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## **The Study of Cost and Returns from Pineapple (Smooth Cayenne) Intercrop Production in Rubber Plantation in Pabon district, Phatthalung Province**

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**Phatcharee Prasong<sup>\*</sup>, Tikamporn Chairam, Mavika Khongkaew, Yapaporn Dungkaew, Ratchanee Tiled, Varaporn Wongprot, Wahaleemo Marou**

Department of Accounting, Faculty of Management Technology, Rajamangala University of Technology Srivijaya, Nakhon Si Thammarat Campus, 80110 Thailand.

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The purposes of this study were to investigate cost and return on pineapple as on intercrop production in rubber plantation in Pabon district, Phatthalung province. The interview method was used for data collecting from the sample consisting of 5 agriculturists. The data were analysed using descriptive statistic such frequency and percentage. The result were applied for contribution margin and break-even point analysis.

The study revealed that the total cost was 19,627.78 baht per rai, comprising the fixed cost of 3,418.87 baht per rai, the total variable cost of 16,208.91 baht per rai, the total income of 90,459.78 baht per rai. When comparing, there was the contribution margin of 74,250.87 baht per rai. The contribution margin rate was 82.08.

Concerning of the break-even point analysis, it was found that the break-even point in the production was 333.87 kilogram per rai. The costs of production factors are expensive such labour and material costs. However, declining and fluctuations the selling price of the products which are resulted instability of the agriculturists' incomes. Finally, production process problem is the epidemic of plant diseases which are attached with the breeding plants.

**Keywords:** cost, return, pineapple (Smooth Cayenne)

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<sup>\*</sup> **Coressponding Author:** Phatcharee Prasong, **E-mail address** [phat\\_prasong@hotmail.com](mailto:phat_prasong@hotmail.com)

## **Introduction**

Pineapple is one of commercially important fruit crops of Thailand. Thailand is the world's leading producer and the first exporter canned pineapples which generate export value more than one billion baht per year. In 2013, Thailand has export value of canned pineapple about 15,112 million baht (Office of Agricultural Economics, 2014). According to the decreasing of rubber price situation, it has suffered for rubber farmers extremely. Therefore, the rubber farmers have realized significantly for intercropping in rubber plantation that generate occupation for monetization policies of the Office of the Rubber Replanting Aid Fund (ORRAF). Cultivation pineapple (Smooth Cayenne) as intercrop in rubber plantation will be a worth guideline for rubber farmers to conduct increment revenue during the decreasing of rubber price issue.

Plantation of pineapple in the groove of rubber farm is a choice to increase income for the small farmer. From the start period to third years of rubber plantation is an appropriate time to plant pineapple. After that, the shade of plantation will cover the groove of rubber plantation and make the production of pineapple do not to yield worthwhile.

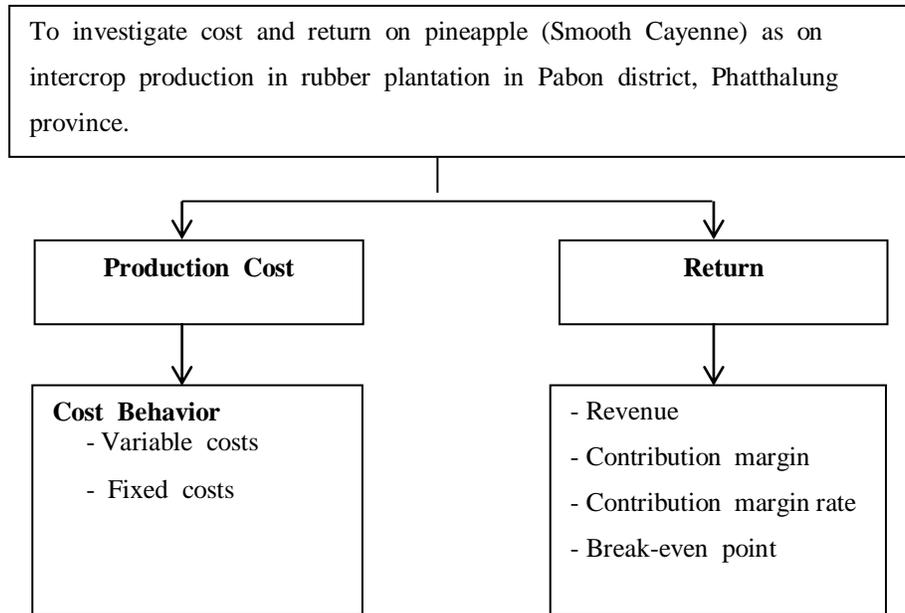
In 2007, Phatthalung have planted pineapples as intercrop in rubber plantation approximately 7,638 rai (Statistical Office of National, Phatthalung District, 2007). Pabon district is an area in Phatthalung province which have planted pineapples as a intercrop in rubber plantation approximately 1,092 rai (Department of Agriculture, 2007). In the manufacturing sector, in sufficiency of using technology in the production sector to farmers which is affected low quality of output, high product cost, outputs over exceeds demand that were suffered losses (Department of Agriculture, 2016).

Therefore, this research investigate the cost and return on from pineapple (Smooth Cayenne) intercrop production in rubber plantation in Pabon district, Phatthalung province. Information from this research will support the decision making to plant and determine appropriate price to sell.

### **Research objective**

To investigate cost and return on pineapple (Smooth Cayenne) as an intercrop production in rubber plantation in Pabon district, Phatthalung province.

## Conceptual framework



**Figure 1** Research conceptual framework

## Materials and methods

### *Production Theory*

Production theory is a theory to explain the behavior of producers that selected method of the production with maximum performance. This theory is the foundation to analyze the production costs that determining the supply of goods in the market. The production is essential process that entrepreneur need to be awareness. Many scholars have proposed the meanings of production. In conclusion, the production indicated the production process by various inputs to transformed goods and services. Manufacturers may choose factor of production through techniques of production in the ways that under condition of constraint of resources or minimize cost and get the maximize profit with highest efficiency. Accordingly, production refers to any action that contributes to the value added under condition of minimum costs and will get standard of products or services that consumers satisfy.

### ***Production costs theory***

Production costs refer to the value of the cost of the resources of production to get goods or service. The value of goods and service must be measured as currency. Costs incurred in businesses and business used this cost to produce goods or service shall be considered as expenditure. While, the costs that company take advantage in the future shall be considered as assets. Consequently, cost of production refers to various expenditure that produces goods and services that business required. This study use two types of cost which are fixed costs and variable costs as the tool to calculate the cost of planting pineapples in the groove of rubber plantation of farmers.

### ***Concept of benefit***

This research use the term of benefit in three terms as follow.

Contribution margin = (total income - variable costs)

Contribution margin ratio = (contribution margin / income from sales) x 100

Breakeven analysis is a tool that can be used to help business to make decisions about the planned of profit. Break-even point refers to the level of sales of the company equal to the total cost of operation (Srisuda Therakan, 1996).

Break-even point (units) = 
$$\frac{\text{Total fixed costs}}{\text{Price per unit} - \text{variable costs per unit}}$$

### ***Population and samples***

The samples of this research were selected by purposive sampling method from agriculturists who planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation in Pabon district, Phatthalung province.

### ***Research tool***

The interviews schedule was obtained as a tool for data acquiring. It was set into four parts; Part 1: general information of agriculturists who planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation, Part 2: the information about the cost, Part 3: the information about return, and Part 4: the barriers of growing a pineapple as an intercrop production in rubber plantation.

### ***Data collection***

Primary data was the data that got from interview agriculturists interviewing who planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation in Pabon district, Phatthalung province.

Secondary data was collected by thesis and dissertations, research reports, articles, institutions and other that involved with planting pineapple.

### ***Data analysis***

The results of the research were divided into two parts. The first part concerning the general information of agriculturists who planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation. Descriptive statistics were obtained data analysis such frequency and percentage.

The second part analysis of cost of planting pineapple (Smooth Cayenne) as an intercrops production in rubber. The researchers used descriptive statistics analysis to calculate as follows;

1. Average cost analysis per rai of pineapple (Smooth Cayenne) as an intercrop production in rubber plantation, researchers applied cost behaviour to cost calculation that displayed into 3 parts were fixed cost per rai, variable cost per rai and total cost per rai.
2. Return of pineapple (Smooth Cayenne) as an intercrop production in rubber plantation by calculated average revenue per rai and average price per kilogram.
3. Financial analysis of pineapple (Smooth Cayenne) as an intercrop production in rubber plantation by calculated average contribution margin per rai, average profit per rai, contribution margin rate and break-even-point kilogram per rai.

### **Results**

**Part 1:** The general information of agriculturist who planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation

The survey of 5 agriculturists who has planted pineapple (Smooth Cayenne) as an intercrop production in rubber plantation in Pabon district; Phatthalung province found that the most of agriculturist were males (80%), education levels as bachelor degree (60%),

respondents ages revealed between 31 - 40 years old (40%). The area for planting contained between 1-10 rai (80%). The planted areas mainly to rental (60%). The source of funding mainly generated on loans (80%) and generating income from wholesale (60%).

**Part 2:**

1. Analysis of cost planting pineapple (Smooth Cayenne) as an intercrop in rubber. Data were analysed using descriptive statistics in the calculation the following:

**Table 1** Average cost of planting pineapple as an intercrop production in rubber plantation cultivation base on cost behavior (Total area 46 rai)

Item	Total cost (bath)	Bath/rai	% of cost
<b>Variable Costs (VC)</b>			
- Pineapple suckers	386,650.00	8,405.43	42.82
- Fertilizers	86,100.00	1,871.74	9.54
- Herbicides	71,960.00	1,564.35	7.97
- Labour cost	173,900.00	3,780.43	19.27
- Gasoline	27,000.00	586.96	2.99
<b>Total Variable Cost (TVC)</b>	<b>745,610.00</b>	<b>16,208.91</b>	<b>82.58</b>
<b>Fixed Cost (FC)</b>			
- Land rent	105,500.00	2,293.48	11.68
- Panel rent	32,400.00	704.35	3.59
- Depreciation of equipment	4,868.00	40.61	0.21
- Interest expense	17,500.00	380.43	1.94
<b>Total fixed cost (TFC)</b>	<b>157,268.00</b>	<b>3,418.87</b>	<b>17.42</b>
<b>Total Cost (TC) = TVC + TFC</b>	<b>902,878</b>	<b>19,627.78</b>	<b>100.00</b>

Table 1 indicated average cost of planting pineapple as an intercrop production in rubber plantation in Pabon district, Phatthalung Province.

The average total cost of planting pineapple as an intercrop production in rubber equals 19,627.78 baht per rai that divided by the

average variable cost as 16,208.91 baht per rai (82.58%) and average fixed cost as 3,418.87 baht per rai (17.42%).

2. Return on investment planting pineapple as an intercrop production in rubber plantation

2.1 Average income per rai

**Table 2** Yield and income on investment planting pineapple as an intercrop production in rubber plantation of the farmers (Total area 46 rai)

Item	amount
Yield (kg)	7,254.35
Average price (bath/kg)	12.47
Total income (bath)	4,161,150
Yield (kg./rai)	157.70
Average income (Bath/Rai)	90,459.78

Table 2 the results research found that yield and income on investment planting pineapple as an intercrop production in rubber plantation farmers are 7,254.35 kilogram per rai, average price equals 12.47 baht per kilogram, and average income equals 90,459.78 baht per rai.

***Contribution margin and contribution margin ratio***

**Table 3** Contribution margin per rai on investment planting pineapple as an intercrop production in rubber plantation of the farmers (Total area 46 rai)

Item	Bath	%
Income	90,459.78	100.00
<u>Less</u> Variable costs	16,208.91	17.92
Contribution margin	74,250.87	82.08
<u>Less</u> Fixed costs	3,418.87	3.78
Operating income	70,832.00	78.30
Net income	70,832.00	78.30

Table 3 the results research found that contribution margin and contribution margin ratio of planting pineapple as an intercrop production in rubber equals 74,250.87 baht per rai, and contribution margin rate equals 82.08 percentages, respectively.

### 2.3 Break-even point of planting pineapple as an intercrop production in rubber

The volume of production at the break-even point of planting pineapple as an intercrop production in rubber is 333.87 kilogram per rai and the price is 4,163.36 baht per kilogram.

## Discussions

According to the decreasing of rubber price situation, it has suffered for rubber farmers extremely. Therefore, the rubber farmers have realized significantly for intercropping in rubber plantation that generate occupation for monetization policies of the Office of the Rubber Replanting Aid Fund (ORRAF). Cultivation pineapple (Smooth Cayenne) as intercrop in rubber plantation will be a worth guideline for rubber farmers to conduct increment revenue during the decreasing of rubber price issue. Besides, the survey indicated the barriers of planting pineapple as an intercrop production in rubber plantation, included the price of output factors are high such labour cost, material cost.

Finally, production process problem was the epidemic of plant diseases which are attached with the breeding plants. So suggestion on barriers of pineapples production were 1) the government should promote and support production knowledge and using of homemade organic fertilizer to farmers.

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