

Effects of land-use on soil properties, macronutrients and carbon stocks in Eastern Acre, Western Brazilian Amazon

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The fate of soil nutrients and carbon stocks as a function of land-use is an essential information for understanding and planning development patterns in Eastern Acre. Three pastures and secondary forests of varying ages were analyzed regarding inter-time rates of change in apparent density, macronutrient content (0-20, 20-40, 40-60 cm), root biomass (0-20, 20-40 cm) in geo-referenced sampling localities with four replications within a 50 m radius. Current land use causes reduction of carbon stocks from 17 ± 2 t C ha⁻¹ in recently burned sites to 6 ± 1 and 13 ± 5 t C ha⁻¹ in young (1-3 years) pastures and old (>6 years) secondary forests, respectively. Potassium increased from 65 ± 42 kg ha⁻¹ in young pastures to 160 ± 58 kg ha⁻¹ and 77 ± 31 kg ha⁻¹ in old and mature (3-6 years) pastures, respectively. Calcium was an efficient indicator in secondary pastures and dropped from 2500 ± 699 to 680 ± 154 kg ha⁻¹ between young and old secondary forests.

Apparent density varied from $1,3 \pm 0,1$ to $1,6 \pm 0,1$ g cm⁻³ in the recently burned area and old fallow, with an increase in pastures and a reduction in the young fallow areas. The fine roots had lower biomass in the areas of young pastures ($4,6 \pm 0,9$ t ha⁻¹). The land use system in Acre lead to inadequate soil management, since the cycles of slash and burn, in soils with low agricultural potential, without replacement of nutrients result in a gradual reduction in the total stocks, reflecting in decreasing crop productivity.

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