

SUGARCANE TRANSPORTATION MANAGEMENT IN NORTHEAST THAILAND USING MULTI-OBJECTIVES DECISION ANALYSIS

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Abstract: The sugarcane transportation management in the Northeast region of Thailand has been recently relied mainly on unsystematic decisions and no environmental impact considered. This can lead to low efficiency and great loss in transportation cost (TC) as well as opportunity to deteriorate the environment. Environmental impact (EI) issue of the study includes transportation routes passing through communities, industrial standard certifications of factories, and the productivity of the factories. Therefore, the objective of the study aims at applying Multi-Objectives Decision Analysis (MODA) to performing transportation management of sugarcane produced in the region. The sugarcane areas distribute in 228 out of 321 districts. There are 16 sugar factories to serve the region out of total 47 nationwide. The Network Analysis (NA) is performed for selecting the shortest routes with EI considerations from the origins to factories. The optimization of the MODA through the Linear Programming (LP) is minimization of TC and EI by proper allotting sugarcane from plots to certain sets of factories. To deal with the very big number of plots in the region, the methodology comprises 2 steps. The first step considers the whole region in district level to allot the sugarcane transportation from each district to all factories in the region. The results provide to which factory(s) and how much the sugarcane from the each district should be allotted so as to meet multi-objectives function requirement. The second step considers the sugarcane allotments and transportation routes from plots in each district to a factory or a set of factories. This step uses factory allotments from the first step result as input. The results provide to which factory(s) and how much sugarcane from each plot should be allotted. This study is fruitfully successful in providing proper methods and techniques for transportation management in terms of minimizing TC and EI objectives when has to deal with huge amount of plots in the region. The optimized transportation patterns resulted from using these techniques provide the better result compared to any non-systematic methods.

Keyword: Sugarcane transportation, Network Analysis, Linear Programming, Multi-Objectives Decision Analysis (MODA), Environmental impact