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Approach for the Development of a GIS as a Tool for the Integrative Assessment of Natural Resources and Sustainable Rural Development in the Mata Atlântica, Brazil

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Abstract

The paper will report on the application of a GIS to integrate data and information generated within a wider interdisciplinary research project. In that context it is used for the assessment of an endangered natural ecosystem with the aim to offer policy makers and planners a tool to investigate the environmental impacts of interferences in the natural systems, like de- or afforestation or different agricultural practices, on regional as well as on local scale. The design of the GIS is oriented towards a follow-up application by the environmental manager of forest protection areas as well as for the coordination of agricultural extension service on federal state level.

The specific challenge for applying GIS lies in the integration of data in various spheres and levels to provide information for a range of decision fields. The agricultural sector and the natural resources form the core of competing spheres. Research focuses on two valuable natural assets: (1) Forest fragments with specific characteristics, depending on location, size, stage of succession, and — as a major factor for biodiversity preservation — their connectivity by corridors; (2) the water resources of the watershed. The previously mentioned decision fields can be subdivided into different management tasks on different levels. First the environmental protection strategy on the regional level or even the state level (e.g. the state of Rio de Janeiro) has to be mentioned, second the decision of management practices on the local level, and third the monitoring of the status within the protected areas. The different levels of decision making already described require different working scales.

The strength of the GIS is the possibility of displaying and analysing the spatial characteristics of a system. Furthermore GIS is an excellent tool to store additional attribute data (e.g. ecological, meteorological as well as socioeconomic) connected to spatial subdivisions. Within the interdisciplinary research framework, data requirements for pre- and post-processing for modelling purposes can be specified and the problem of processing data from different data sources has to be solved.

Keywords: Atlantic rainforest, endangered natural ecosystem, fragmentation, GIS, interdisciplinary modelling, monitoring, natural preservation, rural sustainable development