MODELING LAND SUITABILITY FOR EXPANSION OF RUBBER CULTIVATION IN MONARAGALA DISTRICT: A GIS APPROACH

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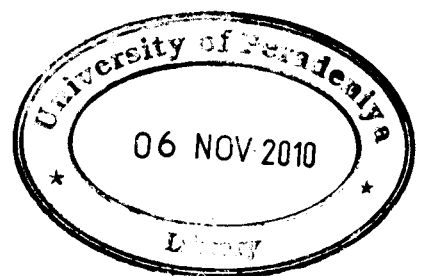
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ABSTRACT

Sri Lanka is a country whose economy is predominantly based on agriculture. Plantation agriculture was initiated in Sri Lanka after the country came under the British dominance in the early 18th century. Those crops introduced during British rule serve as the major source of income to the country even today. These plantation crops together with other agricultural crops contribute 17% to Gross Domestic Product. Rubber is one of the major plantation crop grown in Sri Lanka, which generates foreign earnings to country. This report mainly focuses on the rubber plantation sector of Sri Lanka with special consideration given to the new government policy of expanding rubber to non - traditional areas. Under this new policy, rubber cultivation is expanding to drier climatic regions such as Monaragala, Ampara, Badulla and Hambantota districts.

The objectives of this study are, to assess spatial and temporal variation of the rainfall and temperature within Monaragala District, to assess the land suitability with respect to slope and altitude, to develop land suitability map for rubber grown in Monaragala District, to identify potential land uses to expand rubber in the Monaragala District and finally to identify agronomic changes to be implemented to sustain rubber grown in Monaragala District using GIS.

The data for the study were gathered from Survey Department of Sri Lanka, Monaragala Regional Land Use Division, Natural Resource Management Centre, Department of Agriculture and Department of Meteorology Sri Lanka. Preparation of maps and analysis of spatial data were performed using ARC GIS 9.2 (Arc/Info) version. Non-spatial data

were tabulated in Microsoft Excel and linked to GIS. In order to produce the thematic maps of the rainfall and temperature, point interpolation was carried out using IDW method. Topographic factors such as slope and elevation were analyzed with respect to their suitability for successful growth of rubber. Finally, weighted overlay modeling was performed to develop the land suitability map and to identify potential areas to expand rubber cultivation in the Moneragala District.

Results revealed that 6 months consecutive rainfall less than 500 mm adversely affect the growth of rubber plant. It is proven that July to December, August to January, September to February, October to March and November to April recorded more than 500 mm of rainfall over six consecutive months for all parts of Monaragala District. In case of suitability analysis, Bibile, Medagama, Madulla and Badalkumbura Divisional Secretariat Divisions consisted of highest extent of land under most suitable category.

The conclusions and a set of recommendations derived from this study offer direct guidelines in the process of expansion of rubber cultivation within the Monaragala District. The same methodology could be employed elsewhere for the planning and development of suitability assessment studies related to rubber grown in Sri Lanka

,**Key words** – Rubber, Suitability Modeling, Weighted Overlay Analysis