3.67 ha). GOS types include park and urban forest (8.45 ha), green paths (7.55 ha), home gardens (45.11 ha), and function-specific spaces (3.67 ha). Among these, green paths had the highest potential with biomass at 333.05 tons/ha, carbon stock at 156.53 tons/ha, and CO<sub>2</sub> absorption at 574.48 tons/ha. The total carbon storage potential of UGM's GOS was 86.27 tons/ha, classified as moderate. The biomass, carbon storage, and CO<sub>2</sub> absorption potentials of culturally symbolic trees were lower than those of ordinary trees, at 37.65 tons/ha, 17.70 tons/ha, and 64.95 tons/ha, respectively.*

*These findings highlight the strategic role of UGM's green open spaces (GOS) in supporting the green campus concept while preserving cultural values. The potential of GOS should be optimized through various efforts, including the enrichment of high CO<sub>2</sub>-absorbing and culturally symbolic tree species.*

*Keywords: Green Open Spaces, carbon sequestration, biomass, green campus, cultural philosophy*

---

<sup>1</sup> Student of Faculty of Forestry UGM

<sup>2</sup> Lecturer of Faculty of Forestry UGM