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## Agricultural Logistics, Supply Chain, and Machinery Management

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**Increased international competitiveness and lower commodity prices in recent decades have led to agricultural industries exploring logistics, supply chain, and farm machinery management opportunities to increase profitability and sustainability.**

### Agricultural Logistics and Supply Chain Management

#### *Achievements in Cost Reduction and Efficient Operation of the Thai Sugarcane Supply Chain*

The sugarcane harvesting and transportation in Thailand is a huge logistical operation in which the amount of 47 to 64 million ton of sugarcane must be cut and transported every year. This operation requires thousands of workers, dozens of cutting machines, numerous numbers of tractors, trucks and trailers all over the country. Particularly, the cost of harvesting and transportation occupies nearly half of total production cost. This high cost is one of the reasons for the reduction in the total amount of Thailand's sugarcane cultivation. Accordingly, we conducted the research attempted to reduce the cost of the Thai sugarcane harvesting and transportation. More effective cost reduction in the Thai sugarcane supply is needed in order to maintain its current status in a rigorously competitive international sugar market.

Our study found that cost reduction and efficient operation in mechanical sugarcane harvesting and transportation in Thailand could be achieved by applying multi-objective optimizations via truck allocation planning. The percentage of reduction in operating cost was in the range of 4 to 9%. The percentage of decrease in the number of working days per unit area was in the range of 4 to 43%.



### Agricultural Machinery Management

In Thailand, working of farm machinery has low capability because the machinery usually has to work in small field which is the local constraint of Thai agriculture. Also, number of mechanized resources is limited because the cost of farm machinery is quite expensive. It is difficult for Thai farmers to purchase and own their farm machinery, since most of them usually are in debt. Then, how to best utilize existing farm machinery is necessary for them.

Accordingly, my another interesting research focuses on a research related to farm machinery management. This is promising to compensate for the local constraint of Thai cultivation. We are approaching to understanding the appropriate managing model to enhance a full utilization of farm machinery in Thailand. This is expected to increase field efficiency of farm machinery and Thai farmers' profits and consequently raise the living status of Thai farmers.

#### Publication

- Kaewtrakulpong, K.**, Takigawa, T., Koike, M., Hasegawa, H., Bahalayodhin, B., 2008. Truck Allocation Planning for Cost Reduction of Mechanical Sugarcane Harvesting in Thailand: An Application of Multi-objective Optimization. *Journal of the Japanese Society of Agricultural Machinery*, 70(2), 62-71.
- Kaewtrakulpong, K.**, Takigawa, T., Koike, M., Hasegawa, H., Bahalayodhin, B., 2008. Mechanization for the Improvement of the Sugarcane Harvesting and Transportation System in Thailand: A Case Study in Udon Thani Province. *Journal of the Japanese Society of Agricultural Machinery*, 70(2), 51-61.