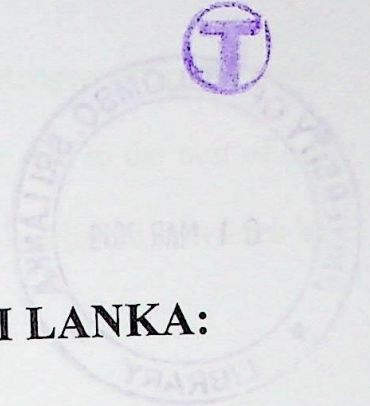
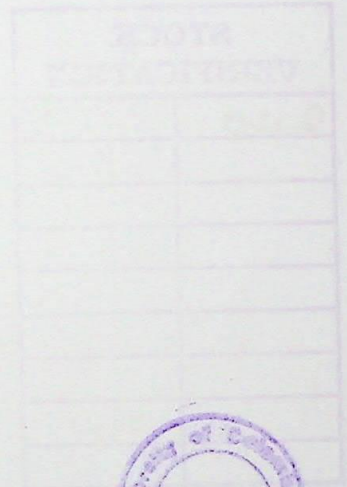


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**RUBBER SMALLHOLDINGS IN SRI LANKA:
OPPORTUNITIES AND CHALLENGES**



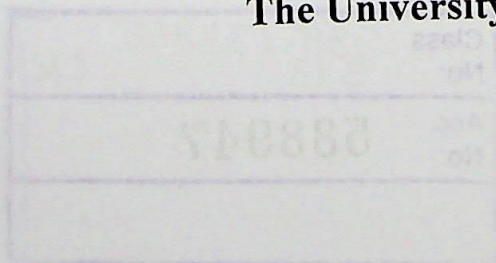
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ABSTRACT

The rubber industry plays a vital role in Sri Lanka's economic growth contributing towards the country's Gross Domestic Production, Balance of Payments, export earnings, generating employment directly and indirectly and creating sustenance in a high manner from production to cater to the domestic industry and export to global markets leading the economy into an overall development effort. Since rubber is one of the major plantation crops in Sri Lanka when coping up with the high local and international demand it is vital to increase the supply to achieve the national production targets.

Land fragmentation is visible in Sri Lanka due to various reasons. Ownership structures were changed when plantation economies passed from colonial status to independence, but the rubber industry in Sri Lanka underwent a major transformation after the land reform acts in 1972 and 1975 with respect to ownership and pattern of holding. As a consequence smallholders emerged as a strong sector in the industry, having the largest extent and production being major contributors to the industry. Decisions taken against rubber cultivation during uncertain situations have created non-reversible conditions in the past. The major focus of the industry is to make use of the opportunities, increase efficiency and to overcome the challenges faced by the industry. Thus this study is carried out to derive and discuss the opportunities and challenges in the sector in order to enlighten policies to increase far-reaching social and economic growth potential. This study is motivated by the need to understand the viability of smallholder-led agricultural growth in the context of fragmentation of rubber lands and increasing efficiency while probing into its nature, causes, magnitude, impact, implications and possible solutions.

The prime objective of this research is to examine the opportunities and challenges of the rubber smallholdings in Sri Lanka, specifically to identify the relationship between farm size and efficiency, to identify the contributing factors for the formation and existence of smallholders, to find out the challenges faced by the smallholders, to elucidate the advantages of rubber rubber smallholdings and to examine the sustainability of rubber smallholdings in Sri Lanka.

Primary and secondary sources are used to extract data for the study from smallholders and industry experts. An extensive field survey is carried out following a scientific sampling technique aiming at achieving research objectives. Data obtained from a sample of 550 smallholders from the 3 main rubber growing districts namely Kalutara, Kegalle and Ratnapura is used for analytical purposes.

A mixed analytical method combining qualitative and quantitative data with a descriptive and econometric approach is used to analyze the key factors of the research employing econometric and statistical packages such as GIS and general purpose software Stata 13.0 for frontier analysis, Genstat 18th edition, SPSS 20.0, MS Excel and Arc GIS 10.3.

A stratified random sampling technique is employed to subdivide smallholdings into four size from 1 to 4 hectare categories. A well-structured questionnaire is developed after an intensive review of literature and practical experience. A Participatory Rural Appraisal was conducted concentrated on smallholder constraints.

The mean and farm specific technical efficiencies of smallholdings were estimated using the stochastic frontier model. The mean technical efficiency of rubber smallholders was 81 percent indicating that 19 percent of efficiency could be further achieved. The overall picture emerging from the study is that smallholders are efficient.

The results of the econometric model which used the multiple regression function used to estimate the production function suggest a significant and positive relationship of land area, labour and number of tappable trees with dry rubber production. Fertilizer and chemical inputs used as dummy variables were not statistically significant yet the negative relationship reveals that if chemicals are not applied the efficiency tends to decrease. The production function is close to constant return to scale.

Findings further indicate the dominant contribution of the existence of substantial inefficiencies of production. The significant factors influencing efficiency are land area which is negatively significant with efficiency which means increasing the land size decreases the efficiency. The subdivision of land into one-two hectares of rubber lands will not lead to a loss of inefficiency. Education has a positive significant relationship with efficiency which means educated farmers are more efficient.

Management and harvesting labour though not significant denotes a negative relationship on inefficiency which means that the owner managed holdings are more efficient than hired supervision and that family labour is more efficient than hired labour. The cost of production is low in owner managed holdings and use of family labour. Family labour helps to generate income even during low income stages to decrease labour costs to validate cost of production.

A non-parametric Friedman Test is employed to analyze the major constraints of the smallholders using preference ranking. The results indicate that the main constraint in all 3 districts selected for the study is low prices for rubber. The next important constraint in Kalutara and Kegalle districts are bad weather which affects production while in Ratnapura labour scarcity is considered as the next important constraint. In Kalutara and Kegalle districts the third important constraint is the high cost of

production and in Ratnapura it is bad weather conditions. The least important constraint faced by all three districts is the poor advisory services for farming operations.

A Spatial analysis is done using GIS mapping system in this study identifying the different categories of efficiency linked to different D.S. Divisions in the three selected areas in the study which would benefit the policy makers to receive information on the relationships in different areas and take measures to increase the efficiency level linking the application of managing the geographical information in a database.

The present study also focuses on recent insights relating to factors affecting the rubber cultivation by a descriptive analysis. It reveals the factors affecting smallholder cultivation and is aimed at assessing the variables related to the study and associated effects on efficiency. The variables are analyzed and explained in the forms of demographic aspect which is assessed by age, gender and education, the socio economic factors by income, credit, uncertainties, integrated and intercropping systems, attitudes and family status, the physical dimensions by size, distance, land ownership and management, technological innovations by training, advisory and awareness, production inputs by tappable trees, age and clone of trees, labour, tapping techniques, frequencies and diseases, cost of production by tapping, rolling, drying, coagulating, fertilizing and weeding costs,

From a sustainable livelihood perspective, there is potential to improve the socio economic condition of the rubber smallholders. This study will provide a rationale to design policy measures to promote efficient use of resources in the rubber smallholding sector.