Jurnal Agrinika: Jurnal Agroteknologi dan Agribisnis
Volume 07, Issue 02 (2023)
E-ISSN: 2721-2807

Analysis of Financial Feasibility and Business Economics Manalagi Mango Cultivation (Case Study in Mertani Village, Karanggeneng District, Lamongan Regency)

Emmy Hamidah
Department of Agrotechnology, Faculty of Agriculture, Universitas Islam Darul Ulum Lamongan, East Java, Indonesia
Corresponding author: emmyhamidah@unisda.ac.id

Keywords:
Business Economics;
Financial feasibility;
Manalagi mango cultivation;
IRR;
NPV.

Submited:
26-07-2023

Accepted:
15-09-2023

Published:
29-09-2023

ABSTRACT

The assessment of the feasibility of Manalagi Mango cultivation in Mertani Village, Karanggeneng District, Lamongan Regency, and the analysis of the sensitivity of this cultivation to increased production costs, decreased production, and reduced output prices are the main objectives of this study. The study was conducted in Mertani Village, Karanggeneng District, Lamongan Regency, using a census approach encompassing all populations as respondents. Both primary and secondary data were employed, with data analysis involving quantitative metrics and sensitivity rate analysis using a 15% discount factor. Qualitative descriptive analysis was utilized to evaluate technical cultivation aspects and market factors. Data collection occurred in March 2021. The findings revealed that intensive Manalagi Mango cultivation in the area was financially feasible, with a Gross Benefit Cost Ratio of 4.7, Net Benefit Cost Ratio of 9.94, NPV of IDR 278,880,609, and an IRR of 35%. Additionally, the study demonstrated the resilience of mango cultivation to potential challenges, including a 10% increase in production costs, a 25% decrease in production, or a 10% reduction in output prices, highlighting its feasibility and profitability. The study also noted the favorable climate and rainfall conditions for Manalagi mangoes, though technological adoption among farmers remained limited. Despite variances in sales compared to other crops, the mango cultivation business in Mertani Village remains promising.

1. Introduction

Agricultural progress can be deemed successful when there is robust economic growth concomitant with positive societal transformation and an improved standard of living. This can be observed in the agricultural sector's contribution to food provision, as well as its role in enhancing foreign exchange reserves through exports, among other factors (Karuniawan *et al*., 2021).

Agricultural science is a field of study that examines the way in which farmers integrate and manage different elements of production, including land, labor, and capital, to determine their decisions regarding the specific crops or livestock they cultivate or raise. The objective is to optimize outcomes by ensuring sustained productivity (Magagula *et al*, 2020).

Mangoes have long been Indonesia's leading agricultural commodity. Indonesia should be proud of the quality of domestic mangoes, which are in the very good category. One type of mango that is currently popular is the manalagi mango (Maghfiroh *et al*, 2022).

Mango fruit grown in Indonesia has various varieties ranging from fruit that is delicious to eat, fresh, and mango trash, which tastes good only, to processed products, such as salad or pickles. Mangoes for fresh fruit have a high economic value compared to trash mangoes (Utami *et al*, 2019). The price of mangoes for fresh fruit consumption can be influenced by the variety, fruit size, and types of mangoes that have high economic value, including *gedong, golek, manalagi, and cengkir* mangoes. The market potential for mangoes can also be seen in terms of prices that are affordable by all levels of society, thereby opening up greater opportunities for market absorption of the mangoes themselves (Rohman *et al*, 2021).

One of them is Mertani Village, Karanggeneng District, where most of the population has a livelihood as farmers. Apart from cultivating fish and rice, the types of plants cultivated by farmers are mango commodities, and the sales results also have high economic value. Mertani Village enjoys a tropical climate with distinct wet and dry seasons. This climate is conducive to mango cultivation, providing the necessary conditions for fruiting and ripening. The soil in Mertani Village is rich in organic matter, well-drained, and slightly acidic, which is ideal for mango cultivation. It supports healthy root development and nutrient absorption. Local farmers employ various cultivation practices such as grafting, pruning, and proper irrigation management to ensure healthy tree growth and high-quality fruit production. Manalagi mangoes are typically harvested at the optimal stage of ripeness to maximize flavor and shelf life. Proper post-harvest handling, including sorting, packing, and transportation, is crucial to maintain fruit quality.

The study is specific to Mertani Village, providing insights into the unique challenges and opportunities faced by mango growers in this particular region. The research evaluates the economic viability of Manalagi mango cultivation by considering factors such as initial investment, operational costs, revenue generation, and potential profits. The analysis of financial feasibility and business economics of Manalagi mango cultivation in Mertani Village holds significant importance for both local farmers and policymakers. By providing valuable insights into the economic viability and sustainability of mango farming in this region, the research aims to empower farmers with the knowledge needed to make informed decisions, enhance their income, and contribute to the growth of the local economy. Additionally, the study can serve as a model for similar agricultural research endeavors in other regions with specific crop specialties.

2. Methodology

Mertani Village, Karanggeneng, Lamongan District was determined purposively as a research site with the consideration that it has potential from the agricultural sector, especially plants with high economic value, and one of the mainstay products is Mango Manalagi (Hamidah, *et al* 2021). Apart from having a sweet taste and characteristic fragrance when ripe, the Manalagi variety is of great interest to young and old, especially for its fruit flesh, which tends to give fans a delicious morning taste. This has triggered farmers in the study area to continue to plant Manalagi mango trees for harvest. and sell the fruit (Liantoni *et al*, 2017).

Both primary and secondary data were employed in the form of qualitative and quantitative data. The interviews served as primary data with respondents and direct

observation in the field. Secondary data was obtained from various literature and related agencies (Flores *et al*, 2017).

Data analysis used qualitative methods and quantitative methods. The quantitative method was presented by interpreting and describing the data obtained, while the quantitative method was carried out by analyzing the data, including data transfer data editing. The analysis of agribusiness development opportunities for Mango Manalagi employs specific investment criteria, including:

a. Net Present Value (NPV): This measures the discrepancy between the current value of incoming funds and the current value of expenses, calculated using a designated discount rate as defined by the following formula (Widyasari *et al*, 2022):

$$NPV = \frac{\sum(Bt-Ct)}{(1+i)^1}$$

Information:
Bt : Benefits earned in t
Ct : Expenses incurred in the year t
I : Discount rate (person)

Evaluation:
a. NPV less than (<) 0: The business is not feasible
b. NPV equals (=) 0: New ventures break even
c. NPV more than (>) 0: Business is feasible

b. The Net Benefit Cost Ratio (B/C) is determined by comparing the present value of positive net benefits to that of negative net benefits. To compute this metric, you can start by evaluating (Bt – Ct)/(1+i)t using the following formula (Fisu *et al*, 2020):

$$\text{Net B/C} = \frac{NPV(+)}{NPV(-)}$$

Information:
NPV (+) = Amount NPV positive (benefit >cost)
NPV (-) = Amount NPV negative (benefit<cost)

Evaluation:
a. B/C<1 : The business is not yet feasible to try
b. B/C=1 : New ventures break even
c. B/C>1 : Business is quite feasible

c. Internal Rate Of Return (IRR) is the discount rate, expressed as a percentage, at which the Net Present Value (NPV) becomes zero. This rate can be calculated using the following formula (Arjunan, 2022):

$$IRR = il + \frac{npv\ 1}{npv\ 1 - npv\ 2} \times (i2-i1)$$

Information:

NPV 1: current value of the extra net benefit generated during period i1.

NPV 2: current value of the additional net benefit stream occurring in i2.

Sensitivity Analysis involves examining the impact of changing conditions or uncertainties on a project. This analysis may focus on factors such as output, production levels, and input prices to assess their effects (Imai *et al,* 2019).

3. Results and Discussion

Mertani Village is located in the western part of the city of Lamongan, precisely north of Sukodadi District. The use of plantation land in this village is quite good, and the community is able to maximize the results of gardening by utilizing Manalagi mango farming, whose selling price is of high economic value.

3.1 Agribusiness Study of Manalagi Variety mango Cultivation in Research Area

This research discusses the cultivation of Manalagi mangoes in the Mertani area, Karanggeneng District, which includes the cultivation, maintenance, harvesting, and post-harvest processes. In fact, in the field, when farmers carry out mango cultivation activities, they tend to use simple and traditional tools still. This is characterized by the seeding process obtained by farmers from the grafting of mango fruit trees, which are then ready to be processed after the grafted stems are available to be transferred to the planting medium. The fertilization process itself takes an average of 2 years after planting until it is ready to be harvested (Rohman *et al*, 2021). For their harvest, most farmers sell to middlemen. During the harvest season, the middlemen themselves come to the farmers' place. The middlemen buy ready-to-harvest mangoes at a price of IDR 10,000 per kilogram.

3.2 Operational Variables

In a farming business, of course, some things facilitate production, such as initial capital, both from investment costs, production costs, and depreciation costs.

3.2.1 Investment Cost

Investment costs are costs incurred to purchase goods that are used as initial capital that can be used many times until the goods are damaged (Pambudi *et al*, 2017). Can be seen in Table 1.

Table 1. Details of Investment Costs in Mango Cultivation Farming

Number	Types of goods	Price per unit (Rp)	Amount	Value
1	Sprayer (elektrik)	900,000	2	1,800,000
2	Hoe	100,000	3	300,000
3	Basket	30,000	5	150,000
4	Sickle	75,000	3	225,000
5	Waring	250.000	1(rol)	250,000
	Total			2,725,000

Source: Primary Data Processed 2021

3.2.2 Cost of Depreciation

Depreciation expense is a reduction in the economic value of an item due to the existence of use during the period when the item can still be used (Nimoh *et al*., 2020). It can be seen in Table 2.

Table 2. Manalagi Mango Cultivation Equipment Annual Depreciation

No	Investment Type	Amount	Price	Value	Economic Age	Depreciation
1	Sprayer (Elektrik)	2	900,000	1,800,000	5	360,000
2	Hoe	3	100,000	300,000	6	50,000
3	Basket	5	30,000	150,000	5	30,000
4	Sickle	3	75,000	225,000	5	45,000
5	Waring	1	250,000	250,000	5	50,000
	Total					535,000

Source: Primary Data Processed, 2021.

3.2.3 Cost of Immature (IP) Manalagi Cultivation

At the time of the plant's age from year 0 to 1, it cannot be declared a productive plant, which is divided into two, namely variable costs or variable costs and fixed costs. Variable costs are costing whose size is influenced by the production obtained, while fixed costs are costs that are relatively fixed in a year and continue to be issued regardless of whether the production is large or small (Musliu *et al*, 2019).

Variable costs include purchasing seeds, fertilizers, pesticides, and labor, while fixed costs include land rent, equipment, taxes, and depreciation (E. Hamidah *et al*, 2021). This can be seen in Table 3

Table 3. Cost of Cultivating Immature Manalagi Mango Plants (IP)

Number	Description	Year 0	Year 1
	Fixed cost		
1	a. Land lease	3,500,000	3,500,000
	b. Tax	700,000	700,000
	c. Equipment	2,725,000	2,725,000
	d. Tool depreciation		535,000
	Total fixed cost (TFC)	6,925,000	7,460,000
	Variable cost		
2	a. Seeds	5,000,000	
	b. Fertilizer		
	- Phonska	825,000	825,000
	- Petorganik	300,000	300,000
	c. Labor	2,000,000	1,500,000
	Total Variable Cost	8,125,000	2,625,000
	Total cost	15,050,000	10,085,000

Source: Primary Data Processed, 2021.

3.2.4 Production Cost

Production costs are the costs of all types of needs incurred in the manalagi mango farming business per year for 5 years (E. Hamidah *et al*., 2021). Table 4 shows the cost of production when the plants produce.

Table 4. Costs When Producing (TM) Mango Cultivation Farming

No	Description	Age (Year)			
		2	3	4	5
1.	Fixed cost				
	Land Lease	3,500,000	3,500,000	3,500,000	3,500,000
	Tax	700,000	700,000	700,000	700,000
	Equipment	2,725,000	2,725,000	2,725,000	2,725,000
	Tool depreciation	535,000	535,000	535,000	535,000
	Total fixed Cost (TFC)	7,460,000	7,460,000	7,460,000	7,460,000
2.	Variable cost				
	Fertilizer	1,125,000	1,125,000	1,125,000	1,125,000
	Labor	4,000,000	4,10,000	4,200,000	4,300,000
	Total variable cost	5,125,000	5,225,000	5,325,000	5,425,000
	Total cost	12,585,000	12,685,000	12,785,000	12,885,000

Source: Primary Data Processed, 2021.

3.2.5 Production and Sales Value

Manalagi mango is an annual plant with a harvest period of once a year whose fruit can be harvested. Market demand and increasing demand among the public make this mango variety attractive and of high economic value (Rohman *et al*, 2021). The production potential of Manalagi mangoes planted in the Tegal rice fields begins to be given exclusive care during the generative period, and bit-by-bit maintenance is reduced during the vegetative period, with a planting distance of 4x4 meters from tree to tree so that the ripe fruit is harvested and can produce maximum production with excellent fruit taste. At harvest time, Manalagi mangoes that are ready to be harvested are dark green with a typical Manalagi mango aroma (Liantoni *et al*, 2017). By a selling price of IDR 10,000 per kilogram, 1 tree produces more than 10 kg of mangoes. This can be seen in Table 5.

Table 5. Production Results and Selling Prices of Manalagi Mangoes

Plant Age	Fruit Production /Kg	Price(IDR/ fruit)	Sales Value (IDR/Ha/Year
0	-	-	-
1	-	-	-
2	7,500	10,000	75,000,000
3	8,750	10,000	87,500,000
4	6,500	12,000	78,000,000
5	6,250	14,000	87,500,000
	10,500		328,000,000

Source: Primary Data Processed, 2021.

3.3 Manalagi Mango Cultivation Farming Income

The revenue generated from Manalagi mango farming is determined by subtracting all expenses from the total income. The desired outcome is the net income or net cash flow, which encompasses both the money received (cash inflow) and the expenditures made (cash outflow) (Anwar *et al*, 2021). Expenditure costs in Manalagi Mango farming include investment costs, immature plantation costs (TBM), and mature plantation costs (TM) (Yan *et al*, 2022). At the same time, it is obtained by multiplying the production obtained by the selling price of Manalagi mangoes (Fisu *et al*., 2020). The selling price is the selling price of farmers, and farming income can be seen in Table 6.

Table 6. Income Per Hectare

Plant Age(Year)	Cash in flow (IDR)	Cash Out Flow (IDR)	Net Cash Flow (IDR)
0	0	15,050,000	-15,050,000
1	0	10,085,000	-10,085,000
2	75,000,000	12,585,000	62,415,000
3	87,500,000	12,685,000	74,815,000
4	78,000,000	12,785,000	65,215,000
5	87,500,000	12,885,000	74,615,000
Total	328,000,000	76,075,000	251,925,000

Source: Primary Data Processed, 2021.

3.4 Feasibility Analysis

Financial analysis of manalagi mango cultivation farming with an interest rate of 20% can be seen in table 7.

Table 7. Financial Analysis of Mango Manalagi Farming Business for 5 Production Year

Plant Age(Year)	DF 20%	Future Nominal Value			NPV	PV(Bt)Bt.DF	PV(Ct)Ct.Df
		benefit(Bt)	Cost(Ct)	Net Benefit			
0	1	0	15.050.000	-15.050.000	-15.050.000	0	15.050.000
1	0,833	0	10.085.000	-10.085.000	-10.085.000	0	10.085.000
2	0,694	75.000.000	12.585.000	62.415.000	43.316.010	52.050.000	8.733.990
3	0,579	87.500.000	12.685.000	74.815.000	43.317.885	50.662.500	7.344.615
4	0,482	78.000.000	12.785.000	65.215.000	31.433.630	37.596.000	6.162.370
5	0,402	87.500.000	12.885.000	74.615.000	29.995.230	35.175.000	5.179.770
Total					122.927.755	175.483.500	52.555.745

Source: Primary Data Processed, 2021

1. Net Present Value (NPV)

$$NPV = \sum \frac{(Bt-Ct)}{(1+i)^1}$$

$$= \sum (Bt - Ct)DF$$
$$= \sum (Net\ Benefit)DF$$
$$= \sum NPV$$
= -15.050.000+...+29.995.230
= 122.927.755

2. Net Benefit Cost Ratio (NetB/C)

$$\text{Net B/C} = \frac{NPV(+)}{NPV(-)}$$
$$= \frac{148.062.755}{25.135.000}$$
$$= 5{,}890$$

3. Gross Benefit Cost Ratio

$$\text{Gross B/C} = \frac{\Sigma_{T-0}^{T-12} PV(BT)}{\Sigma_{T-0}^{T-n} PV(CT)}$$
$$= \frac{175.483.500}{52.555.745}$$
$$= 3{,}338$$

Based on the comprehensive financial analysis conducted in the research, it is evident that Manalagi mango cultivation in Mertani Village, Karanggeneng District, Lamongan Regency, is indeed a financially feasible venture.

The calculation of Net Present Value (NPV) at 122,927,755 indicates that the projected cash flows from Manalagi mango cultivation are higher than the initial investment and ongoing operational costs. This positive NPV value signifies that the mango cultivation project is expected to generate a substantial return on investment over its lifetime. In simpler terms, it suggests that the project is financially viable and capable of delivering positive returns (Cusworth, 2020).

The Net Benefit-Cost Ratio (Net B/C) of 5,890 implies that for every unit of currency invested in Manalagi mango cultivation, there is a significant increase in the net benefits generated. With a Net B/C greater than 1, this indicates that the project's benefits outweigh the costs. Specifically, for every monetary unit invested, nearly 5,890 units are expected to be returned in the form of net benefits (Loutzenhiser & Mann, 2021). This demonstrates the profitability and attractiveness of mango cultivation in Mertani Village.

The Gross Benefit-Cost Ratio (Gross B/C) of 3,338 highlights that the total benefits accrued from Manalagi mango cultivation substantially surpass the overall costs associated with the project. A Gross B/C greater than 1 underscores the economic efficiency of the venture. In this case, for each unit of cost incurred, approximately 3,338 units of benefits are expected to be realized. This ratio reaffirms the financial soundness of investing in Manalagi mango cultivation (Maulida & Andriani, 2022).

In summary, the financial analysis reveals that Manalagi mango cultivation in Mertani Village is not only financially feasible but also holds substantial potential for profitability. The positive NPV, robust Net B/C, and promising Gross B/C ratios all point toward the viability and attractiveness of this agricultural endeavor. These findings are encouraging for local farmers and stakeholders, suggesting that Manalagi mango cultivation can not only enhance their livelihoods but also contribute to the economic development of the region (Abbas *et al*., 2019). It is essential for farmers to consider the results of this analysis when making decisions related to mango cultivation in Mertani Village.

3.5 Manalagi Mango Cultivation Farming Feasibility Test

The feasibility assessment was conducted to determine the Internal Rate of Return (IRR) for the tree farming venture. An IRR exceeding the prevailing interest rate suggests that the business is viable at that specific moment, as noted by Fisu *et al*. (2020). The results of the feasibility examination for the manalagi mango cultivation business, considering interest rates of 25% and 35%, are presented in the table below.

Table 8. Feasibility Test of Manalagi Mango Cultivation Farming with 25% Interest For 5 years.

Plant Age(Year)	DF 25%	Future Nominal Value			NPV	PV(Bt)Bt.DF	PV(Ct)Ct.Df
		Benefit (Bt)	Cost(Ct)	Net Benefit			
0	1	0	15,050,000	-15,050,000	-15,050,000	0	15,050,000
1	0.800	0	10,085,000	-10,085,000	-10,085,000	0	10,085,000
2	0.640	75,000,000	12,585,000	62,415,000	39,945,600	48,000,000	8,054,400
3	0.512	87,500,000	12,685,000	74,815,000	38,305,280	44,800,000	6,494,720
4	0.410	78,000,000	12,785,000	65,215,000	26,738,150	31,980,000	5,241,850
5	0.328	87,500,000	12,885,000	74,615,000	24,473,720	28,700,000	4,226,280
Total					104,327,750	153,480,000	49,152,250

Source: Primary Data Processed, 2021

1. Net Present Value (NPV)

   NP = -15.050.000+...+24.473.720
   = 104.327.750

2. Net Benefit Cost Ratio (Net B/C)

   $$\text{Net B/C} = \frac{129.462.750}{25.135.000}$$
   = 5,15

3. Gross Benefit Cost Ratio

   $$\text{Gross B/C} = \frac{153.480.000}{49.152.250}$$
   = 3,122

Table 9. Feasibility Test for Manalagi Mango Cultivation Farming With 35% For 5 years.

Plant Age(Year)	Df 25%	Future Nominal Value			NPV	PV(Bt) Bt.DF	PV(Ct) Ct.Df
		Benefit(Bt)	Cost(Ct)	Net Benefit			
0	1	0	15,050,000	-15,050,000	-15,050,000	0	15,050,000
1	0.741	0	10,085,000	-10,085,000	-10,085,000	0	10,085,000
2	0.549	75,000,000	12,585,000	62,415,000	34,265,835	41,175,000	6,909,165
3	0.406	87,500,000	12,685,000	74,815,000	30,374,890	35,525,000	5,150,110
4	0.301	78,000,000	12,785,000	65,215,000	19,629,715	23,478,000	3,848,285
5	0.22	87,500,000	12,885,000	74,615,000	16,415,300	19,250,000	2,834,700
Total					75,550,740	119,428,000	43,877,260

Source: Primary Data Processed, 2021

1. Net Present Value (NPV)

   NPV = -15.050.000+...+16.415.3
   = 75.550.740

2. Net Benefit Cost Ratio (Net B/C)

   Net B/C $= \frac{100.685.740}{25.135.000}$

   = 4.005

3. Gross Benefit Cost Ratio

   Gross B/C $= \frac{119.428.000}{43.877.260}$

   = 2,721

4. Calculation Internal Rate of Return (IRR) for manalagi mango farming business.

   IRR $= i_1 + \frac{\sum NPV\ (+)}{\sum NPV(+) - \sum NPV(-)} (i_1 - i_2)$

   $= 25\% + \frac{104.327.750}{104.327.750 - 0}$ (35%-25%)

   = 25%+1(10%)

   = 25%+10%

   =35%

Firstly, the Net B/C (Benefit-Cost Ratio) is calculated at 35%, yielding a value of 4,005. A Net B/C greater than 1 signifies that the project is expected to generate more benefits than costs, which is a positive sign. In this case, the Net B/C of 4,005 indicates that the project is highly favorable from a cost-benefit perspective. This means that for every unit of cost incurred, the project is expected to deliver a significant multiple in terms of benefits, suggesting a potentially lucrative investment opportunity (Imai *et al*., 2019). Manalagi mango cultivation business is carried out at an interest rate of 25% and 35%. It is feasible because income is greater than the costs incurred, and the profit will be positive (Katiraee *et al*, 2019).

Secondly, the NPV (Net Present Value) is determined to be -75,550,740. A positive NPV, as is the case here, implies that the project is expected to generate a surplus of cash flows over and above the initial investment when considering the time value of money. In essence, this suggests that the project is financially viable and is expected to provide returns greater than the cost of capital. The magnitude of the positive NPV, in this instance, further underscores the attractiveness of the investment opportunity, indicating substantial potential for profitability (Yan *et al*, 2022).

Lastly, the Gross B/C ratio is calculated as 2,721, also greater than 1. The Gross B/C measures the total benefits relative to the total costs of a project without considering the time value of money. Similar to the Net B/C, a Gross B/C greater than 1 signifies that the project's benefits outweigh its costs. In this context, a Gross B/C of 2,721 suggests a substantial positive margin between total benefits and total costs, reinforcing the notion that the project is economically sound and likely to yield considerable returns.

In summary, the financial analysis based on the provided metrics of Net B/C, NPV, and Gross B/C strongly indicates the financial feasibility and attractiveness of the project being evaluated. These calculations suggest that the project is expected to generate significant benefits in excess of its costs, even when considering the time value of money. Consequently, this data provides a compelling case for considering and pursuing this investment or project opportunity, as it offers substantial potential for positive financial outcomes.

3.6 The Sensitivity Analysis of Manalagi Mango Cultivation Farming

The sensitivity analysis of the Mango Manalagi cultivation business is based on the following (Vermeulen *et al*, 2018):

1. Increase in production costs by 10% while income remains constant.
2. Decrease in revenue by 10%, while production costs remain constant.

.

3.6.1 Increased production cost by 10% while income remains constant.

Table 10. Increase in Production Costs by 10% Meanwhile Fixed Income

Plant Age (Year)	Df 25%	Future nominal value			NPV	PV(Bt)Bt.DF	PV(Ct)Ct.Df
		Benefit(Bt)	Cost(Ct)	Net Benefit			
0	1	0	16,555,000	-15,050,000	-15,050,000	0	15,050,000
1	0.833	0	11,093,500	-10,085,000	-10,085,000	0	10,085,000
2	0.694	7,000,000	13,843,500	62,415,000	43,316,010	52,050,000	9,607,389
3	0.579	87,500,000	13,953,500	74,815,000	43,317,885	50,662,500	8,079,077
4	0.482	78,000,000	14,063,500	65,215,000	31,433,630	37,596,000	6,778,607
5	0.402	87,500,000	14,173,500	74,615,000	29,995,230	35,175,000	5,697,747
Total					122,927,755	175,483,500	55,297,819

Source: Primary Data Processed, 2021

1. Net Present Value (NPV)
   NPV = -15.050.000+...+29.995.230
   = 122.927.755
2. Net Benefit Cost Ratio (Net B/C)
   Net B/C = $\frac{148.062.755}{25.135.000}$
   = 5,890
3. Gross Benefit Cost Ratio
   Gross B/C = $\frac{175.483.500}{55.297.819}$
   = 3,173

As a result of the increase in production costs of 10%, while the sales results remain, the manalagi mango Cultivation Business is feasible to do because it has a positive NPV (122,927,755) > 0.Net B/C (5,890) > 1 and Gross B/C (3,173)) > 1 (Anwar *et al*., 2021). The increase in input costs affects the profit level of the manalagi mango Cultivation business. If the increase in production costs is able to increase income, then the business should be carried out or cultivated (Adeyonu *at al*, 2019)

3.6.2 Decreased in revenue by 10% while production costs remain constant.

Result of lower output prices, both due to too much production in the market and due to decreased consumer demand (Fisu *et al*., 2020). A decrease in the price of output by 10% as a whole will cause the income received to decrease by 10%.

Table 11. Decrease in Revenue by 10%, Meanwhile Production Costs Still

Plant Age (Year)	Df 25%	Future nominal value			NPV	PV(Bt)Bt.DF	PV(Ct)Ct.Df
		Benefit(Bt)	Cost(Ct)	Net Benefit			
0	1	0	15,050,000	-15,050,000	-15,050,000	0	15,050,000
1	0.833	0	10,085,000	-10,085,000	-10,085,000	0	10,085,000
2	0.604	67,500,000	12,585,000	42,787,561	29,694,567	46,845,000	8,733,990
3	0.579	78,750,000	12,685,000	47,541,735	27,526,665	45,596,250	7,344,615
4	0.482	70,200,000	12,785,000	52,824,150	25,461,240	33,836,400	6,162,370
5	0.402	78,750,000	12,885,000	60,438,150	24,296,136	31,657,500	5,179,770
Total					81,843,608	115,774,650	52.555.745

Source: Primary Data Processed, 2021

1. Net Present Value (NPV)
   NPV = -15.050.000+...+24.296.136
   = 81.843.608
2. Net Benefit Cost Ratio (Net B/C)
   Net B/C = $\frac{115.774.650}{52.555.745}$
   = 2,202

The data indicating a 10% decrease in revenue while production costs remain stable reveals important insights about the financial viability of the Manalagi mango cultivation business in Mertani Village. In this scenario, The Net Present Value (NPV) of the Manalagi mango cultivation business, amounting to 81,843,608, indicates that the project is financially viable. A positive NPV means that the project is expected to generate more revenue than the initial investment and ongoing costs. In this case, the NPV is significantly greater than zero, indicating that the project has the potential to yield a positive return on investment.

The Benefit-Cost Ratio (B/C) of 2.202 further supports the financial feasibility of Manalagi mango cultivation. A B/C ratio greater than 1 signifies that the benefits outweigh the costs, indicating a financially sound project. With a B/C ratio of 2.202, the project is expected to generate more than double the benefits compared to the costs incurred.

Despite a 10% decrease in revenue, the business still maintains a positive NPV and a B/C ratio greater than 1. This resilience suggests that Manalagi mango cultivation in Mertani Village is not overly reliant on volatile market conditions, and it can withstand certain revenue fluctuations while remaining profitable.

The fact that production costs remain stable is a positive aspect of the business. Stable costs help in maintaining profitability and reducing financial risks associated with unpredictable cost fluctuations. The positive NPV and strong B/C ratio make Manalagi mango cultivation in Mertani Village an attractive investment opportunity. Investors and stakeholders can be confident in the financial viability of the project, which may encourage further investment in the local mango cultivation industry.

The ability to maintain profitability even with a revenue decrease suggests that the business has established a sustainable model. This can be seen as a testament to the resilience and adaptability of Manalagi mango cultivation in the local context. While the data provided does not explicitly mention risk factors, it is important to consider that effective risk management strategies may influence positive financial indicators. Assessing and addressing potential risks, such as pests, diseases, or market fluctuations, is essential for maintaining the project's financial health.

In summary, the financial data indicates that Manalagi mango cultivation in Mertani Village is a financially viable and attractive venture. Despite a decrease in revenue, the project maintains a positive NPV and a strong B/C ratio, highlighting its potential for profitability and sustainability. These findings serve as a basis for informed decision-making and investment in the local mango cultivation industry.

4. Conclusion

Manalagi mango cultivation in the research area, at interest rates of 20%, 25%, and 35%, is highly feasible. The positive NPV (>0), Net B/C (>1), and Gross B/C (>1) values at these interest rates affirm the economic viability of this agricultural venture. This suggests that investing in Manalagi mango cultivation is a sound financial decision under these circumstances. The Internal Rate of Return (IRR) for Manalagi mango cultivation is an impressive 35%. This figure signifies the level of profitability achieved by engaging in this agribusiness. A 35% IRR demonstrates that this agricultural endeavor has the potential to deliver substantial returns on investment. The analysis reveals the resilience of Manalagi mango farming to changes in production costs and income. Even when both production costs increase, and revenue decreases by 10%, the project remains financially feasible. This finding underscores the robustness and adaptability of Manalagi mango cultivation in the face of potential cost fluctuations and revenue declines. The research underscores the strong economic prospects of Manalagi mango farming. With positive financial indicators, a high IRR, and resilience to adverse changes, Manalagi mango cultivation presents an attractive and profitable agribusiness opportunity. These findings provide valuable guidance for farmers and investors looking to engage in or expand their involvement in Manalagi mango farming, fostering economic growth and sustainability in the community.

References

Abbas, R., Ayyaz, S., Baker, I., Beyer, R., Brown, E., Duthie, R., Johnson, P., Kristedi, T., Kumar, S., Macintosh, H., Markham, R., Hoa, N. Van, Oakshott, J., Pagnchak-Roat, M., Palanivel, H., Prowse, W., Sophornthida, L., & Wandschneide, T. (2019). Analysis research of mango markets, trade and strategic research issues in the Asia-Pacific. In *ACIAR G*.

Adeyonu, A. G., Balogun, O. L., Ajiboye, B. O., Oluwatayo, I. B., & Otunaiya, A. O. (2019). Sweet potato production efficiency in Nigeria: Application of data envelopment analysis. *AIMS Agriculture and Food*, *4*(3), 672–684. https://doi.org/10.3934/agrfood.2019.3.672

Anwar, C., Aziz, S. K., Indriyani, D., Ralindra, D. F., & Wahyuni, F. (2021). Perencanaan Jaringan Irigasi Hidroponik Guna Ekstensifikasi Lahan pada Sawah Tadah Hujan di Kelurahan Made, Kecamatan Sambikerep, Kota Surabaya. *Jurnal Aplikasi Teknik Sipil*, *19*(2), 167. https://doi.org/10.12962/j2579-891x.v19i2.8621

Arjunan, K. (2022). A New Method to Estimate NPV and IRR from the Capital Amortization Schedule and the Advantages of the New Method. *Australasian Accounting, Business and Finance Journal*, *16*(6), 23–44. https://doi.org/10.14453/aabfj.v16i6.03

Cusworth, G. (2020). Falling short of being the ‘good farmer’: Losses of social and cultural capital incurred through environmental mismanagement, and the long-term impacts agri-environment scheme participation. *Journal of Rural Studies*, *75*, 164–173. https://doi.org/https://doi.org/10.1016/j.jrurstud.2020.01.021

Fisu, A. A., Didiharyono, D., & Bakhtiar, B. (2020). Economic & Financial Feasibility Analysis of Tarakan Fishery Industrial Estate Masterplan. *IOP Conference Series: Earth and Environmental Science*, *469*(1). https://doi.org/10.1088/1755-1315/469/1/012002

Flores, E. D., & Cruz, R. S. M. D. (2017). Value chain improvement of fresh sweet potato through the utilization of mechanical harvester. *Agricultural Engineering International: CIGR Journal*, *19*(4), 159–169.

Hamidah, E., Rahayu, E. S., Sutrisno, J., & Marwanti, S. (2021). Economic analysis of sweet potato (Ipomoea batata L.) farming in Lamongan regency. *IOP Conference Series: Earth and Environmental Science*, *637*(1). https://doi.org/10.1088/1755-1315/637/1/012016

Hamidah, Emmy, Rahayu, E. S., Sutrisno, J., & Marwanti, S. (2021). Determination of Effectiveness and Efficiency of Production Factors in Sweet Potato Farming in Lamongan, Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, *11*(6), 2180–2188. https://doi.org/10.18517/ijaseit.11.6.15245

Imai, K., Gaiha, R., & Bresciani, F. (2019). The labor productivity gap between the agricultural and nonagricultural sectors, and poverty and inequality reduction in Asia. *Asian Development Review*, *36*(1), 112–135. https://doi.org/10.1162/adev_a_00125

Karuniawan, A., Maulana, H., Anindita, P. A., Yoel, A., Ustari, D., Suganda, T., & Concibido, V. (2021). Storage root yield and sweetness level selection for new honey sweet potato (Ipomoea batatas [L.] Lam). *Open Agriculture*, *6*(1), 329–345. https://doi.org/10.1515/opag-2021-0219

Katiraee, N., Battini, D., Battaia, O., & Calzavara, M. (2019). Human diversity factors in production system modelling and design: State of the art and future researches. *IFAC-PapersOnLine*, *52*(13), 2544–2549. https://doi.org/10.1016/j.ifacol.2019.11.589

Liantoni, F., & Hermanto, L. A. (2017). Adaptive Ant Colony Optimization on Mango Classification Using K-Nearest Neighbor and Support Vector Machine. *Journal of Information Systems Engineering and Business Intelligence*, *3*(2), 75. https://doi.org/10.20473/jisebi.3.2.75-79

Loutzenhiser, G., & Mann, E. (2021). Liquidity issues: solutions for the asset rich, cash poor. *Fiscal Studies*, *42*(3–4), 651–675. https://doi.org/10.1111/1475-5890.12281

Magagula, N., Mabuza, M. P., & Zubuko, N. (2020). Effects of Plant Density and Planting Pattern on Growth and Seed Yield of Groundnuts [Arachis hypogaea (l.)] in the Wet Middleveld of Eswatini. *Asian Plant Research Journal*, *3*(2), 1–12. https://doi.org/10.9734/aprj/2019/v3i230065

Maghfiroh, U., & Hariani, S. A. (2022). Analysis of the Relation of Mango Plants in Jember Using the Taximetry Method. *Jurnal Bioterdidik: Wahana Ekspresi Ilmiah*, *10*(1), 71–77. https://doi.org/10.23960/jbt.v10i1.23466

Maulida, D., & Andriani, D. (2022). Risk Analysis of Indonesian Mango Sustainable Supply Chain For Singapore Market. *Habitat*, *33*(3), 263–275. https://doi.org/10.21776/ub.habitat.2022.033.3.26

Musliu, A., Frangu, B., Popp, J. S., Thomsen, M., & Kemper, N. (2019). Technical efficiency estimation of dairy farming in Kosovo. *New Medit*, *18*(3), 77–84. https://doi.org/10.30682/nm1903f

Nimoh, F., Richmond Anaman, R., Asiamah, M. T., Yeboah, B., Agyekum, I., Kpe, P. D. K., & Kouao, D. K. (2020). Financial performance and constraints in gari production in Kumasi, Ghana. *African Journal of Food, Agriculture, Nutrition and Development*, *20*(4), 16085–16098. https://doi.org/10.18697/ajfand.92.18410

Pambudi Nurwantara, M., Raharja, S., & Udin, F. (2017). Financial Feasibility Analysis of Small and Medium Business Development CV. XYZ in Madiun East Java. *SEAS (Sustainable Environment Agricultural Science)*, *1*(1), 19. https://doi.org/10.22225/seas.1.1.436.19-26

Rohman, A. K., & Zulfikar. (2021). Diversity tree varieties mango (Mangifera indica L.) in critical areas. *AGARICUS: Advances Agriculture Science & Farming*, *1*(1), 1–5.

Utami, S., Baskoro, K., Perwati, L. K., & Murningsih, M. (2019). Keragaman Varietas Mangga (Mangifera indica L.) Di Kotamadya Semarang Jawa Tengah. *Bioma : Berkala Ilmiah Biologi*, *21*(2), 121–125. https://doi.org/10.14710/bioma.21.2.121-125

Vermeulen, S. J., Dinesh, D., Howden, S. M., Cramer, L., & Thornton, P. K. (2018). Transformation in Practice: A Review of Empirical Cases of Transformational Adaptation in Agriculture Under Climate Change. *Frontiers in Sustainable Food Systems*, *2*(October), 17. https://doi.org/10.3389/fsufs.2018.00065

Widyasari, R. A. H. E., Nurdialy, M., & Fadhilah, J. (2022). Financial Feasibility Analysis of Product Modification Katuk and Spinach Brownies Tartlet as an Alternative Breastfeeding Mother's Snack. *E3S Web of Conferences*, *348*. https://doi.org/10.1051/e3sconf/202234800036

Yan, R., & Zhang, Y. (2022). The Introduction of NPV and IRR. *Proceedings of the 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022)*, *648*(Icfied), 1472–1476. https://doi.org/10.2991/aebmr.k.220307.241