

## **Variability of Technical Efficiency in High Grown Tea Estates – A Bayesian Approach**

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This study was carried out to identify the technical efficiency levels of the high grown tea estates in Sri Lanka. Data were collected from tea estates in the Nanuoya region in Dimbula planting District covering seven tea estates. Monthly data on green leaf production, revenue extent of the estate, labour costs, agrochemical costs, and fertilizer costs were extracted from monthly accounts and progress reports from the year 2005 to 2018 to form a panel data set. To estimate efficiency, stochastic frontier production functions of Cobb Douglas and Translog forms employed. Two distributional assumptions were made on the distribution of the firm specific inefficiency term as exponential and half-normal. Econometric estimation used a Bayesian framework with a non-informative Jeffrey's before estimate the posterior distribution. Results indicated that the Cobb-Douglas stochastic frontier with an exponentially distributed inefficiency term with random effect was the best fit. Technical efficiency was estimated for each tea estate assuming the time variation of efficiency cannot be seen in the sample estates. Results further indicated that there is a positive and significant impact on the monthly green leaf production by the revenue extent, labour, agrochemical, and fertilizer costs. The average technical efficiency level estimated was 86.9% and the minimum level is 66.2%. This shows that on average, in the high grown tea estates, a 13.1% increase in the production can be obtained without increasing the cost of production. Further, the highest impact on the green leaf production comes from the extent and therefore, estates should consider utilizing the abandoned tea lands to increase the production. Besides, it is prudent for the estates to look into the reasons for inefficiency and correct them so that they can increase their profitability in these hard times that most estates are running at a loss.

*Keywords:* Bayesian analysis, Stochastic frontier analysis, Tea estates, Technical efficiency

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