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“Utilisation of diversity in land use systems:
Sustainable and organic approaches to meet human needs”

An Approach to Environmental Services by Landuse Systems Assessment; Functional Biodiversity in Tropical Agroforestry Systems (The Case of Tomé-Açú Community, Northern Brazil)

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Abstract

Currently, the environmental services concept and its assessment seems the most appropriate approach to estimate, evaluate, conserve and in general make environmental use sustainable. The most well known environmental services are water purification and carbon sequestration. However, there are knowledge gaps.

In the case of biodiversity, for example, evaluation has mostly been based on quantitative or qualitative studies of individuals and functional groups.

We suggest functional biodiversity as an indicator of the sustainability of land-use systems, as it is closely related to the variability, resilience and dynamics of ecosystems.

The application of the Criteria & Indicators (C&I) approach addresses this intention, operationalizing the functions involved in three main clusters: productive, ecological and operational through the definition of a sufficient number of indicators to represent the most relevant interactions. Such indicators are mainly process based and underline the impact of human intervention on ecosystems.

In this framework, the objective of this research is to assess the factors influencing the biophysical processes that determine the capabilities of agroforestry systems to maintain functional biodiversity, underlining the

importance of the management factor to make them more productive and sustainable.

The data collecting methods include: ecological field studies, interviews and secondary sources review; the units of analysis are agroforestry plots in small farmer properties; data processing is supported by multi-criteria protocols: work-shops at different levels of target groups and specialised software (CIMAT2.0); and statistical multivariate analysis: the protocols of cluster analysis and factor analysis, assisted by SPSS 11.5.

The results attend to the development of an assessment protocol of functional biodiversity in agroforestry systems and an interactive optimisation —support decision- model for farmers.

Keywords: Agroforestry Systems, Criteria & Indicators, Environmental Services, Functional Biodiversity, Multivariate analysis