



Increasing Farmers' Income with Implementation *Good Agricultural Practices* (GAP) in Dragon Fruit Cultivation Farming Business

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ABSTRACT: This study aims to evaluation the technical differences between Dragon Fruit cultivation before and after application *Good Agricultural Practices* in Talok Village, Dlanggu District, Mojokerto Regency and the increase in farm income after implementation *Good Agricultural Practices*. Data analysis in this study used descriptive qualitative analysis, namely obtaining accurate data and a clear picture of farmers. Based on the research results, it can be concluded as follows a pplication of cultivation techniques *Good Agricultural Practices* give better results that is with 76.85% less investment on deployment *Good Agricultural Practices* (GAP) was able to sell 77.78% more dragon fruit and a higher income level of 140.32% with a difference in income of Rp. 480,745,000 per 7 Ha or IDR 68,677,857 per hectare compared to the conventional period.

KEYWORDS: Farmer, Good Agricultural Practices, Income.

I. INTRODUCTION

Dragon fruit is native to Mexico, North America and this plant is able to grow well and adapt to tropical climate conditions in Indonesia, thus increasing the variety of fruits available to the community. The high public interest and preference for dragon fruit has caused many farmers to carry out dragon fruit farming which was initially carried out in accordance with cultivation procedures, but the demand for horticultural products continues to increase, especially dragon fruit, causing farmers to overdo the application of technology, especially for the use of chemical pesticides (Mart, 2018). The motivation of farmers in implementing farming properly is very low, resulting in low quality of horticultural products because farmers do not manage farming properly in accordance with SOP (*Standard Operating Procedures*).

In order to avoid things that can reduce the quality of dragon fruit, farmers are encouraged to apply GAP namely the method of implementing or cultivating dragon fruit plants that are of high quality and safe for consumption. GAP is a technical implementation of an agricultural production process certification system that uses environmentally friendly and advanced technology sustainable, so that harvested products are safe for consumption, worker welfare is considered and farming provides economic benefits for farmers. According to Mushobozi, (2010) said that GAP is a way of carrying out the cultivation of fruit and vegetable plants properly, correctly and precisely. GAP covers from pre-planting activities to post-harvest handling in an effort to produce fresh fruit and vegetable products that are safe for consumption, of good quality, environmentally friendly, sustainable and competitive. GAP applies the principle of back tracking, namely the origin of products can be traced from the consumer to the business area.

The amount of income that will be obtained from a farming activity depends on several influencing factors such as land area, level of production, identity of the entrepreneur, planting and efficiency in the use of labor. In carrying out farming activities, farmers hope to increase their income so that their daily needs can be met. Prices and productivity are sources of uncertainty, so that when prices and production change, the income received by farmers also changes. The amount of income in farming economically can be compared between revenue and costs (*Revenue Cost Ratio*) issued. Farm business cash income (*farm net cash flow*) is the difference between the cash receipts of the farm business and the cash outlays of the farm business. Farming income is the difference between receipts and all costs (Spicka et al., 2019).

In farming income there are two elements that are used, namely the elements of income and expenses from the farming business. Revenue is the result of multiplying the total number of products by the selling price unit, while expenses or costs are intended as the value of using production facilities and others incurred in the production process (Williamson, 2017). Production is related to revenue and production costs, this income is received by farmers because it still has to be reduced by production costs, namely the entire cost used in the production process. Based on With this description, this study aims to determine the difference



between before and after implementation GAP on dragon fruit cultivation techniques and to find out the increase in farm income after implementation GAP on Dragon Fruit cultivation.

II. RESEARCH METHODS

The research object is done intentionally (*purposive*) both in the selection of research sites, namely in Talok Village, Dlanggu District, Mojokerto Regency, East Java, Indonesia and farmers who cultivate dragon fruit plants with certain varieties in the village with a managed planting area of 7 hectares. Data analysis in this study used quantitative descriptive analysis. Primary data is obtained from farmers directly through interviews and observations in the form of production figures and income generated due to the application GAP on technical activities of dragon fruit cultivation to post-harvest handling, as well as data on dragon fruit production prior to application GAPs. Secondary data was obtained from the Mojokerto Regency Agriculture Office and the office of the Talok Village head.

1. Revenue Analysis

Income : $TR - TC$

Reception : $TR = Q \times P$

total cost : $TC = FC + VC$

2. Analyze the R/C ratio

Farming is profitable or not economically can be analyzed by using the *Revenue Cost Ratio*, it can be formulated as follows:

$$R/C \text{ Ratio} = \frac{TR}{TC}$$

Information:

R/C = Revenue and expense ratio

TR = Total Revenue (Rp)

TC = Total Cost (Rp)

The decision making criteria are as follows:

1. If $R/C > 1$, then the farm will experience a profit because the revenue is greater than the cost.
2. If $R/C < 1$, then the farm suffers a loss because the revenue is less than the cost.
3. If $R/C = 1$, then the farm will break even because the revenue equals the cost.

3. Vertical Analysis (*Common Size Analysis*)

Financial Report =

$$\frac{\text{Year II Pos Value}}{\text{Year I Pos Value}} \times 100\%$$

4. Horizontal Analysis (*Dynamic Analysis*)

Sales Growth Rate

$$= \frac{\text{Year Sales II}}{\text{Year Sales I}} \times 100\%$$

Sales are net sales (Rachmina et al., 2014).

III. RESULTS AND OBSERVATIONS

3.1 Dragon Fruit Farming Capital

To start a dragon fruit farming business, entrepreneurs need capital both to buy equipment and materials needed. The source of capital can come from own capital, loan capital from banks and other credit institutions. A description of working capital can be seen in Table 1.



Table 1. Description of the Use of Capital for Dragon Fruit Farming with a Land Area of 7 Ha.

Method	Personal	Capital Loan	Amount
Before	Rp. 70,000,000	Rp. 100,000,000	Rp. 170,000,000
After	Rp. 50,000,000	Rp. 100,000,000	Rp. 150,000,000

Retained profit of Rp. 69,210,300, - is the previous profit that was reinvested into the business to increase capital.

3.2 Technical Differences Before And After Implementation Good Agricultural Practices Cultivation of Dragon Fruit Plants

Table 2. Technical Differences Between Before and After Deployment *Good Agricultural Practices* (GAP) Cultivation of Dragon Fruit Plants.

Technical	Before GAP (Conventional)	After (GAP)
Setting up the climbing pole	Make a climbing pole 2 meters high	Make a climbing pole 2 meters high
Land preparation	Make a hole in the ground measuring 60 x 60 cm and 25 cm deep. The climb is right in the middle of the planting hole. Prepare 4 dragon fruit seeds	Dig a hole in the ground with a size of 60x60 cm and a depth of 25 cm, the climb is right in the middle of the planting hole. Prepare 4 dragon fruit seeds
Seed preparation Planting	Plant 4 dragon fruit seeds in the planting hole with a size of 60 x 60 cm and a depth of 25 cm, the climb is right in the middle of the planting hole.	Plant 4 dragon fruit seeds in the planting hole with a size of 60 x 60 cm and a depth of 25 cm, the climb is right in the middle of the planting hole.
Fertilization	Tie 4 dragon fruit seeds to a climbing pole Hoard the seeds with soil until solid Use phonska fertilizer, urea fertilizer, SP36 fertilizer, pearl fertilizer	Tie 4 dragon fruit seeds to a climbing pole Hoarding seeds with soil that has been mixed with manure. Using mature manure as organic fertilizer which is given every 2 months. Using liquid organic fertilizer every 2 weeks.
Crop Protection	Spray with an organic pesticide at intervals of 1 month Using a paralon system using diesel	Using pearl fertilizer Using organic pesticides
Irrigation		Using a paralon system using diesel
Plant management	Must be exposed to sunlight, cut off yellow leaves	Must be exposed to sunlight, cut off yellow leaves
Harvest	The fruit skin has changed color to dark red or shiny red, the crown of the fruit has shrunk, cut the fruit directly using fruit scissors	The fruit skin has changed color to dark red or shiny red, the crown of the fruit has shrunk, cut the fruit directly using fruit scissors



3.3 Analysis of Revenue Before and After Implementation GAP Dragon Fruit Cultivation

1. Cost Analysis

Table 3. Total Cost of Dragon Fruit Farming Before and After Using the Method *Good Agricultural Practice* On a Land Area of 7 Ha.

No.	Average Total Cost type	Before		After	
		total cost	Percentage	total cost	Percentage%
1	Fixed cost	61.555.300	49,66%	73.705.300	33,62%
2	Variable costs	62.400.000	50,34%	145.505.000	66,39%
Amount		123.955.300	100%	219.210.300	100%

Based on table 3, it can be seen that the average total costs incurred by dragon fruit farming businesses before implementation GAP Rp. 123,955,300, while after implementation GAP is Rp. 219,210,300, -, meaning that there is an increase in total costs of 76.85%.

2. Receipts and Earnings

Table 4. Dragon Fruit Farming Income Before and After Implementation GAP (Planting Land Area 7 Ha).

No.	Method	Cost (IDR)	Revenue (IDR)	Income (IDR)
	Before (GAP)	123.955.300	324.000.000	200.044.700
	After (GAP)	219.210.300	900.000.000	680.789.700

Based on table 4 it is known that the costs, receipts and income of dragon fruit cultivation after implementation GAP the average is higher than the previous conventional cultivation. Total costs are 1.77 times and revenues are 2.77 times higher than before but with revenues 3.40 times as much with the same land area. Difference before and after deployment GAP namely the difference in Total Cost of Rp. 219,210,300 – Rp. 123,955,300 = Rp. 95,255,000, Total Revenue of Rp. 900,000,000 – Rp. 324,000,000 = Rp. 576,000,000, while the total income is Rp. 680,789,700 – Rp. 200,044,700 = Rp. 480,745,000, - after implementing the GAP.

3. Vertical Analysis (Common Size Analysis) and Horizontal (Dynamic Analysis)

Table 5. Vertical and Horizontal Analysis of Dragon Fruit Farming Before and After Implementation GAP With a Planted Land Area of 7 Ha.

No	Description	Before	After
1	Total Modal	170.000.000	150.000.000
2	Fixed cost	61.555.300	73.705.300
3	Variable Cost	62.400.000	145.505.000
4	Total Cost	123.955.300	219.210.300
5	Sales (Receipt)	324.000.000	900.000.000
6	Income	200.044.700	680.789.700
a. Vertical Analysis (%)			
	1) Total Assets	100	100
	2) Fixed Costs	49,66	33,62
	3) Variable Costs	50,34	66,38
b. Horizontal Analysis (%)			
	1) Fixed Costs	100	119,74
	2) Variable Costs	100	233,18
	3) Total Cost	100	176,85
	4) Sales	100	277,78
	5) Income	100	340,32



a. Vertical Analysis (Common Size Analysis)

In table 5 it is known that before implementation GAP Capital invested in Fixed Costs is 49.66%, while in Variable Costs is 50.34%. Meanwhile, after implementation GAP. Capital invested at a fixed cost of 33.62%, while at a Variable Cost of 66.38%.

If there is a risk of farming if the dragon fruit plants are attacked by plant pests which cause crop failure or dead plants, then the dragon fruit entrepreneur will lose capital equal to the Variable Costs incurred, namely after implementation GAP of Rp. 145,505,000 (66.38%) and a fixed fee for land rent per year of Rp. 7,500,000 so if the total is Rp. 145,505,000 + Rp. 6,142,108 = Rp. 151,647,108, - or 69.18% of the lost capital of the total capital of IDR 219,210,300, - in the current year.

b. Horizontal Analysis (Horizontal Dynamic Analysis)

Horizontal analysis compares financial statement items for two or more periods, for example the previous year's period with the current year's period. The goal is to find out the changes and developments of each post over a certain period of time. Rate sales growth is very important to note so that it can be compared with the rate of inflation that occurs. Inflation by simple can be interpreted as the level of price increase (Geske & Roll, 1983).

Table 6. Cost Increase Before and After Application GAP

No.	Description	Before (GAP)	After (GAP)	Inflation	Inflation Rate
1.	Seeds	10.000	20.000	10.000	50%
2	Fertilizer :				
	organic	2.000	2.200	200	10,00%
	SP36	4.000	6.000	2.000	50,00%
	pearl	7.000	10.000	3.000	42,85%
3	Labor	50.000	80.000	30.000	60%

In table 6the it appears that the highest inflation rate is on labor costs (60%) compared to seeds by 50%, and fertilizers on average by 34.28%. In table 5 it is known that the horizontal analysis after applying GAP the following growth occurred:

- 1). Total Cost = 176.85% – 100% = 76,85%
- 2). Sales = 177.78% – 100% = 77,78%
- 3). Income = 240,32% – 100% = 140,32%

3. Farming Efficiency

Table 7. Efficiency of Dragon Fruit Farming Before and After Implementation GAP.

No	Description	Before (GAP)	After (GAP)
		Amount	Amount
1	Reception	324.000.000	900.000.000
2	total cost	123.955.300	219.210.300
R/C		2,61	4,11

Table 7 shows the efficiency of dragon fruit farming before implementation GAP of 2.61, while after implementation GAP of 4.11.

IV. DISCUSSION

Good application GAP on dragon fruit cultivation techniques can maintain and improve the quality of dragon fruit products produced and food ingredients that are safe for consumption. GAP is basically a technical guide for the implementation of an agricultural production process certification system that uses environmentally friendly and advanced technology sustainable in carrying out the cultivation of fruit, vegetable and ornamental plants correctly and precisely, so as to obtain high productivity, good product quality, optimum profit, environmentally friendly and pay attention to aspects of food safety, safety and welfare of farmers, as well as sustainable production efforts. The application of GAP through Standard Operating Procedures (SOP) which are specific



to location, specific to commodities and specific target markets aim to increase productivity and quality of products produced by farmers so that they meet consumer needs and have high competitiveness compared to products from abroad (Bihn & Reiners, 2018).

In table 2 it appears that there are technical differences before and after implementation GAP especially on cultivation techniques, namely planting, fertilizing and protecting plants. According to Agegnehu et al., (2014) that the application of manure and liquid organic fertilizer as organic fertilizer in seed planting and further fertilization will have an impact on improving the physical and chemical properties of the soil, so that the planting medium becomes more friable and sufficient nutrients are available for growth and development crop yields. Furthermore, Alengebawy et al., (2021) argues that excessive and sustainable use of an organic pesticides on plants will cause adverse effects on human health, namely poisoning and what is even more dangerous is disruption of the body's organ systems.

In the analysis of farming costs as shown in table 3, there is an increase in total costs of 95,255,000 after the implementation of the GAP with details on the proportion of variable costs higher than fixed costs, namely 50.34% before the implementation of the GAP increased to 66.39% after the implementation GAP, meaning that in dragon fruit cultivation, entrepreneurs allocate most of their funds into variable costs. Furthermore, the analysis of acceptance and income shows that there is a difference in total income between before the GAP and after the implementation of the GAP of Rp. 480,745,000, -, this is due to the increased productivity of dragon fruit harvests with quality that can be accepted by consumers.

The results of this study prove that there is application GAP in dragon fruit cultivation farming can provide an increase in income of Rp. 480,745,000, - with a land area of 7 hectares or Rp 68,677,857, - per hectare. According to Cooper & Kaplan, (1991), business profit is income received by a person from the sale of goods or services minus the costs incurred in financing these goods and services. Farm cash income (*farm net cash flow*) is the difference between the cash receipts of the farm business and the cash outlays of the farm business. Farming income is the difference between receipts and all costs.

In horizontal analysis after applying GAP the following growth occurred: 1). Total costs of 76.85%; 2). Sales of 77.78%; 3). Revenue of 140.32%. This means that sales and revenues increased more than the increase in total costs, that is with less investment (76.85%) on deployment GAP can sell more dragon fruit (77.78%) because of its high productivity and get more profits (140.32%) compared to the conventional period

Furthermore, the analysis of farming efficiency shows that the dragon fruit farming that has been carried out has increased the value of farming efficiency by 1.5 which was originally before the GAP of 2.61 increased to 4.11 after the implementation GAP. Based on the analysis of the R/C ratio, it shows that the value of $R/C > 1$ means that farms that apply GAP provide greater profits because the revenue is greater than the costs incurred.

V. CONCLUSION

Based on the results of the study it can be concluded, among others:

1. There are technical differences in the process of planting, using fertilizers, and protecting plants between before and after application GAP Dragon Fruit Cultivation in Talok Village, Dlanggu District, Mojokerto Regency.
2. By application GAP on the dragon fruit cultivation technique provides a better value that is by 76.85% less investment on deployment GAP was able to sell 77.78% more dragon fruit and a higher income level of 140.32% with a difference in income of Rp. 480,745,000, - with a land area of 7 Ha or IDR 68,677,857 per hectare compared to the conventional period or before implementation GAP.

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Cite this Article: Budi Utomo, Dimas Hendra Febrianto (2023). Increasing Farmers' Income with Implementation Good Agricultural Practices (GAP) in Dragon Fruit Cultivation Farming Business. International Journal of Current Science Research and Review, 6(4), 2478-2485