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# Dynamics of Carbon Sequestration in Areas with Historical Use of Agriculture in Northeastern Mexico

Israel Yerena Yamallel, Javier Jimenez Perez, Marco Aurelio Gonzalez Tagle, Oscar Alberto Aguirre Calderon, Eduardo Javier Treviño Garza, Eduardo Alanis Rodriguez

*Universidad Autónoma de Nuevo León, Dept. of Silviculture, Mexico*

**Abstract**

Human activities produce land use changes in accordance to the needs of society. This leads either to a direct exploitation of the natural resources or to an agricultural land adaptation. The objective of the present study was to estimate the carbon content of former cultivated mezquital areas with a time of abandonment of 15 and 30 years. The study areas were located near the town of Linares, Nuevo Leon. For the estimation of the carbon content a systematic sampling design was used, in each area four sampling sites of 1,600 $m^2$ ($40 \times 40$ m) divided into four quadrants were established. In quadrant I all trees and shrubs larger than 1 cm in diameter were counted. In the quadrants II, III and IV only trees over 5 cm in diameter were evaluated. The dasometric measurements made were total height (h) and diameter.

The for 30 years abandoned mezquital resulted in the largest value of carbon content in the aboveground biomass with 18.83 t $ha^{-1}$, followed by the primary mezquital with 14.76 t $ha^{-1}$ and mezquital of 15 years abandonment with 5.24 t $ha^{-1}$. The carbon sequestration potential expressed in t $CO_2e$ $ha^{-1}$ $year^{-1}$ had a minimum value of 0.35 t C $ha^{-1}$ $year^{-1}$ which is equivalent to 1.29 t $CO_2e$ $ha^{-1}$ $year^{-1}$ in the mezquital of 15 years. The maximum value was obtained in the mezquital of 30 years with 0.63 t C $ha^{-1}$ $year^{-1}$ which equals 2.31 t $CO_2e$ $ha^{-1}$ $year^{-1}$. Recovering the initial state of primary mezquital in a geoform type of valley is possible, as can be seen with the mezquital of 30 years that bypasses the carbon content that was found in primary mezquital reserves. The abandoned valleys with former agricultural use showed a high level of natural regeneration that should be taken into account as an important ecosystem for carbon storage. Likewise these areas could be promoted for forest plantations.

**Keywords:** Aboveground biomass, carbon content, mezquital

**Contact Address:** Israel Yerena Yamallel, Universidad Autónoma de Nuevo León, Dept. of Silviculture, Linares, Mexico, e-mail: yamallel@hotmail.com