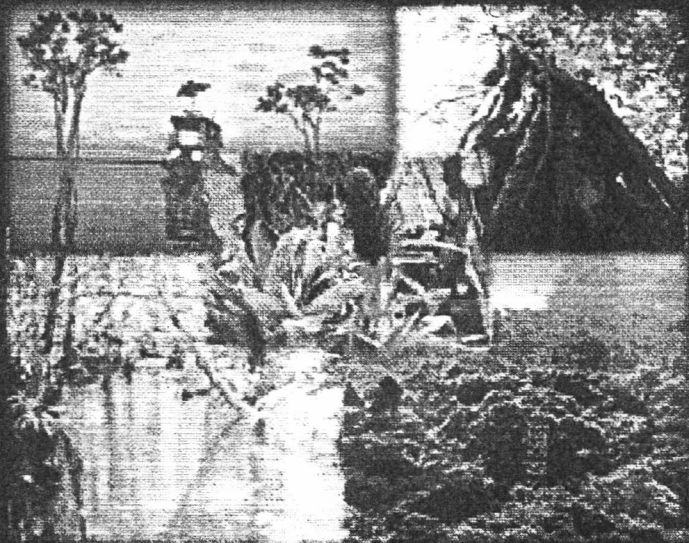


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# Effects of Interannual Climate Variability in Capoeira and Crops Under Traditional and Alternative Shifting Cultivation

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## Abstract

Regenerating forests play an important role in long-term carbon sequestration and sustainable landuse as they act as potentially important carbon and nutrient sinks during the shifting agriculture fallow period. The long-term functioning of capoeira is increasingly threatened by a shortening fallow period during shifting cultivation due to demographic pressures and associated increased vulnerability to severe climatic events. Declining productivity and functioning of fallow forests of shifting cultivation combined with progressive loss of nutrients by successive burning and cropping activities has resulted in declining agricultural productivity. In addition to the effects of intense land use practices, droughts associated with El Niño events are becoming more frequent and severe in moist tropical forests and negative effects on capoeira productivity could be considerable. In Igarapé-Açu (near Belém, Pará), we hypothesize that experimental alternative landuse/clearing practices (mulching and fallow vegetation improvement by planting with fast-growing leguminous tree species) may make capoeira and agriculture more resilient to the effects of agricultural pressures and drought through 1) increased biomass, soil organic matter and associated increase in soil water storage, and nutrient retention and 2) greater rooting depth of trees planted for fallow improvement. This experimental practice (moto mechanized chop-and-mulch with fallow improvement) has resulted in increased soil moisture during the cropping phase, reduced loss of nutrients and organic matter, and higher rates of secondary-forest biomass accumulation. We present preliminary data on water relations during the dry season of 2001 in capoeira and crops for both traditional slash-and-burn and alternative chop-and-mulch practices. These data will be used to test IKONOS data for the detection of moisture status differences. The principal goal of the research is to determine the extent to which capoeira and agricultural fields are susceptible to extreme climate events (drought) under contrasting landuse/clearing practices.