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**AN AGRO-ECONOMIC APPROACH
TO THE
OPTIMAL ALLOCATION OF LAND
TO
RUBBER, OIL PALM & COCOA**

A thesis presented in partial fulfillment of the requirements for
the degree of MAgSc in Agricultural Economics at Massey University.

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ABSTRACT

This study details the formulation of a dynamic mathematical programming model for obtaining optimal crop-soil allocation plans for perennial crops. The hypothetical model was built to complement soil survey studies in making land-use recommendations for Malaysian plantations.

The intertemporal linear programming model was constructed to solve the problem of allocating Rubber, Oil Palm and Cocoa to various soil types encountered in Malaysia over a three year land allocation period in such a manner so as to maximize the present value of annual after-tax net income over the crops optimal rotation age.

The framework also treats alternative goals by requiring basic consumption needs be met, and permits borrowings (upto a prespecified limit) and lendings to cover annual negative and positive annual cash balances respectively.

Data input-output coefficients used in model formulation reflect the agro-economic environment in which Malaysian plantations today operate. However, commodity prices forecasted by the FAO for the commodities concerned were used in the valuation of planted assets beyond the three year land allocation model horizon.

The results obtained on computation provide detailed planting plans with respect to the amount of a particular soil type that should be allocated to a crop and the year in which the planting(s) should be carried out. In addition, the amount of labour, fertilizer and capital goods required in any of the three years within the horizon is generated, as is the amount of crop produced and sold. Also, annual income and expenses are automatically allocated to the various tax-brackets in such a manner as to minimize cash lost through taxation.

By making multiple optimization runs, the sensitivity of the optimal plan to changes in the various parameters was also examined.

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**An Agro-Economic Approach to the Optimal Allocation of Land
to Rubber, Oil Palm & Cocoa.**

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