

PHOTOSYNTHETIC BIOMASS CURVES IN THE EARLY GROWTH STAGES OF SELECTED DOMINANT PLANT SPECIES IN IRRIGATION CANAL SYSTEMS OF SRI LANKA

W.S.S.L. Aberathna^{1,2*#} and M.K.M. Fernando³

¹Lanka Organic Agriculture Movement, Regional Office, Bibila, Sri Lanka

²Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

³Eumla, No.413, Hermanstate, 1st Step, Ganima, Dodangoda, Sri Lanka

*Correspondence E-mail: ethnosameera40000@gmail.com, Phone: +94714521209

#Presenting Author

Abstract: Tank Cascade Systems are associated with canal-bank vegetations that support high biodiversity, habitats and provide ecosystem services, which should be quantified to assist conservation and economic decision-making. The eco-tokens are a virtual currency type, generated by the gross production of clean oxygen and the sequestration of carbon during the early growth stages of a predefined set of plants. These captured values are integrated into an IT platform, creating tradable assets. The main objective of this study was to establish the gains in photosynthetic biomass (PB) during the early growth phases of three common tree species: *Diospyros malabarica*, *Terminalia arjuna* and *Ficus racemose*, associated within the tank cascade ecosystems of dry and intermediate zone of Sri Lanka. The PB accumulation in the early growth stages of the above tree species were collected from individuals found in the reforested sites in Mahiyangana, Bibila, Monaragala and Padiyathalawa, Sri Lanka representing the growth at 1st, 2nd, 3rd and 4th years with 60 individuals from each site and age group totaling 720 individuals per plant species. The fresh weight was measured from collected leaves and analyzed to derive PB curves. Oxygen production (1g of PB gives 0.4 g of oxygen) was quantified using the measured PB value applied to a standard allometric equation. The PB and oxygen production had a significant relationship with age. The PB, and oxygen production demonstrated an exponential growth after the 3rd year. Results showed that at the end of 4th year *T. arjuna* produced the highest PB value, i.e., 1948.12 g and then 1550.92 and 246.92 g occupied by *F. racemose*, *D. malabarica*, respectively. The findings will be used to generate eco-tokens which are based on aggregate values of Regulatory Ecosystem Services (RES) to establish an ecosystem services-based payback system to the Sri Lankan green economic initiatives.

Keywords: Eco-tokens; Regulatory ecosystem services; Tank cascade systems; Watershed management