Modelling the Allocation of Cavendish Bananas into Enterprises of Small-scale Farmers

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Abstract

Changes that occurred in the agriculture food system pose challenges to small-scale Cavendish banana farmers in terms of their vulnerability and ability to survive. The current challenges can be addressed by increasing the opportunities available to small-scale farmers in order to increase their profits. The current system of the farmers is to allocate their entire land into either the contractual market or the spot market. Although these farmers can also venture into processing raw bananas into an alternative product such as banana flour, the participation of farmers to embark on such enterprise is minimal. Hence, we formulated mathematical models to explore via model simulation how a farmer's profit varies with different proportions of harvested bananas to be allocated simultaneously into three enterprises, namely, the contractual market, the spot market, and the banana flour market. Varying selling rates were also investigated to see the profitability potential of each enterprise. Our findings showed that (1) it is best to allocate >75% of the harvested bananas in the contractual market when it has 100% selling rate while the other enterprises have ≤10% selling rates; (2) the farmer can gain the highest profit when the selling rate of the spot market is high; and (3) even without allocation to the spot market, the food-grade banana flour market has a potential role in increasing the profit of the farmer by ≥6% for every 10% increase in its allocation. Insights from different model scenarios will aid farmers in making decisions on where to allocate harvested bananas under uncertain selling rates.