Green Point-to-Point Logistics at Kalasin: A Case Study of Rice Transportation

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Abstract. Kalasin, a rice city, is in the center of the Northeast. With access to irrigation system throughout the year from Lam Pao Dam, it accounts for more than half of Thailand's rice plantation. However, its population is among the poorest in the country. Rice distribution is one important activity affecting the supply chain cost and the atmospheric emissions. Generally, the transportation decision is based on the experience of the truck drivers. Owing to high fuel expense and environmental awareness, the case study local rice mill desires to increase its transport efficiency. Hence, this study aims to adopt green logistics practices in the planning of delivery route that helps reduce transportation cost and allow for the environment. A case analysis of rice transportation between Kalasin local mill and six main retailers was done in comparison to the current practice by means of two-steps problem solving. Following the mathematical model, routing problem is solved using excel solver considering truck capacity and customer demand. Afterwards, scheduling problem is solved using excel spreadsheet concerning truck load and distance between points. When transport routes were determined, mill can reduce fuel costs by 10.54% per delivery cycle, equivalent to a savings of 53,107 baht per year. And when the schedule of delivery was established, mill can reduce greenhouse gas emissions by 24.77% per cycle, equivalent to an emission of 15,307 kgCO2e per year. Indication of the benefit of green practices in logistics management is shown by the reduction of distance and pollution. Identification of a need to consider quantity of load between points on a trip when environmental impacts are to be measured and lowered. In road transport, routes determination towards minimum total cost, delivery scheduling towards emissions mitigation, and applications of IT are the driving forces and image development for the province to compete.

Keywords: Rice, Green Supply Chain, Green Logistics, Kalasin, Transportation