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## Conversion Process and Reforestation Practices of Coffee Plantations in Chiapas, Mexico

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### Abstract

The Soconusco is considered the heart of coffee production in Mexico and belongs to the Mesoamerican coffee belt. The coffee agro-ecosystems are undergoing a thorough transformation process, although insufficiently documented as yet. In this study, different aspects of a gradual conversion process from coffee to timber production were evaluated, with the aim to understand, how the agro-ecosystem coffee changes in horizontal and vertical structure, in terms of biomass components, and which ecological conditions are prevailing in this process. The field study was carried out between 2003 and 2005 in five different farms in the Soconusco, within which 17 experimental areas were identified in an altitudinal range from 400 to 1000 m asl and combined with different expositions to the sun. Dry biomass assessment was carried out in four different components: coffee plants, shade trees, timber trees as well as soil cover and litter (sub-divided into fine, coarse, monocotyledonae, dicotyledonae). After measuring height and basal area, biomass components were calculated for both timber trees and coffee plants, using allometric equations. Destructive sampling was used for shade trees, soil cover plants and litter. Plant species diversity was determined and the ten most important species for commercial timber production were identified (*Acrocarpus fraxinifolius*, *Cedrela odorata*, *Colubrina arborescens*, *Cordia alliodora*, *Melia azederach*, *Ocotea* spp., *Swietenia macrophylla*, *Tabebuia donnell smithii*, *Tabebuia rosea*, *Tectona grandis*). The coffee agroforestry systems have between 1279 and 3978 coffee plants ha<sup>-1</sup>. The study shows that total basal area and its partitioning among vegetation components is the mean issue in this conversion process. While timber trees grow, coffee biomass is not affected and shade tree biomass can be reduced. Also monocotyledonous and dicotyledonous biomass is being replaced by fine litter biomass while timber trees grow. The different variables were significantly influenced by timber tree age, altitude and exposition.

**Keywords:** Agroforestry, Chiapas, Coffee, Conversion, Mexico, Timber