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Feasibility Analysis of Siamese Orange Farming Business in Banyuwangi

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Abstract

Tropical countries have priceless natural resources and are very suitable places to grow various kinds of plants, one of which is fruit plants. One of the favorite fruits in Indonesia that thrives is citrus fruit. The prospect of citrus agribusiness in Indonesia is quite good because of the potential for extensive production land. Farmers will plant and develop tangerine farming if it is financially profitable. The formulation of the problem includes questions regarding the amount of revenue obtained from Siamese Orange farming in Tegalsari village. Revenue is an important indicator to evaluate the income potential of these farming activities. The question of the amount of profit generated from tangerine farming in the village. This research method was carried out in Tegalsari village, Tegalsari sub-district, Banyuwangi regency, which was chosen deliberately because most of the population earns a living as a chayote farmer. Data collection methods using interviews and questionnaires are expected to provide an in-depth understanding of the practice of chayote farming in Tegalsari village. In such a situation farmers are faced with various circumstances. To cover the physical weaknesses of farmers utilize labor in the family and hired labor. The results of research and analysis of citrus farming in Tegalsari village, Tegalsari District, Banyuwangi Regency provide a clear picture of the financial performance and feasibility of the project over a ten-year period

Keywords

Agribusiness, Farming, Economic Developments, Prospect

1. Introduction

Indonesia is a tropical country that has priceless natural resources and is a very suitable place to grow various kinds of plants, one of which is fruit plants. One of the favorite fruits in Indonesia

that thrives is citrus fruit. The prospect of citrus agribusiness in Indonesia is quite good because of the potential for extensive production land. Through a program to improve the quality of citrus farmers' resources and supported by the results of technological innovations in fertilization and natural hormones, integrated pest and disease management, and other cultivation systems that are all based on the spirit of environmentally friendly will increase the quantity and quality of citrus production. Siamese orange (*Citrus nobilis*) is a small part of the many citrus species that have been widely cultivated. Siamese oranges are members of the tangerine group which has the scientific name *Citrus nobilis*. It has the name siamese orange because this orange comes from Siam (Thailand) (Gros, 1996). One of the citrus centers in East Java is Banyuwangi Regency. Siamese oranges are one of the most popular citrus commodities in Indonesia because of their fresh taste, a combination of sweet and sour.

From the available data, Banyuwangi district's citrus production shows encouraging figures. In 2010, citrus production reached more than 78 thousand tons. Meanwhile, orange production in 2011 reached around 184 thousand tons. Meanwhile, in 2012 production reached 165 thousand tons. (Dispertahutbun Banyuwangi). Citrus production is generated from the harvest area (2012) which is spread across 8 sub-districts out of 24 sub-districts. Among them, Bangorejo, Purwoharjo, Tegaldelimo, Pesanggaran, Siliragung, Cluring, Gambiran and Tegalsari. All of these sub-districts are in the southern Banyuwangi region. Of the 8 sub-districts in Banyuwangi that are citrus centers. One of them is Tegalsari village / sub-district. Data from Dispertahutbun Banyuwangi states that the citrus farmer groups there reach 9 farmer groups (Ashari et al., 2014; Diny & Santoso, 2021).

Ups and downs of productivity of Siamese oranges in Banyuwangi Regency with an average during 2009-2013 of 17 tons/ha. The productivity is high and satisfactory. The level of productivity of Siamese oranges related to the use of production factors is considered very important because it has an influence on the production produced. The importance is emphasized on the combination of the use of production factors because it supports the achievement of optimal production conditions. Therefore, farmers are required to work efficiently in managing their farming business so that the production received is optimal. The successful development of a commodity is determined by three main factors, namely technical feasibility, economic feasibility and political feasibility (Morris et al., 2012; Zhao et al., 2010). In other words, farmers will plant and develop tangerine farms if they are financially profitable. Based on the explanation above, this research is to determine the feasibility of tangerine farming in terms of financial analysis.

Crucial questions related to Siamese orange farming in Tegalsari village, Tegalsari sub-district, Banyuwangi regency. First, the study sought to identify the amount of production costs incurred in running a Siamese orange farm in the location. This question underlies the understanding of the financial aspects and resource management in the production of Siamese oranges in the region. The formulation of the problem includes questions regarding the amount of revenue obtained from Siamese Orange farming in Tegalsari village. Revenue is an important indicator to evaluate the income potential of these farming activities. questions about the amount of profit generated from Siamese orange farming in the village. Profits are a very relevant parameter to evaluate the success and potential profitability of citrus farming in the midst of market conditions and the business environment. this research asks questions about the feasibility

of citrus farming in Tegalsari village. This question includes the economic, financial, and potential sustainability aspects of the farm in the future. The aim of the subsequent research was to detail and answer each of these issues through in-depth analysis.

2. Literature Review

Siamese oranges are a small part of the many citrus species that are widely known and cultivated. Siamese oranges are members of the tangerine group which has the scientific name *Citrus nobilis*. It has the name Siamese orange because this orange comes from Siam (Thailand). In Thailand, Siamese oranges are named Som Kin Wan (Monzo & Stansly, 2017). Until now, there is no official data on when and where Siamese oranges were first brought to Indonesia. However, there are areas that have sufficient records about the initial story of the entry of siamese oranges in the region, such as in West Kalimantan. Basically, siamese oranges have one ancestor that comes from Siam (Thailand). Siamese people call this type of orange by the name som kin wan. Perhaps because the Indonesian tongue is difficult to mention the name so accustomed to calling it by the name Siam. This habit continues until now. Siamese oranges in Indonesia have many types depending on the area of origin such as: Pontianak siam oranges, Simadu siam, Garut siam, Palembang siam, Banyuwangi siam and others.

The variety of siam oranges is not much different from one another. The difference is usually in terms of skin color, fragrance and slightly different taste. This difference usually arises because of different planting areas. Different planting places certainly have different characteristics of natural factors that affect the characteristics of the fruit. In general, the trunk of a commercially cultivated siamese orange tree is between 2.5-3.0 m tall. These trees usually come from vegetative propagation (grafts or grafting). For trees derived from grafting, the height is determined by the type of rootstock used. Siamese oranges that use JC (Japanese citroen) rootstock usually have a height of about 272.5 cm, a trunk circumference of 16.8 cm, and a crown width of about 197.5 cm. While Siamese citrus plants that use RL (Rough lemon) usually have a height of about 267.5 cm, stem circumference of 31.9 cm, and a crown width of 217.5 cm.

The trunk of the citrus plant has different heights. In siam oranges, the height of the plant can reach 2.5-3 m. The tree usually comes from grafts and grafting. For trees derived from grafting, the height is determined by the use of the rootstock. Siamese orange trees that use sirtun orange (Japanese citroen) rootstock usually have a height of about 272.5 cm, a trunk circumference of 16.8 cm, and a crown width of about 197.5/207.5 cm (two directions) (PS, 1995). Citrus plants have different colors, such as in Siamese oranges the stem is green to dark green adjusted to the age of the plant. All types of citrus plants are always overgrown with buds. If there is growth, these buds will become new branches. Usually each bud eye has pustules of prospective leaves. This new shoot is usually often used by farmers as a patch on grafting.

The leaves of citrus plants are generally dark green in color. The leaf bones are pinnately alternate and the edges of the leaves are serrated. In siam oranges, the leaves are shiny dark green on the upper surface and light green on the lower surface of the stalk, winged leaves, and small short, oval shape with a length of 6-8 cm, width of approximately 4 cm, and 1-1.5 cm petiole. The shiny color of citrus leaves because there is a layer of wax and contains a little pectin which causes the leaves to become slippery (Alamgir & Alamgir, 2017; Jeffree, 2006). Siamese orange plants usually start flowering around September to November. Orange flowers are compound in

one stalk, bunches or panicles are mostly two-stemmed, flower petals number 4-5, some are fused and some are not. The crown of the flower is separate with a number of 4-5.

The bulge of the flower base is jagged and grooved in the stamens. In siamese orange plants, flowers are white and flowers come out of the leaf axils or tops of young twigs; smell fragrant, and contain a lot of nectar (Averyanov et al., 2016). Orange fruit is classified as a true fruit, single, and fleshy. The shape of the fruit is round, oval, and slightly elongated oval. Siamese oranges have fruits with distinctive characteristics: thin skin (about 2 mm), smooth surface, slippery, shiny, and attached to the fruit flesh (Ward, 2021). The fruit is hitchhiking, round or elliptical in shape. The fruit stalk is short with a length of about 3 cm and a diameter of 2.6 mm. The outer skin layer is stiff with a pungent odor and the fruit wall contains essential oil. The fruit skin wall contains many pores, there are glands containing pectin. The most pectin content is found in the innermost layer of orange peel which is like a sponge, consisting of spongy tissue that is usually white in color called albedo. The outer layer also contains flavedo which is utilized for its pectin (Mamma & Christakopoulos, 2014).

To prevent drought and to prevent weeds from growing, mulch should be applied. Mulching during the rainy season will reduce soil density and erosion. Mulch can also retain soil moisture during the dry season so that the roots can absorb enough nutrients and water (Iqbal et al., 2020; Mwangi et al., 2016; Zhang et al., 2019). But if these elements are not present, the absorption of other substances will be neglected. Although these micro elements are only needed by plants in very low quantities, they are very important for the life of citrus plants. What must be considered is the provision of micro elements. Because if the provision of this element is not in accordance with the dose and rules will result in plants suffering from poisoning. If there is a lack of micro elements, the result is that some parts of the plant become imperfect (defective). Fertilization is a must because each age period of citrus depletes the availability of soil nutrients. Siamese oranges require organic fertilizers (manure or compost) and inorganic fertilizers (urea and TSP). Organic fertilizers are needed to increase humus levels in the soil so that dense soil can be converted into crumbly (Dubey et al., 2015; Lasmini et al., 2018; Lim et al., 2015). While inorganic fertilizers are needed to increase the nutrients needed by plants (Hernández et al., 2016; Moe et al., 2019; Palm et al., 1997).

3. Research Methods

This research was conducted in Tegalsari village, Tegalsari sub-district, Banyuwangi regency, which was purposively selected because most of the population earns a living as citrus farmers. The research was conducted in November 2015 by determining respondents using the strata method, which is intentionally according to the age of citrus plants owned by each farmer. A total of 20 people were selected as respondents, with the age range of citrus plants ranging from 1 year to 10 years. Data was collected through interviews using a questionnaire. Operational definitions of concepts in this study are also given, such as the definition of farming as a person who does business in agriculture, fertilizer as a material to support plant growth added to the planting medium, fertilization dose as a dose or volume in applying fertilizer, polybag as a plastic bag for planting citrus seedlings, mulch as a soil cover with various materials to prevent drought and reduce soil density due to heavy rain, and samples as part of the population used to estimate population characteristics. data collection methods using interviews and questionnaires are

expected to provide an in-depth understanding of citrus farming practices in Tegalsari village. By taking a representative sample of respondents who own citrus with a diverse range of plant ages, this study is expected to provide relevant and reliable results related to production costs, revenues, profits, and the feasibility of citrus farming in the region.

4. Results and Discussion

Age actually plays a role in the farming activities that will be managed. This is because the older the age of the farmer, the physically weaker in work. But on the other hand, the older the age of the farmer, the relatively more experience he gets in organizing a farm. In such a situation farmers are faced with various circumstances. To make up for their physical weaknesses, farmers utilize family labor and hired labor. Farmers with higher formal education tend to be faster in thinking / solving or receiving something related to the field of farming is managed, especially if supported by the experience and non-formal education that exists within the farmer and his family.

The number of family members of a citrus farmer includes himself, his wife, children and family dependents. The number of adult family dependents on the one hand is beneficial, namely as a source of labor in the family, because implicitly labor in the family is also a citrus farmer's income when paid for the farmer himself and his family. But on the other hand, it adds to the expenses or costs for the farmer's family itself. The land factor is a very important element in citrus farming activities. From the observation of the land area owned by farmers in the study area amounted to an average of 1-2 ha. For more details can be seen in Table 1 below.

Table 1. Land Area Owned by Siamese Orange Farmers in Tegalsari Village

No.	Land Area (ha)	Number of Farmers (people)	Percent (%)
1	1-2	14	70%
2	3-4	5	25%
3	5-6	1	5%
TOTAL		20	100%

Source: Primary data processing, 2015

Total cost or what is called *total cost* is the amount of all costs incurred by farmers in carrying out citrus farming in Tegalsari village. The total cost in the study there are 2 types of fixed costs incurred 1x during the production process of citrus crops. Non-fixed costs are costs incurred annually. The total cost incurred for citrus farming is the cost used for the purchase of land or land rent and the purchase of citrus seeds. For land rental for 10 years amounted to Rp 16,000,000 / ha. Costs incurred by farmers to buy seeds that will be planted in the land for 1 Ha of land in the need for 625 pieces of citrus seeds. With a price per fruit of IDR 8,000. So that the costs that must be incurred by farmers for 1 Ha of citrus crop land amount to Rp 8,000 x 625 pieces = Rp 5,000,000.

Non-fixed costs incurred by 20 citrus farmers in Tegalsari village, Tegalsari sub-district, Banyuwangi regency for a land area of 1 Ha. costs incurred to buy fertilizer to support the growth of citrus plants. This fertilizer cost has a significant effect on production costs. Where fertilizer is given every year to plants. this cost includes variable costs. The organic fertilizer used is

manure, obtained for free around cattle and goat breeders. while the inorganic fertilizers used are Urea fertilizer, SP 36 fertilizer, KCL fertilizer. Fungicides are used to remove mold, insecticides are used to get rid of pests, and herbicides are used to get rid of weeds. The average cost used by farmers.

Transportation costs are costs incurred for accommodation such as buying fertilizer, buying pesticides, and others. This cost is rarely taken into account by farmers. In this study for 1 ha of land, the average transportation cost was calculated to be Rp 500,000/year. From the above description can be seen in the table below.

Table 2. Variable Costs Incurred by Siamese Orange Farmers in Tegalsari Village Every Year.

No.	Cost Type	Amount (Rp)
1	Fertilizer Cost	IDR 11,500,000
2	Land Processing Cost	IDR 2,000,000
3	Labor Cost	IDR 5,400,000
4	Pesticide Cost	IDR 2,980,000
5	Transport Costs	IDR 500,000
TOTAL		IDR 22,380,000

Based on the data above, it can be seen that the total fixed costs of crops incurred by farmers in Tegalsari village amounted to Rp 21,000,000 for 10 years. While the costs incurred by farmers every following year is Rp 22,380,000 / year. In this calculation the selling price of citrus used is the average price of 20 farmers when doing research, which is Rp 10,000/Kg. To find out the acceptance of citrus farmers for 10 years can be seen in the following table:

Table 3. Yearly Revenue of Siamese Orange Farmers in Tegalsari Village

Year-	Total Production	Selling Price	Reception
1	0 kg	IDR 10,000	Rp 0
2	0 kg	IDR 10,000	Rp 0
3	4,000 kg	IDR 10,000	IDR 40,000,000
4	12,000 kg	IDR 10,000	IDR 120,000,000
5	22,000 kg	IDR 10,000	IDR 220,000,000
6	19,000 kg	IDR 10,000	IDR 190,000,000
7	17,000 kg	IDR 10,000	IDR 170,000,000
8	12,000 kg	IDR 10,000	IDR 120,000,000
9	8,000 kg	IDR 10,000	IDR 80,000,000
10	2,000 kg	IDR 10,000	IDR 20,000,000
TOTAL REVENUE			IDR 960,000,000

From the table above, it can be seen that the total revenue of citrus farming for 10 years is Rp 960,000,000 / Ha. Then the biggest acceptance in the 5th year. Profit (π) is the difference between total revenue (TR) and total costs (TC).

$$\pi = TR - TC$$

1 Based on the results of research conducted in Tegalsari Village, the profit of citrus farming is the total revenue obtained from the sale of citrus (Kg) minus the total cost of citrus farming incurred during the citrus farming process from land preparation to the sale of citrus production.

Table 4. Profits of Siamese Orange Farmers in Tegalsari Village Each Year

Year-	Revenue	Spending	Advantages
1	Rp 0	IDR 43,980,000	- IDR 43,980,000
2	4 0	IDR 22,380,000	- IDR 22,380,000
3	IDR 40,000,000	IDR 22,380,000	IDR 17,620,000
4	IDR 120,000,000	IDR 22,380,000	IDR 97,620,000
5	IDR 220,000,000	IDR 22,380,000	IDR 197,620,000
6	IDR 190,000,000	IDR 22,380,000	IDR 167,620,000
7	IDR 170,000,000	IDR 22,380,000	IDR 147,620,000
8	IDR 120,000,000	IDR 22,380,000	IDR 97,620,000
9	IDR 80,000,000	IDR 22,380,000	IDR 57,620,000
10	IDR 20,000,000	IDR 22,380,000	- IDR 2,380,000

From the table above, it can be seen that the total profit of citrus farming for 10 years is highest in year 5 (five), which is Rp 197,620,000 / ha.

Table 5. Feasibility Analysis of Net Present Value Method

Year	Revenue	Spending	Benefit	DF (15%)	PV (Rp)
1	Rp0	IDR 43,980,000	- IDR 43,980,000	0,8696	-38.245.008
2	Rp0	IDR 22,380,000	- IDR 22,380,000	0,7561	-16.921.518
3	IDR 40,000,000	IDR 22,380,000	IDR 17,620,000	0,6575	11.585.150
4	IDR 120,000,000	IDR 22,380,000	IDR 97,620,000	0,5718	55.819.116
5	IDR 220,000,000	IDR 22,380,000	IDR 197,620,000	0,4972	98.256.664
6	IDR 190,000,000	IDR 22,380,000	IDR 167,620,000	0,4323	72.462.126
7	IDR 170,000,000	IDR 22,380,000	IDR 147,620,000	0,3759	55.490.358
8	IDR 120,000,000	IDR 22,380,000	IDR 97,620,000	0,3269	31.911.978
9	IDR 80,000,000	IDR 22,380,000	IDR 57,620,000	0,2843	16.381.366
10	IDR 20,000,000	IDR 22,380,000	- IDR 2,380,000	0,2472	-588.336
TOTAL	IDR 960,000,000	IDR 244,800,000	IDR 715,200,000	-	286.151.896

From the table above we can see that the results of the calculation of the feasibility analysis of the NPV method with a DF of 15% resulted in an NPV value of Rp 286,151,896. the NPV value is positive, so this farm is **feasible** to run.

Table 6. GROSS B/C Ratio

Year	Benefit	Spending	DF (15%)	NPV B (Rp)	NPV C (Rp)
1	- IDR 43,980,000	IDR 43,980,000	0,8696	-38.245.008	38.245.008
2	- IDR 22,380,000	IDR 22,380,000	0,7561	-16.921.518	16.921.518
3	IDR 17,620,000	IDR 22,380,000	0,6575	11.585.150	14.714.850
4	IDR 97,620,000	IDR 22,380,000	0,5718	55.819.116	12.796.884
5	IDR 197,620,000	IDR 22,380,000	0,4972	98.256.664	11.127.336

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6	IDR 167,620,000	IDR 22,380,000	0,4323	72.462.126	9.674.874
7	IDR 147,620,000	IDR 22,380,000	0,3759	55.490.358	8.412.642
8	IDR 97,620,000	IDR 22,380,000	0,3269	31.911.978	7.316.022
9	IDR 57,620,000	IDR 22,380,000	0,2843	16.381.366	6.362.634
10	- IDR 2,380,000	IDR 22,380,000	0,2472	-588.336	5.532.336
TOTAL	IDR 715,200,000	IDR 244,800,000	-	286.151.896	131.104.104

From the table above, the B/C ratio can be calculated:

$$\begin{aligned} \text{B/C ratio} &= \text{NPV B} / \text{NPV C} \\ &= \text{Rp } 286,151,896 / \text{Rp } 131,104,104 \\ &= 2.182 \end{aligned}$$

So the Gross B / C ratio value is $2.182 > 1$. Then the citrus farming project is efficient and **feasible** to run. From the above calculations, it is known that the project investment value for 10 years is IDR 244,800,000. then look for IRR by trying the DF value as follows:

Table 7. IRR Feasibility Analysis

Year	Benefit (Rp)	DF (45% %)	DF (60%)	NPV (45%) (Rp)	NPV (60%) (Rp)
1	- 43.980.000	1	1	(43.980.000)	(43.980.000)
2	- 22.380.000	0,4756	0,3906	(10.643.928)	(8.741.628)
3	9.620.000	0,328	0,2441	5.779.360	4.301.042
4	73.620.000	0,2262	0,1303	22.081.644	12.719.886
5	153.620.000	0,156	0,0735	30.828.720	14.525.070
6	129.620.000	0,1076	0,0596	18.035.912	9.990.152
7	113.620.000	0,0742	0,0373	10.953.404	5.506.226
8	73.620.000	0,0512	0,0233	4.998.144	2.274.546
9	41.620.000	0,0353	0,0146	2.033.986	841.252
10	- 6.380.000	0,0243	0,0091	(57.834)	(21.658)
TOTAL	522.600.000			40.029.408	(2.585.112)

From the table above, we can find out the DF value that produces the NPV value closest to zero:

$$\begin{aligned} \text{IRR} &= 0.15 + (40,029,408 / 40,029,408 - (-2,585,112)) \times (0.45-0.60) \\ &= 0.182 \end{aligned}$$

From the above calculations it is known, $\text{IRR} = 18.2\% > 15\%$. This means that this citrus farming business has an IRR value with a positive interest rate of return, so this business is feasible to run.

6. Conclusions and Suggestions

The results of research and analysis of citrus farming in Tegalsari village, Tegalsari District, Banyuwangi Regency provide a clear picture of the financial performance and feasibility of the project over a ten-year period. First, production costs during the period reached Rp. 244,800,000, illustrating the amount of investment required to run a citrus farm in the location. production

revenue generated from citrus farming for ten years was recorded at Rp. 960,000,000 per hectare. This figure reflects the significant income potential that can be obtained from citrus farming activities in Tegalsari village. The profit generated from citrus farming for ten years reached Rp 715,200,000 per hectare. Thus, these results indicate that citrus farming in Tegalsari village has considerable profit potential during the time period studied. project feasibility analysis using the Net Present Value (NPV) method, Gross Benefit / Cost Ratio (B / C), and Internal Rate of Return (IRR) indicates that citrus farming in Tegalsari village is feasible to run. This finding confirms that farming activities are not only financially profitable, but can also contribute positively to economic growth and the sustainability of agricultural businesses in the region. Thus, this conclusion can serve as a basis to support the development and strengthening of the citrus farming sector in Tegalsari village.

The use of the latest technology in growing Siamese oranges is a crucial step towards significantly increasing agricultural yields. Farmers need to continue learning modern techniques in order to optimize production and achieve greater profits. With a lifespan of up to 10 years, Siamese oranges require ongoing maintenance, so farmers' knowledge of proper farming practices is crucial to maintaining and increasing yields. The role of the government, especially the extension service and agriculture office, is also indispensable in providing regular guidance and counseling to farmers so that they can adopt the latest technology and improve farming efficiency. Thus, good cooperation between farmers and the government can create a sustainable and profitable farming environment for all parties.

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