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Multiple-Resource Inventory in Degraded *Acacia mangium* Stands as a Basis for Planning Forest Rehabilitation in Malaysia

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Abstract

From 1981 to 1992 the “Compensatory Forest Plantation Projects” were carried out in four states of Peninsular Malaysia. The objective was to supply the Malaysian timber industry with quality sawlogs once the resources from natural forests are becoming scarce. The projects were financed by the Malaysian government and through a loan of the Asian Development Bank. Throughout eleven years of reforestation about 50,200 ha of logged over natural forests have been replanted with fast growing pioneer species, mainly *Acacia mangium* WILLD. (over 90% of the area). The program was phased out in 1992 because results in terms of growth and quality have not been satisfactory.

Under the auspices of a Public-Private-Partnership, the Chair of World Forestry / University of Hamburg collaborates with a German company in Malaysia, in order to rehabilitate 4,700 ha of those degraded *Acacia mangium* stands on a 60 years concession basis. A first growing stock and site assessment was carried out with the objective of evaluating the stand and site quality 10 to 15 years after planting. Moreover, a decision was needed if the stands show potentials for further silvicultural activities through, e.g. enrichment planting or if they have to be replaced totally.

A post-inventory-stratification was carried out and subdivided the area into productive *Acacia mangium* stands (65 %) and unproductive semi-natural stands (35 %). With a growing stock of 175 m³/ha on the productive parts, 15 year old *Acacia* stands achieved a mean annual increment of 12.2 m³/ha·yr and thus remained far below the former expectations of approx. 20 m³/ha·yr. Furthermore only 20 % of the timber has the potential to be used as sawlogs due to severe heartrot. The site quality assessment provided a possible explanation for the low stand qualities: phosphorus levels were below limit of detection and very low values of exchangeable K, Mg, and Ca have been found. Only the C/N ratio of 7.3 was within a range suitable for plant growth. The rehabilitation of the stands is now carried out with an appropriate silvicultural concept combining natural regeneration and replanting with fast growing and natural forest species.

Keywords: *Acacia mangium*, inventory, Malaysia, plantation, reforestation