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ASSESSMENT OF TRADE-OFF AMONG BIOMASS ENERGY OPTIONS IN THE TEA MANUFACTURING SECTOR USING CHOICE MODELLING

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Renewable energy receives special attention in energy policy fora mainly due to climate change concerns coupled with escalating fossil fuel prices. However, non conventional renewable energy still accounts for a small fraction of the national requirement which needs to grow and reform to meet these targets. The industrial sector accounts for 24 % of the total energy demand in the country. The tea processing which is the largest agro-manufacturing sector in Sri Lanka uses biomass as the main source of renewable energy which also needs to modify due to the changes in availability, prices and perceptions.

This study was aimed at identifying the trade-offs among different attributes/levels of renewable energy sources in tea manufacturing while estimating the marginal willingness to pay for different aspects of renewable energy, based on a discrete choice modelling approach. Appropriate attributes and levels were identified through a focus group discussion and a key informant survey. Four attributes (type of biomass, level of technology, source and price) with three levels each were selected for the study. A 3⁴ experimental design was developed and then choice sets were derived via a fractional factorial design. These choice sets were included into a questionnaire and this was administered with a stratified random sample of 60 tea factory managers. A multinomial logit model was fitted to estimate part-worth utilities and marginal willingness to pay.

The analysis revealed that the choice of a particular renewable energy mainly depended on the type of biomass, price of biomass, technology used for energy generation and source of biomass. The tea factory managers were reluctant to pay higher prices for municipal and industrial waste, and firewood. The industry is willing to use gasifiers for thermal purposes. Moreover, the industry preferred to pay a higher value to purchase biomass from within the plantation and vicinity. It was found that the tea industry is more willing to move towards renewable energy but it depends on advances in technology and availability of source material.