Yokdao Sanprasert 2015: Design of Mathematical Algorithms to Locate Bioenergy Plant to Supply Biomass in Thailand. Master of Science (Agricultural Systems Technology), Major Field: Agricultural Systems Technology, Department of Farm Mechanics. Thesis Advisor: Assistant Professor Kriengkri Kaewtrakulpong, Ph.D. 73 pages.

This study was done in the order to discover and evaluate the factors affecting site selection of bioenergy plant in Thailand. The factors associated with source and amount of field-based residues biomass, fast growing tree biomass and energy crop biomass were gathered. The study found that there were 19 factors involved. The factors were screened by using questionnaires and interviews with the experts and all stakeholders in the supply chain: farmers; entrepreneur; local people. Then, four factors composed of continuity biomass supply, biomass cost, logistic cost and land price cost were obtained. Also Analytical Hierarchy Process (AHP) was implemented in order to evaluate and prioritize such factors.

The algorithms to find out the optimum location of bioenergy plant to supply biomass in Thailand was designed. Its objective function was to minimize biomass cost, logistic cost and land price cost. By implementing the weights of each selected factors analyzed by AHP, the optimum location of bioenergy plant to supply biomass in Thailand was obtained. This algorithms could be used as a decision support tool for investors and all stakeholders in the supply chain.

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