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Latin America and Caribbean Regional Workshop

Promoting Best Practices for Conservation and Sustainable Use of Biodiversity of Global Significance in Arid and Semiarid Zones

Embrapa

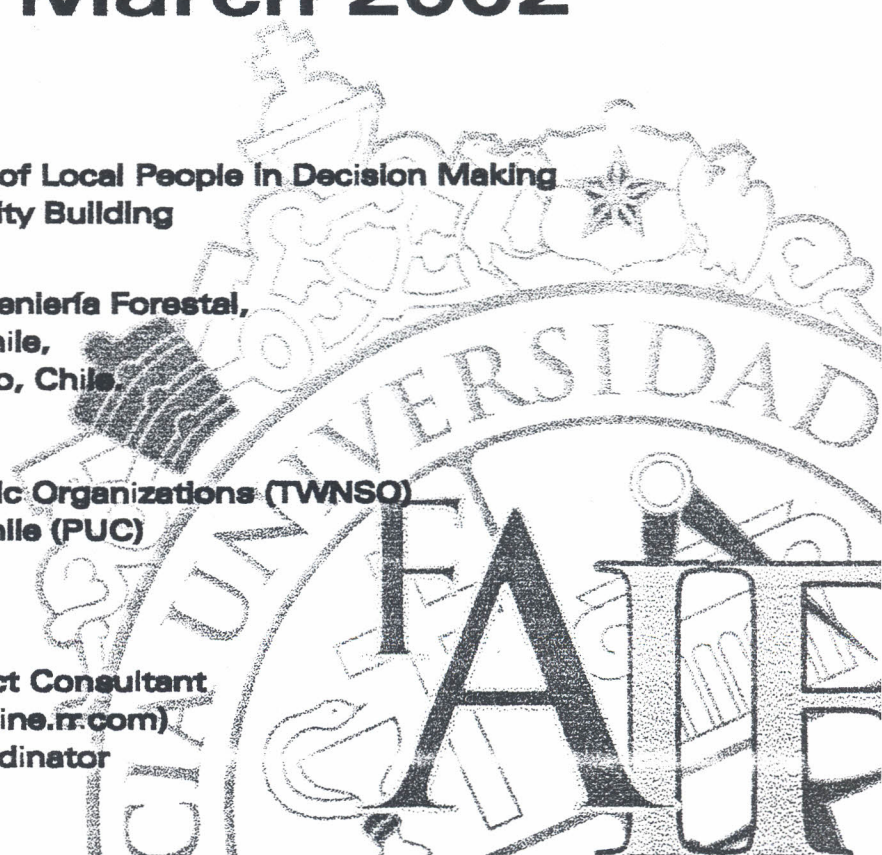# 18 - 22 March 2002

Lessons for Sciences
Lessons for Public Policy
Lessons for Increasing Participation of Local People in Decision Making
Lessons for Partnerships and Capacity Building

Held at Facultad de Agronomía e Ingeniería Forestal,
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MANAGING BIODIVERSITY FOR RECOVERING DEGRADED MINING AREA IN SEMIARID ZONE OF BRAZIL

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This study deals with the analysis of the process of natural regeneration of a degraded area by mining, and possibilities of choosing multipurpose species for recovering the area. The mine is located in the semi-arid zone of Northeastern Brazil and its main activity is the extraction and processing of copper ore, being estimated the exhaustion of the underground mine around 2006. The mine causes great environmental impacts in the land, affecting strongly the ecosystems where it is established. In the process of mining, the natural vegetation and the superficial layers of soil are removed to other areas where mine dumps and dust are disposed. The affected areas look like great lunar pit and the damages are visually on the topography, soil and water resources. Microbiology of the soil was also modified. To reduce the damage caused by the copper mining, Embrapa Semi-Árido was invited to assist the mining enterprise to analyze the natural vegetation nearby the mine and its regeneration, and to suggest suitable species for fodder to recover the degraded area. The work was divided in three phases. In the first phase, it was made a diagnostic of the area, comprising soil analysis, climate and vegetation characterization, local farming systems and commercialization. In the second phase, an experimental planting using appropriate technologies concerning selection of species for reforestation and recovery of degraded area was established. In the third phase, all the innovation technological alternatives for rehabilitation of the area were validated. The first step in the survey was to know the number, name and structure of all species that occur in the vegetation surrounding the mine, identifying the species in risk of disappearing with mining activities, and potential species for rehabilitation the degraded area, in a short time.

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The methodology used permitted to list all the plants found in the area and characterize the architecture of the vegetation. The structure of the present vegetation showed that the composition and distribution of trees and bush species are quite heterogeneous, containing species of generic distribution of the "caatinga" biome. 35 families, 60 genera and 85 species were found in total area of study. Main species found were analyzed with respect to vegetation regeneration and human action. The intensity of mixture of species found in the flora was obtained by the relationship between the number of species and the total individuals found per hectare. The horizontal structure analysis showed the sociological importance of each species in the community, calculated through the Abundance, Frequency, Dominance and Value Index of Importance of the species. The most important species were *Caesalpinia pyramidalis*, *Commiphora leptophloeos*, *Schinopiss brasiliensis*, *Mimosa arenosa* and *Jatropha* sp, classified by the Value Index of Importance. Most of the species found presented regular sociological position in the community without risk of disappearing. In the caatinga vegetation surrounding the mine, the survey showed a flora with about 902 plants per hectare, corresponding to 67 tree/brush species, 31 genera and 30 families. The area directly affected by mine activities presented 18 plants per hectare, corresponding to two species, two genera and two families. Two species found in this area (*Prosopis juliflora* and *Nicotiana glabra*) are exotics of the biome and the structural analysis showed high rate of Frequency, Abundance and Dominance of *Prosopis juliflora,* indicating the first evidence of invasion of this species in that area, which did not occur in the natural vegetation area. To recover the degraded area, small plantings with suitable selected fodder species for semi-arid area conditions were installed. Among the native and exotic species studied, the best results on behavior were observed on *Leucaena leucocephala* and *Prosopis juliflora*. Both species are exotic, and the second seemed to be an invasion problem on areas affected by mining. After analysis of the results obtained in the survey and species selection for recovering the area affected by mining, it was decided to plant fast growth fodder trees, no matter whether it is an exotic or native species. The main objective was the recovery of the soil with trees to assist the demands of the environment law. State and federal regulations require re-establishment of the

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disturbed lands with a wide variety of species. On the other hand, the local agricultural economy is livestock. In the vegetal community, all the species presented regular sociological position without risk of disappearing. Other native tree species, grasses and shrubs
will be tested on disturbed lands under different cropping systems. *Prosopis* will be monitored, observing the intensity and progress of the species in the regeneration under climate and soil conditions in the affected areas by mining and in the caatinga vegetation.