Breakeven Point and Returns for Suitable Investment of Gross Michel Banana Plantation in Thailand

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Abstract

The objectives of research was (1) to examine and analyze the production and marketing of Gross Michel bananas which are currently in operation (2) to test the prototype production process and returns that have a suitable development to be discovered through the production units (farm example).

Population in this study was 120 famers in district of Thayand and Banlad. A prototype of production and marketing bananas was surveyed and explored and then selected agriculturists a master 1experiment pilot. The area of 800 square meters was used with 100 of banana trees in testing. The total fixed cost consists of attractor rental (41.29%), land rental (23.73%, depreciation of equipment and banana root seed (14.23%) depreciation of equipment (08.85%) respectively, while the variable cost is high in labour (50.16%), fertilizer (28.46%), electricity bill (12.53%) and fuel of banana trees are used in the pilot. Then economic analysis of breakeven point was experimental to determine optimal production for farmers.

The research found that the prototype of production was optimal Quantity at breakeven point Q= 469.80 kg. which is the best alternative, following Q = 502.24 kg. and Q =431.32 kg. respectively. The minimum alternative is 502.24 kg, and the best alternative is Q= 431.32 kg. The basic requirement of small farm is Q =469.80 kg. The results indicated that improving the soil condition, organic fertilizer, and the sale of products through the Agricultural Cooperative will be role model to get an excellent result.

Key words:Gross Michel, Breakeven Point,Suitable Investment

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Introduction

Gross Michelwhich is called Kluaihomthong in Thai, is one of important crops for both nutrient utilization and commercial purpose. Bananas also play an important role as a food source of the population, especially in rural area. Land utilization, in Thailand under banana cultivation is about 475,455 milloin Rai of with quantity of 1,031,118 tons. Most banana production are Kluai Namwa(ABB) , Kluai Khai(AA) and Kluai Hom(AAA).It is mostly used for domestic consumption and has a potential for export markets, especially in Japan and China where there is a high demand. Although banana production in Thailand is not good enough

for banana export leading to world market, but it is the third largest banana producer in Asia. Various bananas and plantation cultivars are widely cultivated throughout the country for making food and desert

In Thailand, There are two types of Kluai Hom which produced and consumed are Carvendish banana (Hom Kheio) and Gross michel banana (Hom Thong). The latter is produced more than the former. The products are mostly sold to convenience stores. Hence, Hom thong is a potential food source for cultivators, and also an economically important crop in Thailand. Banana production in Phetchaburi and Chumphon province are mostly exported. Phetchaburi province is area where Gross Michel banana is cultivated mostly with 10630 Rai and products of 32883.76 tones, following Chumpon, Saraburi and Pathumtani(Warin Ngamkaroon, 2015).

The export market-oriented economy of Kluaihomthong in Thayang and Banlad in Thailand begins form Phetchaburi province which started in the year 2535 and 2542 respectively with the operation of the Thayang and Banlad Agricultural Cooperative Limited which began a campaign to connect Homgthong bananas with the Consumer Cooperatives of Japan. In term of agricultural contract farming. Nowadays, both Banlad and Thayang Agricultural Coorative in Phetchaburi, Thailand made an agreement with Consumer Cooperative in Japan for production to export. They demand Kluai Homthong 8,000 tones per week due to banana from Thailand having good quality. Whereas Thailand can produce Homthong only 1,000 tones or valued of 16,000,000 Baht (457,142 USD) per week. At present, Kluai Hom is promoted by Thai Government to export market especially Chaina and Japan. So Kluai Homthong is industrial cash crop in Thailand.

Any problems in production and market efficiency lead to serious problems in Kluaihomtnog farming which results in high input and low output prices. Similarly, the Homthomg Banana growers get the cultivation area increased as it makes money but the expense ratios that occur in the cropping has a higher cost rate. Most of the farmers are not able to estimate the likely expenses, or the cost to cultivate the Kluaihomthong. Therefore, they do not receive the remuneration that they should. Often, most growers do not know the breakeven point or optimal production for precise costs. Moreover, farmers are having a small farm for banana cultivation about 1- 5 Rai. If growers can estimate the expenses and yield of the cultivation, they also examine production costs and develop the market system and can get the maximum yield. The question is how do bananas' growers gain knowledge about the optimal production of Kluaihomthong. Therefore, it is necessary to test the prototype production process and returns that have a suitable production (optimal) to be discovered through the production units in order to investigate the optimal model of Kluaihomthong for growers in the initial production cycle in Thailand.

Research Objectives

1. to examine and analyze the production and marketing of Homthong bananas which are currently in operation
2. to test the prototype production process and returns that have a suitable development to be discovered through the production units (farm example)..

Research Methodology

Areas of study and Population

The areas of cultivation selected were as follows; The District of Banlad and Thayang, Phetchaburi with a cultivated area of 297.20 Rai, which is an important production area for Kluaihomthomg in Phetchaburi province.

In this study, the test group was farmers who grow Kluaihomthong, to trade in Amphoe Bandlad and Thayang, Phetchaburi which included a total of 120 farmers, After that, the production and marketing of Homthong bananas which were currently in operation of those farmers was examined and analyzed for

seeking the suitable production at farm level. The exampled farmer selected to test for optimal and suitable as used a purposive sampling under the condition that the farmers had planted bananas for more than 10 years and there was a continuous production with bananas sold though Agricultural Cooperative. Tools used in this research were agricultural instruments for banana production and observations of planting by farmers in the area of study.

Source of Materials

This is a semi-experimental research. In view of the above, farmers in Amphoe Banlad were selected as the cultivators of the study. The materials for study was consisted of Root seed (200 trees), 150 kg. of fertilizer, electricity, 200 square meters of land , 200 of Plastic bag, four of labor etc. The materials was to be collected and utilized by the researcher though field investigation of the period of study 9 months in the selected farm. The structure schedule for estimating the expense and returns in this study sought information on production cost, marketing cost and selling price at market price in the year of study.

Analytical Method

As well-known as this research is semi-experimental study. The preliminary data of the respondents were analyzed using the terms of engineering and the term of money for forecast the optimal or suitable level for the objectives 2. An analysis of optimal of investment using break even concept from the following equation;

$TC=TR$
$TR=PxQ$
$TC=TFC+TVC$

Whereas
TC=Total cost
TR=Total revenue
TFC=Total fixed cost
TVC=Total variable cost
P=Product price
Q=Product volume

Findings and Discussions:

The results of the investigation reveal that Kluaihomthong production in the study farm used fixed- cost and variable cost in the production. Moreover, fixed-cost consists of land and tractor rental, banana root seed, banana crutches and depreciation of equipment in water pump, shoulder lawn mower, hoe, spade, water pipe, artesian well and halberd. For variable cost, it comprises of electricity bill, chemical fertilizer, organic fertilizer, manure, fuel and labor used in dig a hole, cultivating, cut grass in the farm, pruning, fertilizer, watering, and straw rope. All of those costs were found as follow:

In the table 1, it can be observed that the production cost of fixed cost is higher in tractor rental (41.29%), land rental (23.73%, depreciation of equipment and banana root seed(14.23%) depreciation of equipment (08.85%) respectively, while the variable cost is high in labor (50.16%), chemical fertilizer (28.46%), electricity bill (12.53%) and fuel (01.38%) respectively. The total cost per planted area used in banana production for this experiment was 4,214.00 baht and 7027.00 baht in total fixed cost and variable cost respectively, which shown in the below table 1.

According to the field study, there are two categories of trader in Homthong market. They are, Banlad and Thayang Agricultural Cooperative and local merchants. The analysis focused on price of Agricultural Cooperative because of them buying banana all round year at the constant price which differs from buying price of local merchants which fluctuated every month. The price of bananas at the time of study was 16.00 Baht per kilogram without the marketing cost.

Table 1 shows the materials and production cost applied for test in banana Plantation

Fixed cost			
item	Amount used	Value (Baht)	Percentage
Land rental	800 square meters	1,000.00	23.73
Tractor rental	2.9 hour	1,740.00	41.29
Banana root seed	100 tree	600.00	14.23
Banana crutches	100 pillar	500.00	01.86
Depreciation equipment		374.00	08.85
Total		4,214.00	100.00
Variable cost			
Item	Amount used	Value(Baht)	Percentage
Electricity bill	251.42 unit	880.00	12.53
Chemical fertilizer	100 kg.	2,000.00	28.46
Organic fertilizer	60 kg.	420.00	05.97
Manure	45 kg.	60.00	00.85
Fuel	3.23kl.	97.00	01.38
labor	Man/hour/times	3,525.00	50.16 (100.00)
-dig land/cultivation	1/3/1	(150.00)	(04.25)
-cut grass	1/1.5/18	(1,350.00)	(38.30)
-pruning	1/1.5/9	(675.00)	(19.15)
-fertilizer/watering	1/1.5/18	(1,350.00)	(38.30)
Plastic rope	2 roll	45.00	00.96
total		7,027.00	100.00

From table 1, it shows the production cost was total fixed cost was 4,214.00 baht and 7,027.00 baht for variable costs. Hence, total cost was equal total fixed cost plus total variable cost or 4,214.00+7,027.00=11,241 Baht (TFC+TVC). It can be also written in form of an equation as TC=TFC+TVC. The 100 banana trees cultivated in the farm (experimental plot) gives the 1,000 kilogram of banana. Actually, an average variable cost obtains form total variable cost divided by quantity of banana which written in equation TVC/Q. So, an average variable cost is 7,027.00/1,000 =07.03 baht per unit or kilogram. The product price is 16 Baht which multiplies by quantity of banana 1,000 kilogram. The total revenue was of 16,000 Bah. Total profit is computed from total revenue minus total cost in 16,000-11,241 = 4,759.00 Baht. This is positive outcome for growers who run the banana farms. However, this study concentrates on optimal point in order to show the efficiency in production for each scenario. The first condition focused on optimal point for banana production which is show in the following equation;

Total revalue	= Total cost or	
16*Q	= 4,214+07.03*Q	(1)
16*Q-07.03*Q	= 4,214	
08.97*Q	=4,214	
Q	= 469.80	

Hence, the optimal production was 469.80 kilogram whereas Q denotes of quantity of banana. It means that the grower can cover the production cost due to the revenue being higher than the expenditure. Generally, the agricultural price is not stable. The price fluctuates on account of force of demand and supply. In the condition of decreasing in the price 5 % or 15.2 Baht, the new condition was following;

TR=TC (2)
15.20*Q =4,214+07.03*Q
15.20*-07.03*Q =4,214
08.17*Q =4,214
Q = 520.24

In this case, Agriculturist is still making a profit at 520.24 kilogram. On the other hands, the reducing of price by 5%, the farmers can still operate the business. Again, if the price of banana increases at 5%, the new scenario was the following equation;

TR=TC (3)
16.80*Q = 4,214+07.03*Q
16.80*-07.03*Q = 4,214
09.77*Q = 4,214
Q = 431.32

In this respect, the best condition is 431.32 kilogram of bananas which denotes that the higher prices higher profit. The increases of price of banana coincide the decreasing of quantity of banana. It shown the profitability. The amount of Q was low, the optimal is fast recovery.

From the study, it can be seen that growers gained higher value of Kluai homthong from the first equation (1) at the product price 16 Baht. (2)In the worst way, the second equation, banana production is survivable. The best condition is the third equation (3). Usually, the agricultural market price is unstable. It is necessary to trial it by many means. However, all of equation revealed that Kluai homthong production is subsistence. In the view of producers, although the price lowers than 16 Baht to 15 Baht per kg, they can make a living. Also if they adjust the production cost, then again the profit augments.

Discussion

The Kluai homthong of the farmers in Thayang and Banlad district in Phetchaburi province is recorded the cost of production. The 120 of growers produced Kluaihomthong and sent to market place from a cultivated area. Almost all growers sold the product to Thayang and Banlad Agricultural Cooperative with the price of 16 Baht per kilograms. First of all, before doing model Experimental, the background of farmers regarding Homthong production function in land preparation, cultivating, fertilizing, watering, weeding, harvesting and selling was studied. It is observed that herbicide, pesticide and all agricultural chemicals are not applied by growers.

The farmers who had better experience in farming were selected for doing an experimental plot during 9 months of study time. The experiment started with plowing, digging 100 of holes, growing banana shoot, irrigating the plot in the first month, watering is done every week. Second month, 2-3 gram of chemical fertilizer was applied per tree, watering banana field again. Third month, activities are similarly to second month, except weeding. Fourth month, activities are same as third month, but organic fertilizer and manure are used as a substitute for the chemical twice a month. The activities in the filth – ninth are same as forth month. It is noticed that in the eighth, the banana tree produces a bunch of flowers. In this month, bamboo pillars are applied to support the banana tree. After cutting banana tube bloom in two months, the bunches of bananas are perfect and ready for harvest and to send to market. Bananas are sold to Banlad

Agricultural Cooperatives. And they are exported to international markets, especially Japan. The Agricultural Cooperatives prefer to buy bananas without the chemicals (Nujnetra and Boonarong, 2013).

For the analysis of banana production in experimental farming, it found that the return was unable to recover costs in the respect of lacking an experience and amount of labor used in farm for during the period of the plantation. Detailed finding revealed that the growers have knowledge and good attitude in banana production process and marketing channel. The yield has been lower or higher than the rate of investment, the investment in the market by farmers was supportable only if they modify the method of production in combination with efficient marketing channels.

These findings are consistent with the findings of the experiment which found that improving the soil condition with organic fertilizer, and the sale of products through the Agricultural Cooperative which assists growers in gaining good quality of Kluai homthong and at higher prices.

The production pilot of Kluaihomthongbanlad by growers in the project also achieved positive results. In the case of the trail, it was divided into three ways, the most optimum way selected for agriculturist is Q =469.80 kilogram, which is suitable production whereas Q>469.80 kilogram was quite toward negative result. On other hands, the best alternatives is Q<469.80 kilogram but is not regularly for all farmers except they learn the production about cost reduction (Chanon Athimatichaikul,2016) and marketing system. Agricultural Cooperatives and Government Agency is instrumental in transferring knowledge of production and marketing. In the studied areas, growers who used organic fertilizer and sold product through Agricultural Cooperative can get the handsome profit.

To maintain the suitable production at farm level is necessary to modify production techniques, and marketing, which was consistent with the findings of Nares Chunud (Nares Chunud: et al, 2020) who found farmers should receive training on production and marketing in order to get high productivity.

On the other hand, the experience also plays an important role in the agricultural sector because it brings about learning production techniques, simultaneously the optimal model which is found in the study. This was consistent with the finding of Nicknipar Boonchouy (Nicknipar Boonchouy,2018) who observed that a factor that stimulates the growers receiving a high experience or skill.

Conclusion and Recommendations

The main findings of this test were that appropriate production model of Homthong in the area of study obtained at Q level which equal 469.80, 520.24 and 431.32 kilogram respectively. The growers need the benefits from production should market Kluai Homthong with Agricultural Cooperative and be applied in organic fertilization in order to the soil maintenance in the time of cultivation. The study of Kluai Homthong production in farm pilot indicated the experience, skill and source of investment funds which were still crucial factor. Thai Government Agency plays the important mechanism in helping farmers in order to maintain a career if they need farmer going on.

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References

Athimatichaikul, C. (2016). Improve Operation in Wood Manufacturer for Cost Reduction. Master ofScience Thesis, Faculty of Logistics,Chonburi:BuraphaUniversity.

Boonchouy, N. (2018) The Study Cost and Returns of Planting Cultivated Banana in Tha Yandg District Phetchaburi, Veridiand E-Journal, Silpakorn University, pp. 1883-1892

Chunud, N., Sengpanich, U. and Sittioum, R. (2020). Cost and Return Analysis of Planting Hom Thong Bananas in Muang District, Phitsanulok Province, Humanities and Social Sciences Journal of Graduate School, Pibulsongkram Rajabhat University, Volume 14 No. 2 July-December 2020, pp. 564-576 (in Thai)

Ngamkaroon, W. (2015). Business Plan: Thailand's Banana for Export to Japan, An Independent Study, Master of Business Administration, Thammasat University

Nujnetra, A and Boonarogn, L. (2013) Kluai Homthong Banlad: (Banana Production in Banlad) Production cost and Economic Rent, Advances in Environmental Biology, Volume 7 N.9, pp 2225-2228