

Fire-free alternatives to slash-and-burn for shifting cultivation in the Eastern Amazon region. 1. The role of fertilizers

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Forest fires in slash-and-burn cultivation rank high in the list of environmental concerns. The objective of this study was to evaluate alternatives to burning of the slashed fallow vegetation of different age on crop production in the Northeast of Pará State, Brazil. Burning and mulching of fallow biomass was compared in a cropping sequence of rice, cowpea and cassava, with and without NPK fertilizer. Without fertilizer, fallow duration is important only with slash-and-burn technology where reducing the fallow period from 10 to 4 years caused a 30% reduction in rice yields. If fertilizers are applied, fallow periods beyond 4 years appear to have little effect on yields, irrespective of the land preparation method. Not-burning caused yield reductions of 47 and 76% with rice, and 40 and 100% with cowpea after 4 and 10 years of fallow, respectively. The application of fertilizers raised yields from around 0.67 t ha⁻¹ to over 2.4 t ha⁻¹ for rice, from around 0.11 t ha⁻¹ to over 1.5 t ha⁻¹ for cowpea and from around 15.2 t ha⁻¹ to over 27.8 t ha⁻¹ for cassava. Cassava yields were least affected (0 and 18 %) by fire-free land preparation, because biological nutrient immobilization disappeared by the time cassava was planted.

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