

CARBON SEQUESTRATION POTENTIAL OF AGROFORESTRY SYSTEMS FOR PHYTOREMEDIATION IN CHINANDEGA, NICARAGUA

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Abstract

Greenhouse gases in the atmosphere have increased to earlier unrecorded levels, causing global climate change that increases GMT and threaten ecosystems and livelihoods. IPCC report suggest that agroforestry offers considerable carbon sequestration (c seq.) potential, especially for developing countries. The purpose of this study is to estimate the c seq. potential in different agroforestry systems suitable in Chinandega, Nicaragua - a deforested region where the ground is polluted by toxaphene and other POP:s. Three scenarios were studied; Shading system using *Tectona grandis* and *Pogostemon cablin*; Alley cropping using *Erythrina poeppigiana* and *Ricinus communis* and Silvopasture using *Cordia alliodora* and *Brachiaria ruziziensis*, the last scenario being divided into two subscenarios; unmanaged (grazed) and managed (harvested) grass. Calculations were performed using the modelling program CO2FIX v. 3.2, with a runtime of 100 years and assuming deforested area with no previous land use. Results show a significantly higher c seq. potential in Shading system (168/217 MgC/ha). Alley cropping yields 71 MgC/ha and Silvopasture results in 80/84 MgC/ha unmanaged and 65/70 MgC/ha managed. The higher number includes products from harvest. All scenarios show fluctuations over time due to thinning and harvesting practices. Phytoremediation potential of POPs has been shown in *Ricinus communis* and grass species. Soil c seq. is especially important to consider in long-term scenarios as this c seq. can be sustained over longer time. The inclusion of crop residue, the effect of grazing animals or changes in density of trees and crops and environmental fate of the toxic compounds need further assessment before considering large scale applications. Agroforestry practices could contribute to several benefits, including climate change mitigation and phytoremediation.

Keywords: Carbon sequestration, Phytoremediation, Agroforestry, Climate change mitigation