

Soil carbon content and stock in integrated crop-livestock-forestry systems in the Western Amazon

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ABSTRACT: Soil carbon sequestration is a key process for mitigating climate change. This study assessed soil carbon content (SCC) and stock (SCS) in eight cattle production systems in the Western Amazon, Brazil, to evaluate their potential for carbon sequestration. Located at Embrapa's experimental field in Porto Velho, Rondônia, the systems included integrated crop-livestock-forestry (ICLF), ILF, and pasture areas, besides native forest (NF). SCC was measured at 0-10, 10-20, and 20-40 cm layers using a CHN analyzer with five replicates. SCS was calculated using bulk density (BD), thickness, and SCC, with correction for BD differences using NF as reference. Results showed that ICLF and *Urochloa humidicola* pastures had the lowest SCC. ILF with *Samanea tubulosa* tended to have similar SCC to ILF with *Eucalyptus pellita*, but higher SCC than ICL and *Urochloa* pasture areas, especially at 20-40 cm. SCS ranged from 5.90 kg m⁻² in the *U. humidicola* system to 10.71 kg m⁻² in the *S. tubulosa* ILF. The NF SCS was 7.89 kg m⁻². In conclusion, ILF systems, particularly those with Amazon native species *S. tubulosa*, improved SCC and SCS in relation to monocultivated pasture and NF, demonstrating their potential for carbon sequestration. Associated economic and ecological trade-offs must be studied.

Keywords: rain tree, silvopastoral systems, sustainable agriculture