

Cyclic behavior of soil quality in rotational land use systems of the Northeast of Pará state

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Rotational land use systems are of importance to small scale farmers in tropical regions. During the fallow period of these systems the soil fertility status is restored to a level that allows the farmer to re-initiate a new cropping period of 1-2 years. However, slash and burn systems are mostly lacking in stability due to soil degradation processes. These are loss of plant nutrients, deterioration of physical structure and decline of biological activity of the soil. One of the most common cropping systems in the study region is maize (*Zea mays*) and cassava (*Manihot esculenta*) planted in mixed cropping. The fallow vegetation is a spontaneously growing secondary vegetation.

A multivariate statistical approach was used to characterize the condition of the soil at particular sampling dates on the basis of a set of chemical and biological soil parameters. The data were collected in a field trial in the municipality of Igarapé Açu, 120 km east of Belém, in the state of Pará. Soil samples were taken several times during cropping from right before burning until cassava harvest in two experiments installed following 5 and 8-year-old fallow vegetation. Sampling depth was 0-10 cm. The soil was analyzed for pH, C_{org}, N_t, P_i, Ca, Mg, K, Al and biological (enzymatic) activities.

The graphical projection of the 1st and the 2nd function of a discriminant analysis reflects a cyclic behavior of the different phases of the traditional land use system and, consequently, this curve could serve as a basis for the interpretation of the agronomic management practices compared in the study. Deviations from the cyclical pattern of the traditional system could help to understand why agronomic modifications are successful or not. In this context the discriminant analysis suggested the importance of particular soil parameters.

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