

## BIOMASSA DAN CADANGAN KARBON PADA BERBAGAI TINGKAT SUKSESI HUTAN WANAGAMA GUNUNG KIDUL

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ace jh 28/8/17

### INTISARI

Hutan memiliki peran vital dalam ekosistem dunia karena perannya sebagai penyerap dan penyimpan karbon dioksida. Realita saat ini menunjukkan peran hutan menjadi tidak optimal disebabkan oleh ekosistem hutan yang terganggu akibat deforestasi, degradasi, dan alih fungsi lahan. Deforestasi dan degradasi dapat mengubah status hutan menjadi lahan kritis yang sering dijadikan dasar untuk mengubah fungsinya. Di sisi lain, lahan kritis masih dimungkinkan memperbaiki fungsi ekosistemnya jika dikelola dengan benar, salah satunya melalui upaya rehabilitasi. Berdasarkan hal tersebut, penelitian ini bertujuan untuk mengetahui kontribusi lahan kritis yang direhabilitasi terhadap mitigasi perubahan iklim melalui pendekatan kandungan biomassa, cadangan karbon, dan perkembangan vegetasi di suksesi hutan Wanagama.

Penelitian ini dilakukan pada 3 tingkat suksesi yang disebut sebagai sere 1, sere 2, dan sere 3. Penentuan sere mengacu pada tahapan pembangunan hutan Wanagama berbasis struktur dan komposisi tingkatan suksesi. Oleh karenanya istilah sere tidak merujuk pada suksesi alami, karena terdapat upaya akselerasi suksesi pada fase awal pembangunan. Setiap tingkatan suksesi memiliki indikator, sere 1 tersusun atas tumbuhan bawah, sere 2 tersusun atas dominasi *Glirisdia sepium*, dan sere 3 tersusun oleh dominasi kombinasi jenis (*Glirisdia sepium*, *Podocarpus neriifolius*, *Santalum album*, *Leucaena leucocephala*). Perhitungan biomassa dan cadangan karbon berasal dari seluruh kantong meliputi biomassa di atas tanah dan di bawah tanah, serta tanah.

Hasil penelitian menunjukkan bahwa tingkatan suksesi memengaruhi kandungan biomassa dan cadangan karbon: (1) Nilai biomassa tertinggi diperoleh pada suksesi tingkat 3 dengan nilai 112,81 Mg Ha<sup>-1</sup>; (2) Cadangan karbon tertinggi diperoleh pada sere 3 dengan nilai 125,83 Mg C Ha<sup>-1</sup>; (3) Perkembangan sere ditandai dengan perkembangan struktur tegakan. Sere 1 tersusun atas tumbuhan bawah dengan keanekaragaman jenis tertinggi (9 jenis). Sere 2 tersusun atas 5 jenis tumbuhan bawah dan 7 jenis pohon, sedangkan sere 3 tersusun atas 4 jenis tumbuhan bawah dan 9 jenis pohon. Hasil penelitian mengindikasikan bahwa rehabilitasi dapat mengembalikan fungsi ekosistem lahan kritis melalui peningkatan produktivitas dan percepatan suksesi sehingga mampu berkontribusi memitigasi perubahan iklim.

Kata kunci : Biomassa, Karbon, Sere, Suksesi, Hutan Wanagama

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## **BIOMASS AND CARBON STOCK AT VARIOUS SUCCESSIONAL STAGES OF WANAGAMA FOREST GUNUNG KIDUL**

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### **ABSTRACT**

Forests have a vital role in the world's ecosystems due to their function in carbon sequestration and storage. In reality, forest ecosystem is now in disturbed condition due to deforestation, degradation and land conversion leading to non-optimal forest role. Deforestation and degradation might change the status of forest into critical land often being used as a basis for land use change. In fact, critical land could potentially improve their ecosystem function if managed properly, e.g. through rehabilitation program. Related to that condition, this study aims to determine the contribution of rehabilitated critical land in climate change mitigation by means of biomass content, carbon stocks, and vegetation development at three succession levels in Wanagama forest.

This study was conducted on 3 succession levels regarded as Sere 1, Sere 2, and Sere 3. Sere determination refers to Wanagama forest development stage based on structure and composition of succession level. Therefore, the term sere does not refer to natural succession, due to efforts to accelerate succession in the early phase of development. Each succession level has the following indicator: Sere 1 is composed of the understorey plants, Sere 2 is composed of pioneer species (*Glirisia sepium*) dominance, and Sere 3 is composed by the combinations of dominant species (*Glirisia sepium*, *Podocarpus neriifolius*, *Santalum album*, *Leucaena leucocephala*). The biomass and carbon stock calculated comes from all carbon pools including above ground biomass, underground biomass, and soil.

The results showed that succession levels significantly affected biomass content and carbon stocks: (1) Highest biomass value is obtained at a level 3 succession (Sere 3) with a value of 112,81 Mg per hectare; (2) Highest carbon stock is found in Sere 3 with value of 125,83 Mg C per hectare; (3) Succession level development is represented by development of standing structure. Sere 1 is made up of understorey plants with highest biodiversity (9 species). Sere 2 shows a higher life form with 5 understorey plant species and 7 tree species whereas Sere 3 is composed of 4 understorey plant and 9 tree species. Sere 3 shows the most stable structure. The results indicate that rehabilitation program could restore ecosystem function of critical land through forest productivity improvement, succession acceleration leading to the ability to mitigate climate change.

Key words : Biomass, Carbon, Succession, Wanagama Forest, Karst

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