



Dominant Tree Species for Increasing Ground Cover and their Distribution in Siaya County, Kenya

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Abstract – Climate change resulting from global warming is currently one of the global environmental issues of concern. Trees play a very important role in mitigating this problem through sequestering carbon dioxide which is one of major green house gases. The importance of trees is incontestable; they have many environmental, social and economic benefits, therefore, effective community participation can be an important strategy in ensuring adequate tree cover. In Kenya, environmental degradation occasioned by low tree cover is evident. The current tree cover in the study area is approximately 3% which is far below the recommended national level of 10%. It was important for a study to be carried out to establish the tree species (indigenous and exotic) available in the study area with a view to knowing the tree types that can be given priority when increasing tree cover. Therefore, the objective of this study was to determine the dominant tree species which can be used to increase groundcover and their distribution in Bondo and Siaya sub-counties, Siaya County. This study employed a cross-sectional survey research design. Reliability of 0.710 was realized when pilot tested. A total of 120 household heads were interviewed of which 67% were women and 33% were men. Data analysis used Statistical Package for Social Sciences (SPSS) software for qualitative data, resulting in tables, numbers and percentages. The study concludes that common indigenous tree species are; *Cordia allamanda* (Obino), *Markhamia lutea* (Siata), *Acacia* spp (Alli/Laktar/Kudho), *Euphorbia triculis* (Ojook), and *Albizia zylia* (Otar-bam) and for the exotic tree species in the area are; *Thevetia peruviana* (Achak/Maua), *Eucalyptus* spp (Barwa/ Kalada/ Nyar-maragof), *Grevillea robusta* (Bole bole), *Mangifera indica* (Mawembe) and *Ocotea americana* (Avocado). Any planned increase in ground cover should give the identified species of trees priority for they have adapted themselves to local climatic conditions.

Keywords – Dominance, Distribution, Indigenous Trees Species, Exotic Tree Species.

I. INTRODUCTION

Tree growing involves planting and caring of tree germplasm for farm forestry, land reclamation, agro-forestry, woodlot and landscaping purposes. Different types of trees that grow in Bondo and Siaya districts in Kenya include: woody trees, fruit trees, herbal plants and ornamental trees, among others. Trees are useful in many ways as they filter pollution from the air, help recycle water, prevent soil loss, create shade, give shelter from wind and rain [1], [2], [3]. Tree planting in the farms directly diversify the productivity of the farm making the ecosystem more resilient and sustainable therefore improving the standard of living of the family [4]. In addition, it reduces the time taken by women to go to the forest to collect firewood and reduce the strain and

dangers that they are exposed to while in the forest [5]. Indicators of low tree coverage in the study area are: serious surface run-off, siltation of dams, rivers and lakes, high turbidity of water bodies after rainfall, presence of gullies, charcoal burning, open grounds, drying of springs, heavy brick making, shrinking of water bodies and increased distance covered by women while collecting firewood [6], [7], [8]. In Kenya, this problem is even more evident as a result of low tree canopy cover which has declined from 3% to 1.7% in the last decade due to human factors. 1.7% is very low compared to the international figure of 10%. Locally in Tree coverage in study area of Bondo and Siaya districts is 3% and 2.8% respectively [8].

Benefits of trees in the environment include, improved air quality for they are effective in pollution reduction, help anchor soil and reduce storm run-offs, saving the high costs of draining ditches, storm sewers, and other engineered solutions. Trees can play an important role in deadening unwanted noise, increasing soil fertility, conserving important soil nutrients, shortening the distance while looking for firewood, and has appositive impact on both crops and livestock. Sound waves are absorbed by tree leaves, branches and twigs [9], [10], [11]. It also results in social mobility and increases diversity resulting in greater economic opportunities [12]. The environment is also related to quality of life expectancy in terms of its impact on the incidence and spread of air and water borne diseases. The effective management of the environment and the prudent utilization of natural resources are critical in fostering sustainable development [13].

Studies have shown that planting trees between crops and around land plots can help prevent soil erosion, restore soil fertility and provide shade, thereby offsetting some of the effects of climate change [14]. By planting faster growing trees, shrubs, on fallow land, farmers help the soil to retain more water. Agro-forestry also contributes to climate change mitigation, since trees and shrubs absorb more carbon than other crops. The IPCC reports that agro-forestry has the potential to sequester nearly 600 million tones of carbon dioxide a year by 2040. Trees help maintain production during excessive or poor rainfall. Their deep roots system can explore a larger soil volume for water and nutrients during drought [14].

Agro-forestry is an importance carbon sequestration strategy because of carbon storage potential in its multiple plant species and soil. Average carbon storage by agro-forestry practices has been estimated as 9, 21, 30, and 63 Mg C per hectare in semi-arid, sub-humid, humid and temperate regions respectively [15]. Agro-forestry is

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