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

Landscape History and Degradation in the Serra Dos Órgãos, Brazil

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Abstract

The Serra dos Órgãos mountain range in the state of Rio de Janeiro retains Atlantic forest remnants of high importance for biodiversity conservation, water storage, soil erosion control, local climate stability, and leisure activities. Due to the proximity to Rio de Janeiro city, the human impact on forest remnants is notably high and not only limited to agriculture, but also to tourism, secondary residences, and road construction.

Against that background, the authors tried to find out how land use systems in different periods changed the land cover, affected deforestation rates, influenced landscape evolution, and finally led to the current landscape. Therefore, they analysed geomorphological processes and soil patterns and compared the findings with the local climate history as well as archaeological and historical data.

As a result, the Serra dos Órgãos can be divided into three main parts:

1. Foot hills and lower ranges have a long history of exploration: prehistoric and indigenous slash-and-burn agriculture, sugar cane plantations from the 16th century on, coffee cultivation in the 19th century and animal husbandry and tropical agriculture in the 20th century. These activities caused massive deforestation accompanied by soil erosion, hang slides and even local transitional climate changes. All forest fragments found here have a maximum age of 140 years.

2. The steep slopes are predominantly forested and under protection. Soil analyses and historical data show that the lower, accessible parts have been used for centuries. Relatively untouched forests with undisturbed soil profiles can only be found in the upper range.

3. The mountainous hinterland (800 - 1200 m.s.l.) is dominated by livestock farming and vegetable gardening. First European settlements date back to the late 18th century. Although anthropogenic influence is relatively young, forests are highly fragmented. However, soil degradation and erosion processes are considerably lower compared to the lowlands.

Apart from the spatial and temporal analysis, the work points out the interrelations between regional development, land use practices, deforestation and landscape degradation. The results are of considerable importance for further land use management.

Keywords: Atlantic forest, degradation, landscape history