

Napapron Thanakamonpradit 2012: An Analysis of Return on Investment in Cassava Chip Production Business Using a Mixed Integer Linear Program. Master of Science (Agro-Industry Technology Management), Major Field: Agro-Industry Technology Management, Department of Agro-Industry Technology. Thesis Advisor: Assistant Professor Parthana Parthanadee, Ph.D. 129 pages.

This research studied an analysis of return on investment in cassava chip production business by applying a mixed integer linear programming theory. A mathematical model was constructed to analyze returns on investment based on Net Present Values (NPV) of the profits gained from business operations after income tax deduction under project duration of 5 years. Three locations for building a cassava-chip drying facility were considered, including Amphoe Bamnet Narong, Chaiyaphum; Amphoe Thep Sathit, Chaiyaphum; and Amphoe Sikhio, Nakhon Ratchasima. The most appropriate location was selected based on the maximum return on investment found from the proposed model. The constraints in this model included the production capacity of the chip drying facility, the fresh root procurement capability in each location, the conversion rate from fresh roots to chips, the truck capacity and number of product delivery trips, the weight loss of products in the warehouse and the maximum age of products in stock. Then, the model was solved using GAMS 22.5 and the result revealed that the most appropriate location for investment was the location in Sikhio, Nakhon Ratchasima because it yielded the highest NPV (35.84 million baht) with an internal rate of return (IRR) of 58.83% and a discounted payback period of 1.4 years (17 months). From the sensitivity analysis study, it was found that the NPV was most sensitive to the change in the cassava chip price and the fresh cassava root price at 30% starch. Every 1% increase in the chip price would result in 3.59 - 3.64 million baht increase in the NPV. Every 1% increase in the fresh root price would result in 3.16 - 3.21 million baht decrease in the NPV. The business would be worth investing, if the cassava chip price decreases no more than 9% - 10% from the base case, and the fresh root price increases no more than 11% - 12% from the base case. The NPV was also somewhat sensitive to the procurement capability of the fresh roots. Every 1% change in the amount of fresh roots purchased would result in 0.51 - 0.54 million baht change in the NPV. The diesel price has a little affect to the NPV because it was not a major cost of this business. When both the fresh root price and chip price changed at the same time, the projects would have longer payback periods and higher risks. Every 1% change in the chip price and the fresh root price would result in 0.68 million baht change in the NPV.

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Thesis Advisor's signature