Financial feasibility analysis of hydroponic vegetable farming in sambutan district, samarinda city, Indonesia

**ABSTRACT**

Hydroponic vegetable farming requires a large investment to support its long-term sustainability. Therefore, careful calculations are needed so that the invested funds can generate profits. The purpose of this study was to analyze the income of hydroponic vegetable farming and the financial feasibility of hydroponic vegetable farming in Sambutan District. This study was conducted from October 2024 to December 2024 in Sambutan District, Samarinda City. The data collected consisted of: (1) primary data can be obtained through observation and interviews with informants; and (2) secondary data collected through literature studies of references, theories, and journals of previous research results that are relevant to the research to be conducted. The research sample was taken using the census method, with a total sample of 6 hydroponic vegetable farmers. The results of the study showed that the average investment cost incurred was IDR 104,539,583.33/respondent with an average operational cost incurred of IDR 127,245,900.00/respondent/year; the average income obtained was IDR 182,750,000.00/respondent/year with an average income obtained of IDR 54,968,596.14/respondent/year. The NPV obtained reached IDR 269,332,009.17; IRR of 59%; Net B/C value of 4.44 and a Payback period of 2 years 1 month. Sensitivity analysis with variables of 5% cost increase and 5% production decrease showed that the hydroponic business was feasible to run and provided positive results on the costs invested.

**Keywords:** Cost, Income, Financial Feasibility, Hydroponic Vegetables

**1. INTRODUCTION**

The agricultural sector plays a very important role in the lives of people in Indonesia, this role can be seen in its contribution as a provider of food, industrial raw materials, a contributor to Gross Domestic Product, a source of foreign exchange, an absorber of labor, and provider of feed. To encourage the sustainability of the agricultural sector, comprehensive strengthening and development efforts are needed. This step aims to restore the vital role of agriculture proportionally in rural areas and urban agriculture [1].

Vegetable production is an important sector in global agribusiness, especially for the economy and development in Indonesia, because it can increase agricultural yields higher than cereals and other staple crops. Until now, horticulture, such as vegetables and fruits, still dominates agricultural production in urban areas because they are easy to care for, practical, and quick to harvest. In addition, vegetables have an important role as a source of fiber which is important in meeting nutritional needs and maintaining human health. Along with the increasing awareness of the importance of balanced nutrition, the demand and need for vegetables continue to increase. Therefore, vegetable production needs to be increased to meet the increasing market demand [2].

Urban agriculture refers to agricultural activities carried out within the city (intra-urban) or on the outskirts of the city (peri-urban) to meet food needs or additional sources of income. Urban agriculture is part of the local food system, where food is cultivated and produced in urban areas, and then sold to consumers in the city [1]. Urban agriculture or what is known as urban farming is a real example of technological progress in the field of agriculture in urban areas. This agriculture involves the application of innovation to utilize limited land such as yards or empty land, to meet food needs. In addition, urban farming can be applied commercially to support trade needs. Urban agriculture is a solution to the increasingly limited agricultural land in big cities. This activity can be done on small land, even around the house, thus helping people to meet their food needs independently [3]. Urban agriculture refers to agricultural activities carried out within the city (intra-urban) or on the outskirts of the city (peri-urban) to meet food needs or additional sources of income. Urban agriculture is part of a local food system, where food is cultivated and produced in urban areas, and then sold to consumers in the city [2].

One method that is often applied in urban farming is the hydroponic system. Hydroponics is a farming technique without using soil, but water as the main medium. This technique is a solution to future agricultural challenges, such as limited land and population growth in urban areas. With the hydroponic method, plants can grow with good results in terms of quality and quantity, especially amid limited soil media. Hydroponic plant care is easier to do because the planting land is easily accessible and the planting media is sterile. In addition, the risk of pest and disease attacks is smaller, plants are healthier, and productivity can increase [3].

One of the agricultural commodities that are often cultivated using the hydroponic system is leafy vegetables such as mustard greens, lettuce, and mint. By choosing the right type of plant and providing optimal care, it can provide benefits, produce fresh and healthy vegetables, and be a promising source of income for farmers and agricultural entrepreneurs [24,25].

Sambutan District, Samarinda City, especially in the Sambutan area, the majority of the population works as farmers, and some of them have developed hydroponic vegetable cultivation. It is recorded that out of 685 farmers in Sambutan District, 105 farmers are in Sambutan Village, while the rest are spread across several other villages such as Makroman Village, Pulau Atas Village, Sindang Sari, and Sungai Kapih Village [4].

Several producers of hydroponic vegetable production who have partnerships in Sambutan District are Huma Hydroponics, Pak Taufik Hydroponics, Rumah Sayur Hydroponics, Abidzar Farm, Dack Hijau Hydroponics and Oriana Hydroponics. Hydroponics is a home plant cultivation business, with vegetables cultivated by lettuce, pakcoy, and mint. This business is a supplier of vegetables from Sambutan District to be marketed in several areas in Samarinda City.

The problems that arise among hydroponic vegetable farmers in Sambutan District are the absence of a comprehensive financial feasibility analysis, as well as the lack of clear details regarding the total production costs and income obtained so far so that the actual profit potential is still difficult to predict accurately by farmers involved in the cultivation. Therefore, careful calculations are needed so that the funds invested can generate profits. Every farmer runs their business with the main goal of obtaining economic benefits. Therefore, a financial feasibility analysis of hydroponic vegetable farming needs to be carried out to assess whether the business is feasible to run.

The purpose of the study was to analyze the income of hydroponic vegetable farming and the financial feasibility of hydroponic vegetable farming in Sambutan District.

**2. RESEARCH METHODOLGY:**

**2.1. Time and Place**

This research was conducted from October 2024 to December 2024 in several hydroponic vegetable farms, namely Huma Hydroponics, Pak Taufik Hydroponics, Rumah Sayur Hydroponics, Abidzar Farm, Dack Hijau Hydroponics and Oriana Hydroponics located in Sambutan District, Samarinda City, East Kalimantan Province.

**2.2. Data Collection Method**

The data collected consists of: (1) primary data can be obtained through observation and interviews with sources, namely farmers who are also owners of Huma Hydroponics, Hydroponics Pak Taufik, Rumah Sayur Hydroponics, Abidzar Farm, Hydroponics Dack Hijau and Oriana Hydroponics; and (2) secondary data collected through literature studies of references, theories, and journals of previous research results that are relevant to the research to be conducted.

**2.3. Data Analysis Method**

The data analysis method used in this study is a quantitative analysis by calculating business costs, revenues, income, and financial feasibility of farming businesses. The data analysis consists of:

2.3.1. Production Costs or Total Costs are all costs incurred by farmers to process agricultural businesses. Total Cost is calculated using the formula [5]:

TC = TFC + TVC

Description: TC = Total Cost (IDR); TFC = Total Fixed Cost (IDR) and TVC = Total Variable Cost (IDR)

2.3.2. **Total Revenue** is obtained by multiplying the production obtained by the selling price calculated using the formula [5]:

TR = Y.Py

Description: TR = Total Revenue (IDR); Y = Number of products (Units); Py = Selling Price (IDR)

2.3.3**. Income** is the difference between revenue and all costs Income is calculated using the formula [6]:

I = TR-TC

Description: I = Income (IDR); TR = Total Revenue (IDR), and TC = Total Cost (IDR)

2.3.4. **Net Present Value (NPV)** is a method that calculates the difference between benefits or income and costs or expenses [7] which is calculated using the formula:

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

Description: Bt = gross benefit in year t; Ct = gross cost in year t; i = discount factor; and

 t = economic life of the project

Criteria:

If NPV> 0, the business is feasible to run.

If NPV = 0, the business is in a break-even condition, without loss or profit.

If NPV <0, the business is not feasible to run.

2.3.5. **Internal Rate of Return (IRR)** is the rate of return on equity used in running a business. IRR measures how effectively equity is used to generate profits [8]. IRR is calculated using the formula:

$$IRR=i^{'}+\frac{NPV^{'}}{\left(NPV'-NPV"\right)}(i"-i')$$

Description: f = discount rate that produces positive NPV; i” = discount rate that produces negative NPV; NPV’ = positive NPV; and NPV’’ = negative NPV

2.3.6. **Net Benefit-Cost (Net B/C)** is a ratio that compares the Present Value (PV) of positive net benefits with the Present Value (PV) of negative net benefits [9]. Net B/C is calculated using the formula:

$$NET B/C = \frac{NPV (+)}{NPV (-)} × -1$$

Criteria:

If Net B/C > 1, the business is feasible to run.

If Net B/C = 1, the business is in a break-even condition, without loss or profit.

If Net B/C < 1, the business is not feasible to run.

2.3.7. **Payback Period** is the period required to return the initial investment value that has been issued [10] which is calculated using the formula:

$$Payback Period=n+\frac{a-b}{c-b} ×1 tahun$$

Note: n = The last year in which cash flow still cannot cover the initial investment; a = Initial investment amount; b = Cumulative amount of cash flow in year n and c = Cumulative amount of cash flow in year n+1 8.

2.3.8. **Sensitivity Analysis** is a method used to evaluate the impact of risks arising from uncertainty in a project [11]. This analysis is to measure the extent to which changes in certain variables can affect the financial results or feasibility of a hydroponic vegetable business. In this study, it is assumed that there is a 5% increase in costs and a 5% decrease in production. This is due to the investment in pump machines that are prone to damage, resulting in increased costs and reduced production levels.

**3. RESULTS AND DISCUSSION**

**3.1. Respondent Characteristics**

Based on the results of the study of six respondents in Sambutan District, Samarinda City, the following description of the characteristics of the respondents was obtained:

**3.1.1. Respondent Age**

Age is one of the factors that can affect a person's level of productivity. In addition, age is also an indicator to assess whether someone is in the productive category in managing their business. The conditions of the 6 respondents based on age are presented in Table 1. All respondents are included in the productive age group, namely the age range of 15 to 64 years.

Table 1. Respondents' Conditions Based on Age

|  |  |  |  |
| --- | --- | --- | --- |
| Number |  Age | Number of Respondents (People) | Percentage (%) |
| 1. | 40 years | 2 | 33,32 |
| 2. | 49 years | 1 | 16,67 |
| 3. | 54 years55 | 1 | 16,67 |
| 4. | 55 years | 1 | 16,6711166,67 |
| 5.  | 61 years | 1 | 16,67 |
|  | Total | 6 | 100,00 |

Source: Primary Data (processed), 2025

**3.1.2. Education Level**

Formal education plays an important role in increasing a person's knowledge and ability to seek information and make decisions in facing various business challenges. The level of education of hydroponic vegetable business owners in Sambutan District is presented in Table 2.

Table 2. Respondents' Conditions Based on Education Level

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Education Level | Number of Respondents (People) | Percentage (%) |
| 1. | Elementary school | 1 | 16,67 |
| 2. | Junior high school | 1 | 16,67 |
| 3. | Senior high school | 1 | 16,67 |
| 4. | Bachelor | 3 | 50,00 |
|  | Total | 6 | 100,00 |

 Source: Primary Data (processed), 2025

Based on Table 2, it can be seen that hydroponic vegetable business owners have a bachelor's degree, which is 3 people (50.00%), while the education level of elementary school, junior high school, and high school is 1 person each.

**3.1.3. Number of Family Dependents**

The number of family dependents includes all family members, both those who are still studying and those who are not working, and the head of the family is responsible for meeting their living needs. The average family dependents range from 2 to 4 people. The larger number of family members also increases the need for labor to meet daily needs. Therefore, the number of family dependents is an important aspect of managing a production business.

**3.1.4. Status of Hydroponic Vegetable Business**

Hydroponic vegetable businesses in Sambutan District are managed by farmers as their main income which also provides additional income. As many as 4 respondents (66.66%) make hydroponic vegetable businesses their main job. Meanwhile, 2 respondents (33.34%) manage hydroponic businesses as a source of additional income. This shows that the majority of respondents depend on hydroponic vegetable farming as their main livelihood, while others use it as an additional source of income.

**3.1.5. Reasons for Establishing a Hydroponic Vegetable Business**

Hydroponic vegetable business owners have various reasons for starting their businesses. Based on the results of interviews with 6 respondents, namely 3 respondents stated that they started this business to utilize their home yard land, and 3 other respondents stated that they were driven by the desire to become independent entrepreneurs. Their main motivation is the desire to develop a hydroponic vegetable business. This business requires consistency in its maintenance but provides benefits in the form of increased family income.

**3.1.6. Land area and investment costs for Hydroponic Vegetable Business in Sambutan District**

Based on the results of observations and interviews with respondents, data was obtained regarding the area of ​​​​greenhouse land for hydroponic businesses and investment costs as presented in Tables 3 and 4.

Table 3. Area of ​​Greenhouse Land for Hydroponic Business

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Name of Hydroponic Business  | Greenhouse land area (m2) | Percentage(%) |
| 1 | Huma Hidroponik | 200 | 16.63 |
| 2 | Hidroponik Pa Taufik | 600 | 49.88 |
| 3 | Abidzar Farm | 64 | 5.32 |
| 4 | Rumah Sayur Hidroponik | 120 | 9.98 |
| 5 | Hidroponik Dack Hijau | 105 | 8.73 |
| 6 | Oriana Hidroponik | 114 | 9.48 |
| The total area of ​​the greenhouse  | 1.203 | 100.00 |

Source: Primary Data (processed), 2025

Table 4. Total Investment Costs for Hydroponic Vegetable Business in Sambutan District

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Name of Hydroponic Business  | Total Investment Cost (IDR) | Percentage(%) |
| 1 | Huma Hidroponik | 67.484.000,00 | 10.76 |
| 2 | Hidroponik Pa Taufik | 335.025.000,00 | 53.41 |
| 3 | Abidzar Farm | 21.586.000,00 | 3.44 |
| 4 | Rumah Sayur Hidroponik | 47.452.000,00 | 7.57 |
| 5 | Hidroponik Dack Hijau | 65.462.500,00 | 10.44 |
| 6 | Oriana Hidroponik | 90.228.000,00 | 14.38 |
| Total Investment Cost | 627.237.500,00 | 100.00 |
| Average investment cost | 104.539.583,33 |  |

Source: Primary Data (processed), 2025

The total investment cost of the Hydroponic respondent Mr. Taufik is the largest investment cost among the other 5 respondents, which is IDR 335,025,000.00. This cost is due to the greenhouse land which is also the largest land among the other 5 respondents, in line with the largest number of planting holes, which is 2,000 planting holes for lettuce and 3,000 planting holes for pakcoy vegetables. Next is followed by the Oriana Hydroponic respondent, which is IDR 90,228,000.00. The large cost is due to the use of more pump machines among the other 5 respondents, which is 14 units.

**3.2. Costs, Income and Revenue of Hydroponic Vegetable Farming Business**

**3.2.1. Investment Costs**

Investment costs are expenses incurred by respondents to start a hydroponic vegetable business in Sambutan District. Investment cost components include purchasing land for a greenhouse, UV plastic, light steel, wood, lights, wages for making hydroponic installations, PVC pipes, pump machines, water tanks, hoses, net pots, buckets, and trays. The average investment cost incurred was IDR 104,539,583.33/respondent with a total of 2,283 planting holes, so the investment cost per planting hole was IDR 45,790.44. The results of a similar study reported by [12] stated that the investment cost was IDR 68,648,000.00 with a total of 3,456 planting holes, spending an investment cost per planting hole of IDR 19,863.43. The investment costs in this study were higher even though the number of planting holes was smaller.

**3.2.2. Operational Costs**

Operational costs are expenses required by respondents to run a hydroponic vegetable business. These costs include various components, such as labor wages, purchase of lettuce and pak choy seeds, Rockwool, AB mix nutrient solution, pest and disease control drugs, electricity, plastic packaging, and fresh vegetable duct tape. These operational costs are periodic and are an important part of ensuring the smooth running of the production process. In this study, the total operational costs were IDR 127,245,900.00 with a total of 2,283 planting holes, so the investment cost per planting hole was IDR 55,736.27. The results of a similar study reported by [12] stated that the investment cost was only IDR 13,710,000.00 with a total of 3,456 planting holes, so the investment cost per planting hole was only IDR 3,967.01. The investment costs for hydroponic businesses in Batuah village are higher even though the number of planting holes is smaller.

**3.2.3. Depreciation Cost**

Depreciation cost is an indirect expense calculated as an allocation of the decrease in the value of fixed assets during their useful life. This cost illustrates the decrease in the economic value of assets due to use or age. In the hydroponic vegetable business, several assets have different economic lives, such as lamps and trays that last for 2 years; pump machines, net pots, and buckets for 3 years; water hoses for 5 years; UV plastic for 7 years; and light steel, wood, PVC pipes, and water tanks that have an economic life of up to 10 years. The average depreciation cost incurred by respondents in the hydroponic vegetable business reached IDR 535,503.86/respondent/year.

**3.2.4. Labor Costs**

Labor costs are expenses allocated to pay for workers who contribute to business activities or production processes. In the hydroponic vegetable business, these costs include wages given to workers for routine activities such as plant maintenance, harvesting, and other activities that support smooth operations. The average labor costs incurred by respondents in the hydroponic vegetable business in Sambutan District were IDR 46,200,000.00/respondent/year. The large cost is due to the calculation of labor wages from family members, although in practice these wages are not given. In this business, the labor used by all respondents consisted of 4 men and 2 women with an age range of 40 to 61 years.

**3.2.5. Packaging Costs**

In the hydroponic vegetable business, packaging is carried out to ensure that vegetables remain fresh, hygienic, and easily accepted by the market. This stage plays an important role in increasing the added value of the product while building consumer confidence in the quality of the production results. The average cost of plastic packaging incurred by respondents in the hydroponic vegetable business was IDR 1,518,500.00/respondent/year, while the cost of fresh vegetable duct tape was IDR 607,400.00/respondent/year.

**3.2.6. Production Results**

The types of leafy vegetables grown in hydroponic businesses in Sambutan District are lettuce, pakcoy, and mint. The production results of these leafy vegetables are presented in Table 5.

Table 5. Results of Leafy Vegetables from Hydroponic Businesses in Sambutan District

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Name of Hydroponic Business  | Lettuce (kg) | Pakcoy (kg) | Mint (kg) |
| 1 | Huma Hidroponik | 1.440 | 3.000 | 36 |
| 2 | Hidroponik Pa Taufik | 3.600 | 3.600 | - |
| 3 | Abidzar Farm | 1.440 | 540 | - |
| 4 | Rumah Sayur Hidroponik | - | 960 | - |
| 5 | Hidroponik Dack Hijau | 900 | 660 | 36 |
| 6 | Oriana Hidroponik | 1.170 | 840 | - |
| Total | 8.550 | 9.600 | 72 |

Source: Primary Data (processed), 2025

Based on Table 5, shows that the results of the three types of leafy vegetables vary depending on the area of ​​the greenhouse land. From the 6 hydroponic businesses, the lettuce yields ranged from 900 to 3,600 kg, the pak choy yields ranged from 540 to 3,600 kg, and the mint yields were 36 kg.

**3.2.7. Revenue**

Revenue is the result of product sales in a certain period. In the hydroponic vegetable business, revenue is calculated based on the number of lettuce, pak choi, and mint vegetables sold per kilogram, which is then multiplied by the selling price in IDR per kilogram.

Lettuce vegetables are cultivated by 5 respondents with a harvest frequency of 12 months and a selling price of IDR 35,000.00/kilogram. The average revenue from lettuce vegetables obtained by 5 respondents is IDR 59,850,000.00/respondent/year. Pak choi vegetables are cultivated by all respondents with a harvest frequency of 12 months and a selling price of IDR 25,000.00/kilogram. The average revenue from pak choi vegetables received by all respondents is IDR 40,000,000.00/respondent/year. Meanwhile, mint leaves are cultivated by 2 respondents with a harvest frequency of 12 months and a selling price of IDR 125,000.00/kilogram. Mint leaf cultivation does not require planting holes because it is carried out using the cutting propagation method. The average income from mint leaves obtained by 2 respondents was IDR 4,500,000.00/respondent/year. The average income from lettuce, pak choi, and mint obtained by all respondents was IDR 182,750,000.00/respondent/year or an average monthly income of IDR 15,229,166.67. As a comparison, the results of other studies reported by [13] stated that the income from hydroponic businesses was IDR 51,483,333.00 with a harvest frequency of 10 months, resulting in an average monthly income of IDR 5,148,333.30.

**3.2.8. Income**

Income is the difference between the total income obtained from the sale of lettuce, pak choi, and mint vegetables with the total operational costs and depreciation costs incurred in the hydroponic vegetable business. The average income from lettuce, pak choi, and mint vegetables obtained by all respondents was IDR 54,968,596.14/respondent/year or an average income of IDR 4,580,716.345/respondent/month. The results of other studies reported by [14] that the income from the hydroponic business was IDR 9,270,000.00 with a harvest frequency of 4 months, resulting in an average income per month of only IDR 2,317,500.00.

**3.2.9. Loans**

People's Business Credit (KUR) loans for hydroponic vegetable businesses are financing facilities provided by the government through banks or financial institutions to hydroponic farmers to support the development and sustainability of their businesses. Of all the respondents, three people obtained hydroponic business capital through KUR loans. The amount of the loan received reached IDR 26,134,895.83 with an interest rate of 8% per year and a loan period of 3 years.

Based on the results of the analysis of total investment costs, operational costs, depreciation costs, receipts, income, and loans can be seen in Table 6.

Table 6. Total Investment Costs, Operational Costs, Depreciation Costs, Income and Income of Hydroponic Vegetable Business in Sambutan District

|  |  |  |
| --- | --- | --- |
| Number | Description  | Total (IDR/Respondent/Year) |
| 1 | Investment Costs | 104.539.583,33 |
| 2 | Operational Costs | 127.245.900,00 |
| 3 | Depreciation Costs | 535.503,86 |
| 4 | Revenue | 182.750.000,00 |
| 5 | Income | 54.968.596,14 |
| 6 | Loans | 26.134.895,83 |

Source: Primary Data (processed), 2025

**3.3. Financial Feasibility of Hydroponic Vegetable Farming in Sambutan District**

**3.3.1. Net Present Value (NPV)**

Net Present Value (NPV) is a financial analysis method used to determine the feasibility of an investment based on the difference between the present value of total benefits (cash inflow) and the present value of total costs (cash outflow) during the project life. In the hydroponic vegetable business, the NPV value obtained was IDR 269,332,009.17 with a discount factor of 6% and a project life of 10 years. This positive NPV value indicates that the hydroponic vegetable business is feasible to run, because the NPV is greater than zero, which indicates that the economic benefits obtained exceed the costs incurred during the project period. The large NPV value in this study is due to the large input investment costs, namely the average cost of greenhouse land of IDR 55,138,166.67, the average cost is 47.26% of the average investment costs that have been incurred. When compared with other studies reported by [15], the NPV value obtained was IDR 7,121,288.42. Furthermore, as reported by [16], the NPV value obtained was IDR 271,716,406.00. This value is due to investment costs of IDR 573,220,000.00.

**3.3.2. Internal Rate of Return (IRR)**

Internal Rate of Return (IRR) is the rate of return on investment that makes the net present value or NPV of all project cash flows equal to zero. In the hydroponic vegetable business, an IRR value of 59% was obtained with a discount factor of 6% and a project life of 10 years. The IRR value shows that investment in the hydroponic vegetable business has an annual return rate of 59%, which is much higher than the discount factor of 6%. This shows that this hydroponic vegetable business is considered financially feasible. The results of other hydroponic business research reported by [17], obtained an IRR value of 15.96%, with a discount factor used of 9%, the IRR value is in line with the investment cost of IDR 10,775,000.00. Other research reported [18], that hydroponic business obtained an IRR value of 29%, with a discount factor used of 9.08%. The IRR value is in line with the NPV value of IDR 96,967,735.00. Furthermore, it was reported by [19] that Casual Farmer's hydroponic vegetable farming business was financially feasible to continue, because by using an interest rate of 12%, a positive NPV value was obtained, while the Net B/C value was > 1 and the IRR value > Interest rate.

**3.3.3. Net Benefit-Cost (Net B/C)**

Net Benefit-Cost (Net B/C) is a calculation that compares the net value of benefits with the total costs incurred. Net B/C is calculated by dividing the positive NPV by the negative NPV, then multiplying the result by minus one. In the hydroponic vegetable business in Sambutan District, the Net B/C value was 4.44. This value shows that the hydroponic vegetable business is profitable because the benefits obtained are much greater than the costs incurred or the Net B/C value is more than one. This value also shows that for each unit of cost incurred, the hydroponic vegetable business produces benefits 4.44 times greater. The results of other studies reported by [20], in the hydroponic lettuce farming using the Nutrient Film Technique system, a Net B/C value of 1.52 was obtained. Furthermore, as reported by [21], in the hydroponic lettuce vegetable farming using the Nutrient Film Technique system, a Net B/C value of 1.44 was only obtained.

**3.3.4. Payback Period**

Payback Period (PP) is a method used to measure the time required to return the initial investment in a business through the cash flow generated. In the hydroponic vegetable business, the Payback Period is obtained for 2 years and 1 month. Based on the Payback Period obtained, it shows that the investment issued for this business will be returned within 2 years and 1 month after the cash inflow begins. In other words, after that period, the project begins to provide net profits or generate cash flows that exceed the initial investment costs. The results of the study reported by [20], the hydroponic business obtained a Payback Period of 2 years 11 months 15 days, the time needed to return this initial investment is due to the assumption that the business is 6 years old.

Overall, the results of the calculation of Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit-Cost (Net B/C), and Payback Period (PP) for the feasibility of the hydroponic business in Sambutan District are presented in Table 7.

Table 7. Financial Feasibility of Hydroponic Business

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Description  | Financial Feasibility  | Feasibility Indicator | Description |
| 1 | Net Present Value (NPV) | IDR p269.332.009,17 | > 0 | Feasible |
| 2 | Internal Rate of Return (IRR) | 59% | DF 6% | Feasible |
| 3 | Net Benefit-Cost (Net B/C) | 4,44 | > 1 | Feasible |
| 4 | Payback Period (PP)  | 2 Years 1 Month | 10 Years | Feasible |

 Source: Primary Data (processed), 2025

**3.4. Sensitivity Analysis**

The sensitivity analysis in this study uses calculations with two variables, namely a 5% increase in costs and a 5% decrease in production. This condition occurs due to investment in pump machines that tend to be easily damaged, resulting in increased costs and decreased production. Based on the sensitivity analysis, if costs increase by 5% and production decreases by 5%, it can be stated that the hydroponic vegetable business in Sambutan District is not sensitive or is not sensitive or the business is still feasible to run. The analysis of the calculation of a 5% increase in costs and a 5% decrease in costs for hydroponic vegetables in Sambutan District can be seen in Table 8 and Table 9.

Table 8. Results of the Analysis of the Calculation of a 5% Increase in Costs for Hydroponic Businesses in Sambutan District

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Description  | Financial Feasibility  | Feasibility Indicator | Description |
| 1 | Net Present Value (NPV) | IDR 259.362.245,44 | > 0 | Feasible |
| 2 | Internal Rate of Return (IRR) | 52% | DF 6% | Feasible |
| 3 | Net Benefit-Cost (Net B/C) | 4,10 | > 1 | Feasible |
| 4 | Payback Period (PP)  | 2 Years 1 Month | 10 Years | Feasible |

 Source: Primary Data (processed), 2025

Based on the analysis of the calculation of a 5% increase in costs for hydroponic vegetables in Sambutan District, it is known that the NPV value of IDR 259,362,245.44 is more than zero, which means that the business is feasible to run, the IRR value of 52% exceeds the discount factor of 6%, which means that the business is feasible to run, the Net B/C value of 4.10 is more than one, which means that the business is feasible to run, and the PP for 2 years and 1 month is shorter than the business age of 10 years, which means that the investment can be returned before the business period ends.

Table 9. Results of the Analysis of the Calculation of a 5% Cost Reduction for Hydroponic Business in Sambutan District

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number | Description  | Financial Feasibility  | Feasibility Indicator | Description |
| 1 | Net Present Value (NPV) | IDR 200.772.468,95 | > 0 | Feasible |
| 2 | Internal Rate of Return (IRR) | 46% | DF 6% | Feasible |
| 3 | Net Benefit-Cost (Net B/C) | 3,52 | > 1 | Feasible |
| 4 | Payback Period (PP)  | 2 Years 1 Month | 10 Years | Feasible |

 Source: Primary Data (processed), 2025

Based on the analysis of the calculation of a 5% decrease in production of hydroponic vegetables in Sambutan District, it is known that the NPV value of IDR 200,772,468.95 is more than zero, which means that the business is feasible to run, the IRR value of 46% exceeds the discount factor of 6%, which means that the business is feasible to run, the Net B/C value of 3.52 is more than one, which means that the business is feasible to run, and the PP for 2 years and 1 month is shorter than the business age of 10 years, which means that the investment can be returned before the business period ends. Other research results reported by [22] stated that based on the financial aspect, the hydroponic vegetable business is said to be feasible to continue running because it has an NPV value of IDR 3,832,119, an IRR of 16%, a Net B/C Ratio of 1.29 and a Payback Period of 1 year 5 months. Furthermore, [23] reported that based on the results of financial analysis with investment criteria, the NPV value was Rp154,881,734, the PI value was 1.24, the ROI was 124.29%, PP for 2.12 years and the B/C Ratio was 1.75. These results indicate that the business is feasible to be implemented and developed. The results of the sensitivity analysis of the decrease in revenue and the increase in costs of 3.33% still represent that the hydroponic vegetable business at CV Pagi Berkah Mandiri Bogor is feasible.

**4. CONCLUSION**

Based on the results of data analysis and discussion, the following conclusions are the average income of hydroponic vegetable farming in Sambutan District is IDR 54,968,596.14/respondent/year or an average income of IDR 4,580,716.345/respondent/month; Hydroponic vegetable farming in Sambutan District is feasible to be run based on the NPV value of IDR 269,332,009.17 (positive), IRR value of 59% (greater than the discount factor), Net B/C value of 4.44 (greater than 1) and Payback Period for 2 years 1 month (less than the age of the business of 10 years), and based on sensitivity analysis assuming production costs increase by 5% and production decreases by 5%, hydroponic vegetable farming in Sambutan District is still feasible to be run.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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