

THE FINANCIAL FEASIBILITY OF LIME FARMING (*C. aurantifolia*) IN LANDONO DISTRICT SOUTH KONAWA REGENCY



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ABSTRACT

The lime tree is a plant that significantly contributes to economic growth in Landono District, South Konawe Regency. This research aims to determine the feasibility of farming lime in Landono District, South Konawe Regency. The location determination was carried out purposively (purposively) considering that this area is one of the areas that carry out lime tree cultivation. The research was carried out from February to April 2022. The population in this research was 50 farmers. A simple random sampling using the Slovin formula obtained 33 farmers. The variables in this study were the identity of respondents and the feasibility analysis of farming. Data analysis uses feasibility analysis and sensitivity analysis. The research results obtained by calculating the variables in this research are the independence of the feasibility analysis, the NPV/net value is IDR 14,335,362 > 0 (positive) with the applicable bank interest rate of 6%, the NBCR calculation value is 1.87 > 1, IRR is 43.44% > 6%, and the calculation of Payback Period is a return on investment after 23 months. So from the calculation of the feasibility analysis of the business using four feasibility criteria for lime farming in Landono II Village, Landono Subdistrict, South Konawe Regency is feasible to cultivate. Based on the sensitivity analysis of lime farming in Deisa Landono II, Landono Subdistrict, South Konawe Regency, it meets the feasibility assessment criteria for a 10% increase in input costs, a 10% decrease in output costs and a 10% increase in input costs as well as a 10% decrease in output costs simultaneously while other factors are considered constant.

Keywords: farming; feasibility; lime; sensitivity.

INTRODUCTION

The agricultural sub-sector, which plays an important role and provides many opportunities in Indonesia, is the horticulture sub-sector. The horticulture sub-sector provides opportunities because the market for horticultural commodities is expanding, and trade barriers between countries have been removed. Horticultural commodities with great development potential and a strategic role in national development are fruits (Widiyanto, 2018). Farming science studies how a seek and coordinate production factors in the form of land and the natural surroundings as capital to provide the best possible benefits (Suratiah, 2015).

Fruits are horticultural commodities with high economic value and are important in agricultural development. The demand for fruit products continues to increase from year to year, so the increase in fruit production in Indonesia is expected to increase along with an increase in per capita fruit consumption and population (Widiyanto, 2018). The lime plant (*C. aurantifolia*) lime is a herbaceous plant. Has a taproot. The tree trunk is tenacious wood with a thorny surface and hard. It has compound, elliptical leaves with rounded bases, blunt tips, and serrated edges. Lime fruit has the shape of a flat ball and is green to yellowish, and the surface of the fruit is wrinkled (Ardila et al., 2022). Lime production also increases each year, and this increase is also in line with the demand for more and more lime production, so there is a need to increase the planting of lime trees (Sari et al., 2017). One type of citrus developed is lime (*C. aurantifolia*). This commodity is well known, and its



marketing is quite extensive. Orange production in Southeast Sulawesi increased in 2019 by 271,665 quintals to 426,414 quintals in 2020 (BPS Province of Southeast Sulawesi, 2021).

Konawe Selatan is a regency in Southeast Sulawesi which produced 159,506 quintals of oranges in 2019 and has increased in 2020 to 223,385 quintals (BPS Kabupaten Konawe Selatan, 2021). Lime cultivation is expected to improve the people's economy in Landonno District. Landonno II Village is one of the villages in Landonno District, one of the lime production areas. In lime farming in Landonno II Village, harvesting is carried out once every two days during the harvest season, depending on the ripeness of the fruit. Climatic conditions influence the selling price of limes. During the rainy season, from December to June, the prices for limes are lower because many lime trees fall fruit, so harvesting is carried out as a whole and results in excess lime production. Excessive lime production results in lower lime prices, which are around IDR 50,000-IDR 150,000/50kg. In contrast to the dry season from July to November, the market price reaches IDR 500,000-IDR 800,000/50 kg, so the market price of lime is unstable/experiencing increases and decreases.

Research on the financial feasibility of lime (*C.aurantifolia*) farming, including research by Djumadil & Syafie (2020), Bororo & Fauziyah (2021), Putra et al. (2019), Tasya & Novitasari (2020), Sasmita et al., (2022), Amin et al., (2021), Hutasoit et al., (2022), Ermanto et al., (2020). In general, research of this kind focuses on feasibility analysis and sensitivity analysis in responding to variable changes in the feasibility of a business. Analysis techniques that are often used include NPV (Net Present Value), NBCR (Net Benefit Cost Ratio), IRR (Internal Rate of Return), PP (Payback Period), and sensitivity analysis. It can be seen that this study provides a comprehensive view of the financial feasibility of lime farming in Landonno II Village, with an analytical approach that is in line with other studies in the same field.

Financial analysis is very important in this lime plantation business because this financial feasibility analysis aims to find out if a business is feasible or not by comparing the costs incurred and the benefits obtained, and the timeframe for returning an investment used in a lime plantation business. Putra et al., (2019) . The lime cultivation business in Landonno II Village requires an analysis to assess the feasibility level to operate profitably. Appropriate cost analysis regarding the lime cultivation business is expected to be used by lime farmers as a support for making the right decision not to suffer losses and predict profits for the lime cultivation business. This study aims to determine the feasibility of lime farming in Landonno II Village, Landonno District. South Konawe Regency.

MATERIALS AND METHODS

This research was conducted in Landonno II, Landonno District, South Konawe Regency, Southeast Sulawesi Province. This location was determined purposively with the consideration that this area is one of the areas that carry out lime cultivation in Landonno District, South Konawe Regency, Southeast Sulawesi Province. The time of this research was carried out from February to April 2022. The population in this research were lime farmers in Landonno II Village, Landonno sub-district, Konawe Selatan Regency, totalling 50 farmers. A simple random sample is taken so that each research unit or elementary unit from the population has the same opportunity to be selected as the sample. If the sample size used is different, then the size of each elemental unit chosen is also different. For example, if the population size is N , while the elements in the sample (sample size) are n , then the amount for each elementary unit to be selected is n/N . Determining the number of samples in this study used the Slovin formula, so the number of samples obtained in this study was 33 farmers. This study's types and sources of data included primary and secondary data. Data collection techniques are observation, interview, and literature study techniques. The variables in this study are the identity of the respondents, which include age, level of formal education, and experience in lime farming as well as analysis of the feasibility of lime farming: investment costs, operational costs, variable costs, fixed costs, revenue, interest rates, valid year, length of period, net cash inflows.

Analysis of the data used in this study is the feasibility analysis and sensitivity analysis. Data analysis used to determine the feasibility level of lime farming has four criteria, namely: Net present value (NPV), Net Benefit Cost Ratio (NBCR), Internal Rate of Return (IRR) and Payback Period (PP). These four types of eligibility criteria are described in detail: Padangaran (2008) states that NPV is the present value of the difference between the total benefit and total cost at a certain discount rate over the project's life. NBCR is a number that shows the amount of net profit obtained for every rupiah invested. IRR shows the percentage of profit earned from investment every year during the project's life. Yudhato (2018) states that PP is a period needed to recoup expenses. Nurmalina et al. (2020) stated that a sensitivity analysis was used to see the impact of a changing situation on the feasibility analysis. This analysis aims to assess what will happen to the feasibility analysis results of an investment or business activity if there is a change in the calculation of costs or benefits.

RESULTS AND DISCUSSION

Characteristics of Respondents

The characteristics of the respondents are the explanations about the respondents themselves. The respondents in this study are the owners of lime farming in Landonno II Village. There are 33 lime farming owners in Landonno II Village. The characteristics of the respondents in this study were grouped based on age, level of education and farming experience. The characteristics of the respondents who own lime farming in this study can be explained as follows.

Age is one factor influencing a person's workability and productivity. People will experience an increase in their ability to work with increasing age but will also experience a decrease in their ability to work at a certain age. So it is known that there is a productive age. Age indicates work productivity because it relates to a person's physical ability to work. Workers at productive ages tend to be physically stronger than non-productive workers (Ukkas, 2017). Education can influence a person's mindset in terms of decision-making. A person's level of education will determine how much knowledge he has. Andriani et al. (2019) explained that a low level of education affects farmers' decisions in choosing a destination market to sell their crops. Farmers are more likely to choose to sell their commodities in markets that are easy to reach. Farming experience is very important to be owned by a farmer in developing his business. The level of farming experience determines the mindset in farming. The more experience and the longer you have, the more you will understand about lime plants. Experience or the length of time a person pursues a field of activity will affect the individual's ability in the field he is engaged in. Likewise with work, the longer a person pursues his field of work, the more skilled his ability to do the job will be and will increase his productivity towards the job.

Table 1. Characteristics of respondents of lime farmers in Landonno II Village, Landonno District, South Konawe Regency

Characteristics	Number of Respondents (Person)	Percentage (%)
Age (Years)		
15-64	30	90,91
>64	3	9.09
Level of Education		
Elementary School	8	24,24
Junior High School	11	33,33
High School / Vocational School	12	36,36
College	2	6.06
Business Experience		
1-5	33	100.00

The age of the respondents explained that the age of the farmers in Landonno District, South Konawe Regency was 15 to 64 years, or the productive age was 30 people or 90.91%, while the ages above 64 years or the unproductive age were three people or 9.09%. Based on the study's results, it was shown that the average farmer in Landonno II Village, Landonno District, Konawe Selatan Regency was at a productive age. This follows the BPS of Southeast Sulawesi Province (2021), which states that the age grouping of the population is grouped into three, namely the non-productive age population, the productive age population and the non-productive age population. The non-productive age population is the population under 15 years of age. The productive age population is those aged 15-64 years. The non-productive age population is the population aged over 64 years.

The level of education explained that of the 33 respondents of lime farmers in Landonno II Village. The education level of lime farmers who graduated from elementary school was eight people or 24.24%, and lime farmers graduated from junior high school, namely 11 people or 33.33%, lime farmers graduated from high school/vocational school, namely 12 people or 36.36%. , and university graduate farmers, namely two people or 6.06%.

Farmers have undergone formal education to more easily understand and accept new things, such as technology, to develop their businesses. Following Prabawa's opinion (2020), based on the level of education will affect the ability to think and accept new things to develop their abilities. Someone with a high level of education will find it easier to accept new things, such as technological developments, while someone with a low level will tend to go along with it.

Lime farming experience in Landonno II Village, namely, 1-5 years, that is, 33 people are quite experienced, so with long enough experience, these farmers have a better experience with the lime

farming they are running. Following, farmers' level of farming experience will indirectly affect their mindset. Farmers with longer farming experience will be better able to plan their farming because they already understand all aspects of farming.

Farming Cost Analysis

Business costs are the total costs incurred by business owners in lime farming in Landonno II Village, Landonno District, South Konawe Regency which are used to finance various factors of production in business activities, consisting of fixed costs, variable costs, and total production costs, where the total these business costs incurred will be used to determine the value of the amount of revenue, income and feasibility analysis on lime farming in Landonno II Village.

Table 2. Production cost of lime farming in Landonno II Village, Landonno District, South Konawe Regency

Description	Average Amount of Cost (IDR/Year)
Fixed Costs	
Tax	50,758
Shrinkage	41,077
Total Fixed Costs	91,835
Variable Cost	
Fertilizer	1,225,273
Pesticide	581,756
Labour	4,945,455
Total Variable Cost	6,752,485
Total Cost of Production	6,844,320

According to Umar (2003), fixed costs are fixed in amount, not depending on changes in the activity level in producing output or products within certain intervals. Fixed costs incurred by lime farmers include depreciation costs for tools and tax costs. According to Umar (2003), variable costs are costs whose numbers vary according to changes in production levels. The variable costs of lime farming consist of fertilizers, pesticides and labour, the costs of which are used up in one production process. Table 2 shows that the average total production costs incurred by lime farming/per year is IDR 6,844,320, known from all variable and fixed costs. The highest average total costs incurred are variable costs of IDR 6,752,485. The large production influences the number of variable costs. The more production produced, the more variable costs must be incurred by lime farming. Hakim (2021) states that production costs are all costs caused by the production process. Lumintang (2013) states that the cost of production facilities is the cost incurred in the production process, including the cost of fertilizers, peptides, depreciation of equipment and labour costs.

Revenue and Income

Revenue results from multiplying the amount of production and the marketed price of lime. Income is revenue from the lime business minus production costs. The revenue and income of lime farming can be seen in Table 3.

Table 3. Revenue and income from lime farming in Landonno II Village, Landonno District, South Konawe Regency

Description	Unit	Average Number
Lime Production	kg	8,291
Selling Price of Lime	IDR	3,000
Revenue	IDR/year	24,872,727
Production cost	IDR/year	6,844,320
Income	IDR/year	18,028,407

Table 3. explained that the development of lime farming in Landonno II Village resulted in a production of 8,291 kg of lime with a selling price of IDR. 3,000/kg of lime. Proceeds from the sale of limes amounted to IDR. 24,872,727/year, resulting in an income of IDR. 18,028,407 per year. According to Kurniati et al. (2014) stated that the difference between gross income and costs incurred for farming is net income. According to Prabawa's research, income is the difference between total revenue and total costs incurred in doing a business. If the value obtained is positive, it can be said that the business is making a profit, while if the results are negative, it can be said that the business is

not making a profit/loss. The lime farming business in Landono II Village has a positive value, so this business can be said to be profitable.

Farming Feasibility Analysis

Analysis of the feasibility of lime farming in Landono II Village to determine the feasibility analysis used Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Ratio (NBCR), and Payback Period (PP) analysis. From the calculations using this analysis, the results of the calculations can be seen which can be seen in Table 4.

Table 4. Feasibility analysis of lime farming in Landono II Village, Landono District, South Konawe Regency

Feasibility Assessment Criteria	Unit	Mark	Information
NPV (Net Present Value)	IDR	14,335,362	Feasible
NBCR (Net Benefit Cost Ratio)	Ratio	1.87	Feasible
IRR (Internal Rate of Return)	%	43,44	Feasible
PP (Payback Period)	Month	23	Feasible

Based on the financial feasibility analysis, an NPV value of IDR 14,335,362 was obtained. This value shows the profit earned for three years at an interest rate of 6%. The NPV value is greater than zero, so based on the NPV criteria, the development of lime farming is feasible. This is in line with the research of Sumartono et al. (2019) stated that the NPV value of Siamese orange farming during the life of the project was IDR 984,579,113, meaning that with a df of 12.5% the Siamese orange farming would provide a profit of IDR 984,579,113, in theory, the NPV was declared feasible because $NPV > 0$.

The NBCR calculation yields a value of 1.87 rupiah units. This value shows that this business earns a profit of IDR 1.87 for every IDR 1 issued. The NBCR value is greater than 1, so according to the NBCR criteria, lime farming in Landono Village is feasible. This is in line with the research of Sumartono et al. (2019) stated that a comparison between a positive present value and a negative present value obtained a Net B/C value of 6.53. This means that for every expenditure of one rupiah, it will provide benefits for citrus farmers in the research location of IDR. 6.53 and seen from the calculation of the Net B/C, this business is feasible to run with an indicator of a Net B/C value of greater than one ($Net\ B/C > 1$).

The IRR value in developing this business is 43.44%. This value is greater than the discount rate used, which is 6%. So the development of lime farming in Landono II village with IRR criteria is feasible because every investment invested in this business will get a profitable rate of return compared to saving investment funds for savings. This is in line with the research by Putra et al. (2019) state that the IRR from the analysis that has been carried out is 35%. When compared with the current commercial interest rate of 13%, this lime plantation business is flexible to do. This means that investing in a lime plantation business is more profitable than saving the same amount of money at a bank with an interest rate of 13% because the rate of return on capital is 35% or greater than 13% of the rate of return provided by the bank.

The Payback Period (PP) value of the lime plantation village of Landono II is 23 months. This value indicates that all investment costs invested in this business development plan will be returned after 23 months. This shows less than three years, so it is feasible to run. This is in line with research by Tasya and Novitasari (2020), which states that the results of calculating the Payback Period (PP) for the "Bee Juice" citrus agro-industry business are nine months and 18 days. The PP calculation results show that the payback period is not too long because it is less than the economic life of 5 years, so the "Bee Juice" citrus agroindustry is feasible to run. Based on research results, lime farming in Landono II village meets the feasibility assessment criteria (NPV, NBCR, IRR, and PP) to be financially feasible.

Sensitivity Analysis

According to Nurmalina et al. (2020), Sensitivity analysis is used to see the impact of a changing situation on the feasibility analysis. This analysis aims to assess what will happen to the feasibility analysis results of an investment or business activity if there is a change in the calculation of costs or benefits. Is the feasibility of an investment activity or business sensitivity not to occurring changes? Sensitivity analysis of Lime Farming in Landono II Village, Landono District, South Konawe Regency is an analysis used to determine whether the increase in variable costs and a decrease in production prices by 10% with the calculation of NPV, IRR, NBCR and Payback Period Lime Farming in Landono II Village is still feasible or not to be cultivated.

Sensitivity analysis is an analytical method to calculate the feasibility of a business if the calculation size that affects profits is changed. The sensitivity calculation will show the impact of changes in the inputs' prices and the resulting output on NPV, Net B/C, IRR and PP (Sumartono et al., 2019).

Table 5. Sensitivity analysis of lime farming in Landonno II Village, Landonno District, South Konawe Regency

Sensitivity Assessment Criteria	10% Increase in Input Costs	10% Decrease in Output Costs	10% Increase in Input Costs and 10% Decrease in Output Costs
NPV (Net Present Value)	11,821,435	10,033,336	7,519,409
NBCR (Net Benefit Cost Ratio)	1.66	1.61	1.42
IRR (Internal Rate of Return)	35,58	33,40	25,64
PP (Payback Period)	24	25	26

The sensitivity analysis results for each increase in input costs and a decrease in output costs by 10% still meet the feasibility assessment criteria (NPV, NBCR, IRR and PP). Where the NPV value obtained is > 0 , the NBCR value obtained is > 1 , the IRR value obtained $>$ the prevailing bank interest rate, and the PP value obtained while the lime farming is carried out, namely when the investment was successfully obtained in less than three years. Lime farming in Landonno II Village, South Konawe Regency, is still feasible to run even though there has been a change in the feasibility value of the sensitivity analysis results.

Waleleng et al. (2022) stated that sensitivity analysis aims to evaluate the extent to which a company is sensitive to changes in the factors that affect the company's operational activities in generating profits. Sari et al. (2020) stated that sensitivity analysis is an analysis to find out changes in internal and external factors that affect the value of revenue and costs of a business against investment criteria.

CONCLUSIONS AND RECOMMENDATIONS

The conclusion obtained from the financial feasibility analysis of lime is that the NPV/net value is IDR 14,335,362 > 0 (positive) with the prevailing bank interest rate of 6%, the NBCR calculation value is 1.87 > 1 , IRR is 43.44 % $> 6\%$, and payback period calculation of return on investment after 23 months. The results of the sensitivity analysis of lime farming in Landonno II Village, Landonno District, South Konawe Regency, meet the feasibility assessment criteria for a 10% increase in input costs, a 10% decrease in output costs and a 10% increase in input costs and a 10% decrease in output costs simultaneously while other factors are considered constant, so that the financial feasibility analysis of lime farming can be developed. Based on the results of research on the financial feasibility of lime farming obtained, the advice that can be given to lime farmers is suggested that the expenditure and maintenance of lime plants, such as fertilizing and spraying as well as harvesting costs, must be adjusted to the selling price, so that if there is an increase or decrease input or output costs for lime farmers still benefit and do not follow market prices which can be detrimental to farmers.

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