

The Role of Agroforestry Practices in Climate Change Mitigation in Western Kenya

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Abstract : Most of the world ecosystems have been affected by the effects of climate change. Efforts have been made to mitigate against climate change effects. While most studies have been done in forest ecosystems and pure plant plantations, trees on farms including agroforestry have only received attention recently. Agroforestry systems and tree cover on agricultural lands make an important contribution to climate change mitigation but are not systematically accounted for in the global carbon budgets. This study sought to: (i) determine tree diversity in different agroforestry practices; (ii) determine tree biomass in different agroforestry practices. Study area was determined according to the Land degradation surveillance framework (LSDf). Two study sites were established. At each of the site, a 5km x 10km block was established on a map using Google maps and satellite images. Way points were then uploaded in a GPS helped locate the blocks on the ground. In each of the blocks, Nine (8) sentinel clusters measuring 1km x 1km were randomized. Randomization was done in a common spreadsheet program and later be downloaded to a Global Positioning System (GPS) so that during surveys the researchers were able to navigate to the sampling points. In each of the sentinel cluster, two farm boundaries were randomly identified for convenience and to avoid bias. This led to 16 farms in Kakamega South and 16 farms in Kakamega North totalling to 32 farms in Kakamega Site. Species diversity was determined using Shannon wiener index. Tree biomass was determined using allometric equation. Two agroforestry practices were found; homegarden and hedgerow. Species diversity ranged from 0.25-2.7 with a mean of 1.8 ± 0.10 . Species diversity in homegarden ranged from 1-2.7 with a mean of 1.98 ± 0.14 . Hedgerow species diversity ranged from 0.25-2.52 with a mean of 1.74 ± 0.11 . Total Aboveground Biomass (AGB) determined was 13.96 ± 0.37 Mgha⁻¹. Homegarden with the highest abundance of trees had higher above ground biomass (AGB) compared to hedgerow agroforestry. This study is timely as carbon budgets in the agroforestry can be incorporated in the global carbon budgets and improve the accuracy of national reporting of greenhouse gases.

Keywords : agroforestry, allometric equations, biomass, climate change

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