



Financial Feasibility Analysis of Hydroponic Vegetable Farming in Kendari City (Case Study of Simbo Hydroponics)

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Abstract

This study aims to analyze the financial feasibility of vegetable farming with a hydroponic system in Kendari City, with a case study on Simbo Hydroponics. Simbo Hydroponics is a household business that utilizes the Nutrient Film Technique (NFT) system to cultivate several types of vegetables including lettuce, pak choy, Chinese cabbage, caisim cabbage, and samhong. This study uses a quantitative and qualitative approach with data collection techniques through observation, interviews, and documentation. The analysis includes calculating income, Revenue Cost Ratio (RCR), and Break Even Point (BEP). The results of the analysis show that the Simbo Hydroponics farming business has a positive income level and an RCR value > 1, which means that this business is financially feasible to be developed. The break-even point (BEP) of production and price also shows that the business is in a profitable condition. Thus, this hydroponic business can be used as an alternative urban agricultural business that is efficient, sustainable, and has bright prospects.

Keywords: Hydroponics, financial feasibility, income, RCR, BEP

INTRODUCTION

The agricultural sector is one of the potential sectors that can continue to be developed, especially in an urban context. One of the most promising subsectors is horticulture, which includes vegetables, fruits, medicinal plants, and ornamental plants. Among these types, vegetables have significant benefits for human life, both as a source of food, nutrition, and health, as well as a source of income for households and the state. Vegetables such as lettuce, cabbage,





and pak choy contain fiber, vitamins, and essential minerals that are beneficial for the human body (Ardian, 2007). However, the development of urban areas like Kendari City has led to a decrease in agricultural land due to population growth and economic expansion, necessitating agricultural innovations that can address these challenges.

One solution that can be applied in limited land areas is the hydroponic farming system. According to Aini and Azizah (2018), hydroponics is a method of growing plants without soil, using water enriched with nutrient solutions. This method is considered efficient because it can be carried out year-round, is not dependent on the season, and can produce products of higher quality compared to conventional agriculture (Ardian, 2007). In Kendari City, hydroponic farming began to develop in 2017 and has attracted the attention of people from various backgrounds, such as farmers, civil servants, lecturers, and students. Data from the Kendari City Agriculture Department in 2022 shows that there are 39 active hydroponic farming groups.

One of the hydroponic businesses in Kendari City is Simbo Hydroponic, located in Watubangga Village, Baruga District. Established in 2019, Simbo Hydroponic manages a 300 m² plot of land with a capacity of 5,000 planting holes for cultivating various types of vegetables, such as lettuce, pak choy, samhong, chaisin, and kailan mustard. Despite the high quality of its products, this business is still classified as a household-scale operation and requires significant initial investment for the construction of facilities and production equipment. Capital is the main constraint due to limited access and financial capacity among farmers. Therefore, a financial feasibility analysis is necessary to help business operators understand the potential profits, capital efficiency, and long-term sustainability of their operations.

A feasibility study is an effort to assess whether a business is viable, particularly from a financial perspective. According to Kasmir and Jakfar (2003), financial aspects are the main determinants in feasibility studies because even if other aspects are met, if the financial aspects are not feasible, the business cannot be considered profitable. This is also emphasized by Haming and Basmalah (2003) that a project will be rejected if it does not provide optimal economic benefits.

Based on the above, the author is interested in conducting research titled "Financial Feasibility Analysis of Hydroponic Vegetable Farming in Kendari City (Case Study of Simbo Hydroponics)." This study is expected to provide information and considerations for business owners and related parties in developing a more efficient, profitable, and sustainable hydroponic farming system.



METHOD

This study was conducted at Simbo Hydroponic Farm, located in Watubangga Village, Baruga District, Kendari City. The location was selected based on an initial *survey*, which revealed that the farm has been actively engaged in vegetable farming using the hydroponic system since its establishment and continues to do so to this day. The study will be conducted from November 2024 to February 2025. The object of this study is the Simbo Hydroponic Farm owned by Mr. Amir Salim S.T., which cultivates several types of hydroponic vegetables, including lettuce, pak choy, samhong mustard, chaisin mustard, and kailan.

Data collection techniques in this study include observation, which involves direct observation by the researcher of the research object to observe ongoing activities; interviews, which involve direct interaction with respondents using a set of questions to obtain information relevant to the research; and documentation, which involves collecting data through notes and documents relevant to the research object.

Data analysis was conducted using qualitative and quantitative approaches. Qualitative data was presented descriptively to provide an overview of hydroponic vegetable farming and its prospects. Meanwhile, quantitative analysis was conducted through income analysis, financial feasibility analysis, and *break-even point* (BEP) analysis.

1. Income from vegetable farming using the hydroponic system at Simbo Hydroponic is calculated by subtracting the total costs incurred in the cultivation process from the total revenue from product sales.

$$\Pi = TR - TC, \text{ where } TR = P \times Q \text{ and } TC = FC + VC$$

Notes:

Π : Revenue

TR : Total *revenue*

TC : *Total Cost*

P : Product price

Q : Quantity of Production

FC : *Fixed Cost*

VC : *Variable Cost* (Ibrahim *et al.*, 2021)

2. The financial viability of vegetable farming using the hydroponic system at Simbo Hydroponic was analyzed using the *Revenue Cost Ratio* (RCR) method to determine whether the business is viable or not. The *Revenue Cost Ratio* (RCR) is the ratio between the level of profit or revenue obtained and the total costs or capital expended. The formula for the *Revenue Cost Ratio* (RCR) is

$$RCR = \frac{TR}{TC}$$

Explanation:

RCR : Revenue Cost Ratio

TR : Total revenue (*Total Revenue* (Rupiah/year))

TC : Total Cost (*Total Cost* (Rp/year)) (Rahardi and Hartono, 2003)

With the following criteria:

- If the RCR value is > 1 , then the business is economically viable and can be continued.
- If the RCR value is < 1 , then the business is incurring losses and is not viable to continue.

3. *The Break-Even Point* (BEP) analysis is used to determine the break-even point for vegetable farming using the hydroponic system at Simbo Hydroponic , which includes production volume and selling price. *The Break-Even Point* (BEP) is an analysis to determine and find the quantity of goods or services that must be sold to consumers at a certain price to cover the costs incurred and achieve a *profit*. The following is the formula for calculating BEP (Soekartawi, 2006).

$$\text{BEP Production (kg)} = \frac{\text{Fixed Cost (Rp)}}{\text{Sell Price } \left(\frac{\text{Rp}}{\text{Kg}}\right) - \text{Variabel Cost (Rp/Kg)}}$$

The criteria for production BEP are as follows:

- If BEP production $<$ optimal production quantity, the business is in a profitable position.
- If the production BEP = production quantity, the business is at the break-even point or neither profitable nor loss-making.
- If the production BEP is greater than the production quantity, the business is in an unprofitable position.

$$\text{Price BEP (Rp)} = \frac{\text{Fixed Cost (Rp)}}{\text{Production Total (Kg)}}$$

For price BEP, the criteria are as follows:

- If the price BEP is less than the selling price, the business is in a profitable position.
- If the price BEP = selling price, then the business is at the break-even point or neither profitable nor loss-making.
- If the BEP price is greater than the selling price, the business is in an unprofitable position.

RESULTS AND DISCUSSION

Analysis of Simbo Hydroponic Vegetable Farming

Agricultural activities at Simbo Hydroponics require significant costs, both fixed costs such as equipment and installation investments, and variable costs such as seeds, nutrients, maintenance, and distribution; in accordance with the cost classification by Athifa et al. (2019). Although the cost per growing period is relatively high, efficient management is expected to optimize income. In this study, all costs were calculated based on the accumulation over one year. The types of costs examined in this study are fixed costs (*Fixed Cost*), variable costs, and total costs.

Table 1. Total Fixed and Variable Costs

Cost Classification	Cost Type	Total
Fixed Costs (<i>Fixed Cost</i>)	Cost (IDR/Year)	478,015
	Cost (IDR/Month)	39,835
Variable Costs	Seed Cost (IDR/Year)	2,364,000
	Shared Variable Costs (Rp/Year)	30,540,000
	Total Variable Costs (IDR/Year)	32,094,000
	Total Variable Costs (IDR/Month)	2,742,000

Based on Table 1 above, the total fixed costs and variable costs in this study can be explained as follows;

1. That the total depreciation cost is Rp478,015 per year or approximately Rp39,835 per month. This depreciation cost is categorized as a fixed cost because it is incurred by the research institution () on a regular basis and does not depend on the size of the harvest in a single production period.
2. There are several variable cost components calculated annually. First, seed costs incurred over one year amount to Rp2,364,000, covering the purchase of vegetable seeds such as lettuce, pak choy, cabbage, and others required in each planting cycle. Second, there are shared variable costs of Rp30,540,000 per year, which include various operational expenses such as the purchase of nutrients, growing media, water, electricity, as well as labor and transportation costs during the production process. In total, the annual variable costs amount to Rp32,094,000, or approximately Rp2,742,000 per month. These costs highlight the significant routine expenses that must be managed effectively to ensure the business remains efficient and generates optimal profits.

Table 2. Total Costs

Cost Type	Total Cost (Rp/Year)	Total Cost (Rp/Month)
Fixed Costs (Rp/Year)	478,015	39,835
Variable Cost (IDR/Year)	32,904,001	2,742,000
Total Cost (IDR/Year)	33,382,017	2,781,385

The total cost of hydroponic farming at Simbo Hydroponic consists of fixed costs and variable costs. Fixed costs, such as equipment investment and installation, amount to Rp478,015 per year or Rp39,835 per month. Meanwhile, variable costs, which include seed purchases, nutrients, growing media, and distribution of production output, amount to Rp32,904,001 per year or Rp2,742,000 per month. Overall, the total annual operating costs amount to Rp33,382,017 or approximately Rp2,781,385 per month, highlighting the importance of efficient cost management to ensure the business operates optimally and generates profits. From the overall data, it is evident that variable costs are the most dominant component in the hydroponic vegetable production system, reflecting the nature of this business, which is labor-intensive and dependent on daily processes such as nutrient supply, maintenance, labor, and distribution of harvested products. Therefore, efficiency in the use of variable inputs, including control over electricity usage, nutrients, and packaging, is a key factor in improving the profitability of this business. On the other hand, since fixed costs account for a very small proportion of total costs, production fluctuations can significantly impact business efficiency. The higher the production volume, the lower the fixed costs per unit of production, and this can be leveraged to optimize the production capacity of the existing hydroponic system.

Analysis of Vegetable Revenue from Hydroponic Farming

In running a business, one of the most critical factors to consider is the revenue generated. This revenue is influenced by various aspects, including the selling price of the product, sales volume, and costs incurred during the production process. Simbo Hydroponics, as one of the companies operating in the hydroponic agriculture sector, sets a selling price for each type of plant it markets. Sales data for hydroponic vegetables in a single production cycle can be seen in the table below.

Table 3. Sales and Revenue Data for Hydroponic Vegetable Farming

Type of Cost	Total
Total Sales (Kg/Year)	3,960

Total Revenue (IDR/Year)	154,800,000
Total Revenue (IDR/Month)	12,900,000

Based on Table 3, the total sales of hydroponic vegetables at Simbo Hydroponic over one year reached 3,960 kg, with total revenue of Rp154,800,000 per year or equivalent to Rp12,900,000 per month. This data reflects the significant income potential of hydroponic vegetable cultivation, making this business a promising venture if managed effectively and efficiently.

Hydroponic Vegetable Income Analysis

Revenue analysis is obtained by subtracting total expenses (fixed and variable costs) from total revenue over a production period. High revenue can be achieved through low expenses or high revenue.

Table 4. Income from Hydroponic Vegetable Farming at Simbo Hydroponics

Type of Cost	Total
Total Revenue (Rp/Year)	154,800,000
Total Costs (Rp/Year)	33,382,017
Operating Income (IDR/Year)	121,417,983
Business Revenue (IDR/Month)	10,118,165

Based on Table 4, the total revenue from hydroponic vegetable farming at Simbo Hydroponic over one year reached Rp154,800,000, while the total expenses amounted to Rp33,382,017. Thus, the annual income generated was Rp121,417,983 per year or approximately Rp10,118,165 per month. This indicates that the hydroponic business is profitable and has a fairly high economic value. The monthly income from the five commodities shows that the hydroponic system implemented is capable of generating a stable cash flow every month. With relatively low production costs and high efficiency, this business not only provides profits but also demonstrates a healthy and sustainable income structure. The diversification of crops has also proven effective in maintaining income stability. If one commodity experiences price or production fluctuations, other commodities can support the continuity of the business. Therefore, it can be concluded that the hydroponic vegetable farming business at Simbo Hydroponic is economically viable and profitable, both in terms of annual income and monthly income. This business model also shows potential for further development, especially on a larger scale, due to production efficiency and

the continuously increasing market demand.

Financial Feasibility Analysis of Hydroponic Vegetable Farming (RCR)

The hydroponic vegetable farming conducted by Simbo Hydroponic needs to generate sustainable profits to survive in the long term. Therefore, a financial feasibility analysis was conducted to evaluate the efficiency of capital use and the return on investment through the calculation of the Revenue Cost Ratio (RCR), which is the ratio between total revenue and total costs over one year. The RCR is used to determine whether the business is viable and profitable to develop. According to Rahardi and Hartono (2003), the RCR indicates the extent of profit obtained compared to the costs or capital expended. Thus, the calculation of the RCR is not only important for assessing the viability of a business but also serves as a basis for strategic decision-making to enhance efficiency, business performance, and optimal profits in the future.

Table 5. Analysis of the Revenue Cost Ratio (RCR) for Hydroponic Vegetable Farming in Simbo Hydroponics

Type of Cost	Total
Total Revenue (IDR)	154,800,000
Total Cost (IDR)	33,382,017
Revenue Cost Ratio (RCR)	4.64

Based on Table 5, the *Revenue Cost Ratio* (RCR) analysis of hydroponic vegetable farming at Simbo Hydroponic shows that all types of crops cultivated are profitable and economically viable. RCR is an indicator of business efficiency calculated by comparing total *revenue* to total production costs. If the RCR value is > 1 , the business is considered profitable because the income generated exceeds the costs incurred. Overall, the total revenue from the five types of plants over one year was Rp154,800,000, with total production costs of Rp33,382,017, resulting in a total RCR of 4.64. This means that every Rp1,000 spent by Simbo Hydroponic generates Rp4,640 in revenue. With the RCR value for all commodities far above one ($RCR > 1$), it can be concluded that the hydroponic vegetable cultivation business operated at Simbo Hydroponic is highly efficient, profitable, and viable for sustainable development. Diversifying crop types is also an effective strategy to maintain business stability and minimize the risk of losses.

Break-Even Point (BEP) Analysis for Hydroponic Vegetable Farming

The Break-Even Point (BEP) is a condition where total revenue from sales equals total costs incurred by a business, meaning that at this point, the business neither makes a profit nor incurs

a loss. BEP analysis is important in evaluating the feasibility of a business because it can be used to determine how much production or sales must be achieved for the business to cover all operational costs. Additionally, this analysis helps in determining the minimum and optimal limits of production or sales to achieve the expected profit. In this study, BEP analysis was conducted using two approaches: Production BEP (kg) and Price BEP (Rp).

Table 6. Break-Even Point (BEP) Analysis for Hydroponic Vegetable Farming

BEP Classification	Cost Type	Total
Production BEP (kg)	Fixed Costs (IDR/Year)	478,016
	Total Production (kg/year)	3,960
	Production Break-Even Point (kg)	3.25
Break-Even Point Price (IDR)	Total Cost (IDR/Year)	33,382,017
	Total Production (kg/year)	3,960
	Break-Even Point Price (IDR/kg)	8,757

Based on the BEP analysis in Table 6 above, the following can be explained:

1. The results of *the Break-Even Point (BEP)* analysis for hydroponic vegetable farming at Simbo Hydroponic . The BEP was calculated for five types of crops: lettuce, pak choy, chaisin mustard, samhong, and chaisin kailan. The production BEP indicates the minimum harvest quantity (in kilograms) that must be sold to ensure that the revenue generated covers all fixed and variable costs, thereby preventing the business from incurring losses. Overall, the average BEP for the five types of crops is 3.25 kg. This value indicates that the hydroponic farming operation at Simbo generally has an efficient cost structure and a low break-even production value. This means the operation has a high potential for profitability provided it can sell its harvest above the BEP calculated for each crop.
2. The results of *the Break-Even Point (BEP)* analysis of the prices of five types of hydroponic vegetables cultivated at Simbo Hydroponic . The table shows that there are variations in the BEP prices between commodities, influenced by the total costs and annual production of each plant. Overall, the average BEP price for the five types of plants analyzed is Rp8,757 per kilogram. This figure represents the minimum average selling price that must be applied to cover all production costs. This value can serve as a benchmark for developing pricing strategies for hydroponic farmers. As long as the actual selling price in the market is above this value, hydroponic vegetable farming at Simbo Hydroponic has a high likelihood of generating profits. Conversely, if the market selling price falls below the BEP

Price, the business will incur losses, as the revenue generated is insufficient to cover production costs.

CONCLUSION

Based on the research findings, it can be concluded that the hydroponic vegetable farming business at Simbo Hydroponic generates an annual income of Rp.134,617,983. *The Revenue Cost Ratio* (RCR) for all types of hydroponic crops cultivated by Simbo Hydroponics shows a value > 1 , indicating that the business is financially viable.

The Break-Even Point (BEP) for vegetable farming using the hydroponic system at Simbo Hydroponic was analyzed using two approaches: Production BEP (kg) and Price BEP (Rp). Based on the Production BEP analysis, the break-even point for each crop type is as follows: lettuce at 3.25 kg, pak choy at 4.70 kg, caisim mustard at 2.07 kg, samhong at 2.16 kg, and kailan mustard at 4.07 kg, with an average Production BEP of 3.25 kg for all crops. Meanwhile, based on the price BEP analysis, the break-even price for each crop is lettuce at Rp8,416, pak choy at Rp8,124, Chinese cabbage at Rp9,166, samhong at Rp10,000, and kailan mustard at Rp8,077, with an average price BEP for all crops of Rp8,757. These results indicate that production and selling prices exceeding the break-even point will generate profits for business operators.

Based on the findings of this study, several recommendations can be provided, including: business owners are advised to continue expanding production scale as the business has proven to be profitable and efficient; financial record-keeping should be conducted more systematically to facilitate cash flow monitoring and decision-making; business operators should also expand their marketing networks, both directly and through digital platforms, given the significant market potential; and it is hoped that local government support will be provided in the form of technical training, access to capital, and marketing facilitation to promote the development of hydroponic farming as a solution for agriculture in urban areas with limited land.

REFERENCE

- Aini N, Azizah N. 2018. *Teknologi Budidaya Tanaman Sayuran Secara Hidroponik*. Universitas Brawijaya Press. Alfabeta. Bandung.
- Ardian M. 2007. *Tanaman Hidroponik*. Pasca Umum. Jakarta.
- Ibrahim R, Halid A, Boekoesoe Y. 2021. Analisis Biaya Dan Pendapatan Usahatani Padi Sawah Non Irigasi Teknis Di Kelurahan Tenilo Kecamatan Limboto Kabupaten Gorontalo. *AGRINESIA: Jurnal Ilmiah Agribisnis*, 5(3), 176-181.
- Kasmir, Jakfar. 2003. *Studi Kelayakan Bisnis*. Kencana Media Pranada Group. Jakarta.



Rahardi F, Hartanto Rudi. 2003. *Agribisnis Peternakan*. Penebar Swadya. Jakarta.
Soekartawi. 2006. *Analisis Usahatani*. Penerbit Universitas Indonesia (UI-Press). Jakarta.

