

Dry Zone Home Gardens as the Potential Agroforestry Units for Carbon Storage: Study in *Gomarankadawala* area, Trincomalee, Sri Lanka

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Dry zone home gardens could be considered as agroforestry units which have potential to mitigate and adapt climate changes. Carbon quantification in home gardens could give a picture of carbon stock of home gardens as agroforestry systems. Once the present carbon stock is quantified, strategies could be made for dry zone home gardens to further develop into better carbon storages. This study was conducted to quantify existing permanent aboveground carbon stock in *Gomarankadawela* area in the *Kumbukwewa* cascade in the Trincomalee district of Sri Lanka. A total of 44 home gardens were categorized according to the size (≤ 0.2 ha small scale (n=13), $0.2 < \text{to} \leq 0.4$ ha medium scale (n=13) and $0.4 < \text{to} < 1$ ha large scale (n=18) and data were collected. Diameter at breast height, height of 3338 trees and plants with their abundance were recorded. Allometric equation was used to calculate aboveground carbon stock. Pearson R correlation test and one-way ANOVA test were used to analyze the calculated carbon stock values. Mean above ground carbon stock was 30 mg C ha^{-1} ranging from $0.005 \text{ mg C ha}^{-1}$ to $80.99 \text{ mg C ha}^{-1}$. The size of the home garden was not significantly ($p < 0.05$) correlated with aboveground carbon stock, but it had significant differences among the scale of the home gardens. The small-scale home gardens had the highest carbon stock ($40.16 \pm 22.5 \text{ mg C ha}^{-1}$) and medium scale had the lowest carbon stock ($23.54 \pm 14.7 \text{ mg C ha}^{-1}$). The findings revealed that the dry zone home gardens are having lower carbon stock and there is still a possibility of strategizing to increase the capacity of carbon storage as a measure of climate change mitigation specially focusing on medium and large-scale home gardens. This could be done strategically by increasing the carbon stock using under-utilized land area on a sustainable basis by optimizing tree density with proper mixture in the dry zone home gardens.

Keywords: Above ground carbon stock, Agroforestry system, Allometric equation, Climate change, Dry zone home gardens