FEASIBILITY ANALYSIS OF MELON AGRIBUSINESS GREENHOUSE SYSTEM

Olga Oviolitta Dhamayanti[1], Rahayu Relawati[1]*, Istis Baroh[1]

[1]Direktorat Program Pascasarjana, Universitas Muhammadiyah Malang, Malang, Indonesia

*Correspondence: rahayurelawati@umm.ac.id

ABSTRACT

Blitar Regency also experienced a decrease in melon production by 23.1 thousand quintals in 2021 and 11.2 thousand quintals in 2022. One of the right solutions is using technology in the cultivation process. The technology that is widely used is climate modification through greenhouses. This research aims to determine the feasibility of cultivating melons in a greenhouse using the polybag planting method based on investment criteria. The research was conducted in Wates District, Blitar Regency, East Java Province. Data collection was carried out through direct interviews with melon farmers. The assessment criteria include Net Present Value (NPV), Net B/C Ratio, Gross B/C Ratio, and Internal Rate of Return (IRR). Blitar Regency is considered feasible based on an NPV of Rp. 5.8 million, Gross B/C Ratio 1.09, Net B/C Ratio 1.08, and IRR 13%. The results of this study can be conveyed to investors that melon farming can be profitable for investors with a greenhouse system.

Keywords: greenhouse, investment criteria, melon

ABSTRAK

Kabupaten Blitar mengalami penurunan produksi buah melon dari tahun 2021 sebanyak 23.1 ribu kwintal, sedangkan tahun 2022 sebanyak 11.2 ribu kwintal. Salah satu solusi yang tepat yaitu penggunaan teknologi dalam proses budidaya. Teknologi yang banyak digunakan saat ini adalah modifikasi iklim menggunakan greenhouse. Tujuan penelitian ini yaitu untuk mengetahui apakah budidaya melon sistem greenhouse dengan metode tanam polybag layak untuk dilakukan sesuai dengan kriteria investasi. Penelitian ini dilakukan di Kecamatan Wates, Kabupaten Blitar, Provinsi Jawa Timur. Metode pengumpulan data melalui wawancara langsung kepada petani melon. Kriteria penilaian yang digunakan terdiri dari NPV (Net Present Value), Net B/C ratio, Gross B/C ratio, dan Internal Rate of Return. Kabupaten Blitar layak untuk dijalankan berdasarkan nilai NPV sebesar Rp. 5,8 juta, Gross B/C ratio sebesar 1,09 dan Net B/C ratio sebesar 1,08 serta nilai IRR sebesar 13%. Hasil studi ini dapat disampaikan kepada investor bahwa usahat melon dapat menguntungkan investor dengan sistem greenhouse

Kata kunci: *greenhouse, kriteria investasi, melon*

INTRODUCTION

Agriculture is currently a mainstay sector in building the national economy. As a tropical country, including Blitar Regency, it has the potential to produce horticultural products to meet demand. Blitar Regency is known for its largest chicken egg production in East Java, besides being the largest red chili producing area, but currently Blitar

Regency is also starting to be known as a melon producer in East Java.

Melon production in East Java has experienced a downward trend from 2021 to 68.5 thousand tons, while in 2022, it was 62.3 thousand tons (BPS, 2023a). Not only in the province but Blitar Regency also experienced a decline from 2021 by 23.1 thousand quintals, while in 2022, it was 11.2 thousand quintals (BPS, 2023b). One of the right solutions is the use of technology in the cultivation process. The technology that is widely used today is climate modification using greenhouses.

Greenhouses function as a place to protect plants from direct sunlight and rainfall (Ristian et al., 2022). Cultivation in a greenhouse is also a solution to deal with climate change so that it can inhibit plant growth, this is because the greenhouse has a microclimate that can be controlled according to the needs of the plant, besides that it can protect against pests and diseases and prevent a decline in plant quality (Khoiris & Thoriq, 2022).

According to Saleh, (2020) A financial feasibility analysis of honey pumpkin farming is feasible in Pandeglang Regency. The difference between this study and previous studies is applying an agribusiness project evaluation model in a melon agribusiness greenhouse system with a planting method using polybags. Research Karimil et al., (2021) stated that melon cultivation in Bengkulu City is worth pursuing. This is the same as the research Bulan et al., (2022) which states that melon cultivation in a greenhouse has a reasonably large NPV value with a high bank interest rate, but based on the analysis, the business is still feasible.

The similarity between previous studies and this study is that they both use investment criteria analysis, but the difference is in the system being studied. There have been many studies on the feasibility analysis of melon cultivation in the greenhouse system. However, few project analysis studies still discuss melon cultivation in the greenhouse system using polybag planting methods. Based on this description, this study aims to determine whether melon cultivation in the greenhouse system using the polybag planting method is feasible according to investment criteria.

METHODS

This research was conducted in Wates District, Blitar Regency, East Java Province. The selection of the research

location was done intentionally (purposively) to melon farmers using the greenhouse system in Wates District. The data used are primary data. Data yang digunakan yaitu data primer. Data collection method through direct interviews with melon farmers. Data collection implementation starts from November-December 2023. Sample criteria are farmers who grow melons with a greenhouse system. Data analysis uses financial feasibility analysis with a project evaluation approach. Financial feasibility analysis aims for investment activities to be carried out. The assessment criteria used consist of NPV (Net Present Value), Net B/C ratio, Gross B/C ratio, and Internal Rate of Return (Aprilia *et al*., 2021). The project age refers to the economic life of the greenhouse, which is 5 years. The interest rate used is 9% per year. Net Present Value is the difference between the present value of income and the present value of expenditure. Determination of feasibility based on the NPV value (Riana et al., 2022), the following formula is used.

$$\text{NPV} = \sum_{t}^{n} \frac{Bt - Ct}{(1-i)^t} \dots\dots\dots\dots\dots(1)$$

Description:

Bt = Benefit in year t

Ct = Cost in year t

i = Interest rate (9%)

t = Economic life of the greenhouse (5 years)

Decision-making criteria:

1. If NPV > 0, then the melon agribusiness is declared feasible

2. If NPV < 0, then the melon agribusiness is declared unfeasible

3. If NPV = 0, then the melon agribusiness is declared in a break-even position.

Net Benefit Cost Ratio (Net B/C) is a comparison of positive net benefit discounts with negative net benefit discounts. According to Dayanti and Zulkarnain (2022), the Net B/C formula is as follows:

$$\text{Net B/C} = \frac{\sum_{t=1}^{n}(NPV\ positif)}{\sum_{t=1}^{n}(NPV\ Negatif)} \dots\dots\dots\dots(2)$$

Description:

Net B/C = Net Benefit Cost Ratio

i = Interest rate (9%)

t = Economic life of the greenhouse (5 years)

Decision-making criteria:

1. If Net B/C > 1, then the melon agribusiness is declared feasible

2. If Net B/C < 1, then the melon agribusiness is declared unfeasible

3. If Net B/C = 1, then the melon agribusiness is declared in a break-even position.

Gross Benefit Cost Ratio (Gross B/C) is a comparison between gross benefit and gross cost. According to Gandhi and Purwana (2023), Gross B/C is systematically formulated as follows.

$$\text{Gross B/C} = \frac{\sum_{t=0}^{n}\frac{Bt}{(1+i)^t}}{\sum_{t=0}^{n}\frac{Ct}{(1+i)^t}} \ldots\ldots\ldots\ldots(3)$$

Description:

Gross B/C = Gross Benefit Cos Ratio

Ct = Benefit year t

I = Interest rate (9%)

T = Economic life of the greenhouse (5 years)

Assessment criteria:

1. If Gross B/C > 1, then the melon agribusiness is declared feasible.

2. If Gross B/C < 1, then the melon agribusiness is declared unfeasible.

3. If Gross B/C = 1, then the melon agribusiness is declared in a break-even position.

Internal Rate of Return is an interest rate that shows the net present value (NPV) equal to the total amount of project investment or in other words the interest rate that produces NPV equal to zero. According to Ali and Tunnisa (2022) the IRR formula is as follows.

$$\text{IRR} = \frac{NPV_1}{NPV_1 - NPV_2}\ (i_2 - i_1)\ldots\ldots\ldots(4)$$

Description:

NPV1 = positive NPV

NPV2 = negative NPV

i1 = Interest rate NPV1

i2 = Interest rate NPV2

Assessment criteria:

1. If IRR > interest rate, melon agribusiness is declared feasible.

2. If IRR < interest rate, melon agribusiness is declared unfeasible.

3. If IRR = interest rate, then melon agribusiness is declared break-even.

RESULT AND DISCUSSION

Investment costs are the initial costs incurred for a business. The initial investment in melon agribusiness is the construction of a greenhouse. Operational costs are costs incurred during the production process, while benefits are income during the post-production period. The following is data on total investment, operational managers and benefits of the greenhouse system melon agribusiness.

Table 1. Total investment costs, operational costs, and benefits of the greenhouse system melon agribusiness.

Description	Total COST (IDR)
Investment Cost	34,7
Operating Cost	67,3
Benefit Cost	136,5
Total	238,5

Source: Primary Data, processed (2024)

Investment is a capital investment that will be used to create or increase production for profitable returns in the future (Zifa et al., 2023).

The investment cost for melon agribusiness is IDR 34,723 million with details for greenhouse construction, land rental, and equipment purchase. The greenhouse is built using a bamboo frame and UV plastic measuring 500 m2 with a total of around 1300-1500 trees.

Operational costs are costs incurred during the production process related to administrative and sales activities (Widodo et al., 2020). The operational costs incurred in this study are the cost of procuring seeds, polybags, labor, fertilizers and pesticides. The use of polybags in planting melons using the greenhouse system will be more productive than using beds, this is because it can produce continuously without crop rotation, besides making it easier to maintain and harvest activities.

There are 2 types of workers in this business, in the first month there are daily workers who are paid per day during the planting period, while ordinary workers are employed if there are activities that require more than one person. When planting and harvesting requires more labor, it requires an additional budget for the workforce. The melon planting period takes 70-80 days so that one year can produce 4 periods. The total operational costs in table 1 show that for 24 months it requires Rp. 67,279 million. In line with the opinion of Rachmawati and Gunawan (2020) who stated that in one year melon planting can be done 4 times and one harvest reaches a profit of 60-70 million with a turnover of 250 million rupiah. The benefits or income of the greenhouse melon agribusiness system are classified as profitable when viewed from the total income. Based on table 1 shows that the total benefit reaches Rp. 136,484 million for 24 months. Melon farmers sell their harvests primarily to local wholesalers at prices determined by middlemen. Melons are classified based on their respective grades, and each grade has a different price. 3 grades are mostly used by middlemen to buy farmers' harvests, especially melons, namely grade A, grade B, and grade C. Grade A has a weight classification of more than 1.5 kg/fruit with no physical defects. Usually, this grade is priced at IDR 16,000. Grade B, with a weight of 1-1.5 kg/fruit, is priced at IDR 12,000. Grade C, with a weight of less than 1 kg/fruit and there are slight defects due to plant-disturbing organisms, is priced at IDR 5,000. The average weight of the fruit produced reaches more than 1.5 kg/fruit, so the total benefit generated is large. Each plant only produces 1 fruit.

This is what makes melons more optimal in their growth because they do not need to compete for nutrients to grow and develop. Melon is a seasonal plant; therefore, in this case, after the melon is harvested, the old plant will be replaced with a new plant. Melon has a sweet and distinctive taste, contains quite high nutrition, and has a complete composition (Pardosi et al., 2022).

Assessment of investment criteria for melon agribusiness using the greenhouse system for 24 months with an interest rate of 9% per year or 0.75% per month. NPV analysis is used to determine future profits. The NPV value depends on the specified Discount rate. If the NPV value> 1, it is stated that the business is feasible or worth doing. Based on table 2 shows that the NPV value of this business is IDR 5.8 million, which states that this business is feasible to run; this follows the research of Bulan et al. (2022), which states that melon cultivation is profitable and feasible to be pursued because the NPV value> 0.

Table 2. Analysis of investment criteria for melon agribusiness using the greenhouse system

Investment Criteria	Value	Category
NPV	IDR 5,8	feasible
Gross B/C Ratio	1,09	feasible
Net B/C Ratio	1,08	feasible
IRR	13%	feasible

Source: Primary data, processed (2024)

Gross B/C determines the profit obtained from implementing melon agribusiness in Blitar Regency. The Gross B/C value is obtained from calculating the Present Value Benefit divided by the Present Value Cost. The calculation results can indicate whether the business is feasible or not. Based on Oka et al., (2021) states that the greater the profit comparison with the resulting expenditure, the more feasible the business is to run. The Gross B/C value of 1.09 states that this business is feasible to run, which means that every Rp. 1 expenditure will provide a gross income of Rp. 1.09, this is in line with the research Zifa et al., (2023) yang menyatakan bahwa nilai usaha agrowisata golden melon layak untuk dikembangkan karena memiliki nilai *Gross B/C* > 1 .

Net B/C is a way to calculate the feasibility value in melon agribusiness. Net B/C is generated by comparing the positive net benefit discount value and the negative net benefit discount value. The comparison of Net B/C will show that the results of the benefits will be used for a certain period (Oka et al., 2021). The Net B/C ratio value is 1.08, which also states that this business is feasible to run, by research. Novitasari & Syarifah, (2020) which states that the

Net B/C ratio value of the business is > 1, then it is feasible to run. The Net B/C result of 1.08 shows that the melon agribusiness run with an interest rate of 9% will provide a profit of 1.08 times, which means that every Rp. 1 will generate a profit of Rp. 1.08 so that the melon agribusiness is declared feasible.

IRR is a way of calculating investment using a method that uses the same interest rate between the present value invested and the present value received from the melon agribusiness. The IRR value is generated through positive NPV and negative NPV at a discount factor level with a close distance. The IRR calculation results are a measuring tool for investment returns with a specific time interval. The rate of return on capital is used to cover investment and operational expenses during the production process (Oka et al., 2021). The IRR value shows a figure of 13%; according to the statement, the business is feasible to run. The IRR value is more excellent than the interest rate used therefore, the melon agribusiness can provide internal returns from the investment value used during the project life. This is following Khatimah, (2019) which states that the return on shrimp farming is greater than the 9%

interest rate, so it is declared feasible to run.

CONCLUSION

This study concludes that the greenhouse melon agribusiness in Blitar Regency is feasible to run based on the NPV value of Rp. 5.8 million, a Gross B/C ratio of 1.09, a Net B/C ratio of 1.08, and an IRR value of 13%. The Gross B/C value of 1.09 states that every Rp. 1 will provide a gross income of Rp. 1.09. The Net B/C ratio value is 1.08 times, which means that every Rp. 1 will generate a profit of Rp. 1.08 so that the melon agribusiness is declared feasible. The IRR value of 13% means that the rate of return is higher than bank interest. Based on the results of this study, it is necessary to conduct research related to the differences in investment criteria if different methods and sensitivity analysis are used to determine the factors that can affect investment criteria. The analysis results will be the same as with other methods; therefore, further research is needed.

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