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Assessment of Soil Microbial Activity Measurements to Distinguish Land Uses in Leyte, Philippines

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Abstract

Since the 1940s most native forests in the Philippines have been replaced by shifting cultivation, perennial crops and bushland or pasture areas. For Leyte island, as an example, coconut plantations today account for roughly 23 % and grassland for 12 % of the total land area, while old growth and residual forests cover about 11 %. According to other sources, primary forests have been reduced to 10 % of their original area from the 1950s to 1990s (Asio 1996). During the last decades, different reforestation systems have been implemented in Leyte to halt this tendency. In contrast to state-promoted projects focusing on fast-growing exotic trees, the so-called rainforestation system makes use of indigenous high-value timber species, mainly Dipterocarpaceae, planted in high density and diversity. The presented study aims at comparing soil characteristics of successful 'rainforestation' farms installed in the early 1990s to such under adjacent bushland and pasture areas. Considering the similar land-use history of the paired plots before the 1990s, it is assumed, that more than ten years of reforestation have contributed to present differences in soil characteristics. Sampling sites include volcanic as well as limestone areas and were first classified according to WRB (ISSS-ISRIC-FAO, 1998). For assessment, paired plots were then analysed with respect to pH, Corg and NT, available cations and phosphorus. For sampling, special attention was paid to small-scale variability of the plots. In order to compare biological parameters such as basal respiration, substrate-induced respiration and phosphatase activity, experiments with samples from all plots were carried out under controlled conditions in the laboratory. Litter decomposition was assessed on some of the plots.

Keywords: Agroforestry, land-use change, reforestation, soil microbial activity