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Ascertainment of Photosynthetic Biomass Curves in the Early Growth Stages of Selected Dominant Native and Endemic Plant Species in Lowland Rainforest Ecosystems, Sri Lanka that as a Proxy for Value Primary Ecosystem Services and towards Conservation

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Abstract

The lowland rainforests play a significance role in maintaining the rich biodiversity of threatened endemic and native species of flora. However, the physiognomy of many species is still poorly known. The main objective of this study was to established the gains in photosynthetic Biomass (PB) during the early growth phases of three native and endemic tree species *Garcenia quaesita*, *Dipterocarpus zeylanicus* and *Artocarpus nobilis*, which are frequently found in the low land rainforest ecosystems in south-west Sri Lanka. The study was based on field data collection and through observations based on empirical measurements which focused on PB accumulation in the early growth stages of above tree species. The sampled individuals were found in the reforested site in Hinduma, Sri Lanka and Sampling was carried out in four sites which represented the growth at 1, 2, 3 and 4 years. Purposive sampling was carried out and 30 individuals from each and individual age group as mentioned above, totaling 360 individuals of the plant species. Fresh weight was measured from collected leaves and analyzed to derive PB curves using statistical software Minitab version 15. Oxygen production (1 g of PB gives 0.4 g of Oxygen) was quantified using the measured PB value applied to the standard allometric equation. PB and Oxygen production of selected tree species demonstrated an exponential growth after the age of 3 years. Results shows that at the end of 4th year *D. zeylanicus* produce highest PB value, i.e., 2,483.55 grms and then 550.92 and 421.36 grams occupied by *A. nobilis* and *G. quaesita*. Also, PB and Oxygen production had a significant relationship with the age. In conclusion all the selected species under the given climatic conditions shows an increasing rate of PB, and oxygen production with age up to 3 years with an exponential growth thereafter. The findings of this study will be used to explored and included in the contractual process of value Primary Ecosystem Services (PES) hence all the PES derivatives such as carbon sequestering values and oxygen production based on the PB value of that given plant species. Therefore, it creates new scientific proven records to archive economic opportunities, which are not still identified and value of primary ecosystem services of tree dominated ecosystems/land uses to achieve national green economic policy management objectives. Such an economy described above, can generate new ecosystem servicing values and socioeconomical benefits which, at the same time, promotes conservation of these species and their unique environments.

Keywords: Conservation, Green economy, Lowland rainforests, Photosynthetic Biomass, Primary ecosystem services