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“Bridging the gap between increasing knowledge and decreasing resources”

Impact of Human Activities on Carbon Sequestration in a Semi-Arid Ecosystem of Northeastern Mexico

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Abstract

One of the main risks that could endanger the permanence of carbon stocks in forests is the risk associated with the demand: when demand for agricultural and/or livestock is the main cause of deforestation. Carbon content in the aboveground biomass was estimated in different land use systems in abandonment in a fraction of Tamaulipan thornscrub. The study was conducted in the ecological reserve of the Forest Sciences Faculty, UANL, and in three contiguous areas, with secondary vegetation; study systems were primary scrub, traditional agriculture (24 years of abandonment), clearcut (27 years of abandonment) and grasslands (30 years of abandonment). For the estimation of the carbon content a systematic sampling design was used, in each area four sampling sites of 1,600 m². The primary scrub has the highest carbon content with 11.70 MgC ha⁻¹ in the aboveground biomass, the value is drastically reduced in the recovered systems with 8.03 MgC ha⁻¹ in grasslands, 4.67 MgC ha⁻¹ in clearcut and 2.98 MgC ha⁻¹ in traditional agriculture. Recovering the initial state of the primary scrub take many years, as can be seen in the grasslands system 30 years reaching only 68% of what it had in reserves of primary scrub, with the carbon sequestration potential of 0.27 MgC ha⁻¹ year⁻¹ which equals 0.99 MgCO₂e ha⁻¹ year⁻¹. Although also shown as a risk to ecosystem conversion to other uses and therefore with a high potential to develop into sources of emissions of CO₂ and other greenhouse gases, tamaulipan thornscrub has great potential as carbon storage, presents a wide capacity of mitigation due to its important surface.

Keywords: Aboveground biomass, carbon content, land use systems in abandonment, Tamaulipan thornscrub