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IMPACT OF CARBON SEQUESTRATION IN DIFFERENT AGROFORESTRY SYSTEMS

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ABSTRACT: Agroforestry provides a unique opportunity to combine the twin objectives of climate change adaptation and mitigation. It has the ability to enhance the resilience of the system for coping with the adverse impacts of climate change. Agroforestry systems offer important opportunities for creating synergies between both adaptation and mitigation actions. Conversion to invigorating land uses and implementation of recommended management practices can reduce atmospheric carbon because global warming is inevitable. The experiment was conducted with non-destructive methods to analyze the potential of biomass status and carbon sequestration under sustainable land use systems. Carbon sequestration through biomass seems to be a cheap and viable option. Their potential of locking carbon differs not only with the type of species, but also with the agro-climatic zones. Agriculture land use systems (Including *Oryza sativa, Saccharum officinarum* and *Musa paradisiaca* crops) per hectare contributed 21.98% and agroforestry land use systems contributed 37.75% carbon sequestration as compared to tree plantation land use systems as well as fast growing tree species such as Eucalyptus clones, *Casuarina equisetifolia* and *Albizzia procera* contributed significantly maximum carbon sequestered per year as compared to all land use systems. However, tree plantation sequester more carbon and hence are better option for reducing atmospheric carbon but they cannot be extended to very large areas due to population pressure and high demand of land for agriculture purposes. Therefore, agroforestry systems seem to be a better option and simultaneously harness the opportunity for biodiversity conservation and economic benefits to the society.

Key words: Carbon sequestration, Greenhouse gases, Agroforestry, Global warming and Sustainable land use systems.

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INTRODUCTION

Under the Kyoto Protocols articles 3.3, A & R (afforestation and reforestation) with agroforestry as a part of it has been recognized as an option for mitigating greenhouse gases. As a result, there is on increasing awareness on agroforestry potential for carbon sequestration (Nair et al. 2009). The United Nations Framework Convention on climate change defines carbon sequestration as the process of removing C from the atmosphere and depositing it over a long period in a reservoir. Sequestering C through agroforestry is now considered an attractive economic opportunity for mitigating global climate change and C trading in addition to providing multiple products. Projections of the world Agroforestry Centre that the C market may exceed USS1 trillion by 2025 suggest that significant funds could potentially be generated through agroforestry interventions (WAC2010). Tree-based systems with short rotation species either in a farm forestry or agroforestry system have the potential to sequester carbon in a short period. The potential to sequester carbon in a short period. The potential seems to be substantial; but it has not been adequately exploited for the benefit of farmers. Proper design and management of agroforestry practices can make them effective carbon sinks. Another indirect avenue of C sequestration is through the use of agroforestry technologies for soil conservation, which could enhance C storage in trees and soils (Montagnini and Nair 2004). Agroforestry has been recognized as a carbon sequestration strategy because of its applicability in agricultural lands as well as in