

**Universiti Teknologi MARA**

**Nutrient Management for Rubber  
Plantation Using Goal Programming**

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## **STUDENT'S DECLARATION**

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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## ABSTRACT

Rubber plantation in Malaysia is currently not limited to household consumption, but it can be directly involved in the export and import activities. As we know, plantation of rubber in the Farming Unit of UiTM Perlis has a great potential to grow as it has a high market value. Every year, the Farming Unit staff will fertilize the rubber tree 2 times. If they are using incomplete fertilizers, they cannot estimate the exact weight of fertilizers used. This problem gives a big impact to the Farming Unit of UiTM Perlis as the budget allocated is very limited. The main objective of the study is to minimize the cost of chemical fertilizers used to plant rubber. Besides, the sub-objectives are to determine the best combination of weight for fertilizers used on a rubber tree and to calculate the mass per hectare of Nitrogen, Phosphorus, and Potassium needed for the rubber tree. The goal programming approach has been used to reduce the total cost of chemical fertilizers of rubber plantation. In the model formulation, there are seven types of decision variables which represent seven types of chemical fertilizers and three constraints, which are the cost of chemical fertilizers and the requirement of the upper and lower limits of nutrients in the chemical fertilizers. The findings of the study have shown that the cost has been reduced by RM 227.11 which from RM 1,514.00 to RM 1,286.89. The types of fertilizers that would minimize the total cost of rubber plantation are Urea, Muriate of Potash (MOP), and Triple Super Phosphate (TSP) while the mass per hectare of NPK applied was 150 kg/ha of Nitrogen, 110 kg/ha of Phosphorus, and 90 kg/ha of Potassium. Results of the model indicated that this method is able to meet all the goals expected. In conclusion, this study shows that goal programming is an effective technique to deal with nutrient management problem.

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