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RESEARCH ARTICLE

Analysis of Cost, Income, and Feasibility of Areca Nut Seed Breeding Farming Business, Betara District, Tanjung Jabung Barat Regency

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Abstract
Indonesia is the ruler of areca nut exports in the world and 40% of Indonesia's total areca nut exports come from Jambi. The research was focus by Jambi's strategic role in national areca nut production and exports, alongside persistent constraints in the upstream subsystem of agribusiness especially limited capital, production-cost variability, and uneven breeder capacity to consistently meet certification standards. A survey based descriptive quantitative approach was employed. Primary data were collected through structured interviews using questionnaires from three purposively selected certified breeders (from five existing units) who met the criteria of business ownership, a minimum of two years of operation, and active participation in certification. Secondary data were sourced from BPS and relevant provincial agencies. Analysis focused on fixed and variable cost components, total revenue, farm income (TR–TC), and feasibility using the Revenue–Cost (R/C) ratio. Results show that the average total production cost reached Rp 183,266,666/year, comprising seeding costs of Rp 71,889,427 and nursery costs of Rp 111,377,239. Average total revenue was Rp 692,156,067/year, generating an average income of Rp 508,889,401/year (= Rp 42,407,450/month). The mean R/C ratio was 3.5, indicating financial feasibility (R/C > 1). However, substantial income disparities among breeders suggest that scale, managerial capability, and cost control critically determine profitability. Strengthening cost efficiency, optimizing nursery land (including yard-based expansion), and improving compliance support for certification are recommended to enhance sustainability.

Keywords
Cost Analysis; Business Feasibility Analysis; Receipt; Areca Seed Nursery Business; Income.

1 | INTRODUCTION

Agriculture is the largest sector in almost every developing economy. Indonesia itself is an agricultural country, where agriculture plays an important role in the overall national economy. Indonesia's agricultural sector is not only a provider of dreams for most of its population (Faturohman *et al*., 2023). But it also provides employment for almost the entire existing workforce, produces raw materials, raw materials or auxiliaries for industry and becomes the largest source of recipients of foreign exchange for the country through agricultural products. areca nut is spread throughout Indonesia, but the largest distribution and at the same time as an area exporting areca nuts is on the island of Sumatra, including Aceh Province and Jambi Province, while other areas are still limited to local consumption(Tutuko *et al*., n.d.). Although it is not the main commodity nationally, on the island of Sumatra this commodity is the mainstay commodity of some farmers and has long been an export commodity.

Macroeconomically, Indonesia's position in global trade is very dominant. Launching data from the Badan Pusat Statistik Provinsi Jambi (2022), Indonesia dominates areca nut exports globally. In 2021, more than 60% of the world's areca nut exports came from Indonesia. In 2021, the export value of areca nut commodities nationally reached US$ 357 million. Where Jambi Province contributes around 40% of the national export value. Jambi Province is one of the distribution centers of areca nut in Indonesia which plays an important role not only as a genetic resource in the context of plant breeding programs, but also as a potential commodity to improve the welfare of farmers. Based on data from the Directorate General of Plantations of the Ministry of Agriculture, the area of areca nut plants in Jambi Province in 2024 will reach 25,292 hectares (Ditjenbun, 2025)(Suheiti *et al*., 2023). The areca nut land is concentrated in West Tanjung Jabung Regency which is also the area with the largest areca nut production in Jambi Province, which is 17,991 tons with a productivity of 2,160 tons per hectare. Betara District is specifically known as the center for the development of superior Pinang Betara varieties which have certifications and relatively stable market demand (Degustya *et al*., 2024; Tampubolon, 2025). The existence of areca nut seed breeding businesses in this region is an important part of maintaining the sustainability of production and the quality of the plants produced. Despite having considerable economic potential, the development of betel nut seed breeding business still faces various obstacles, including price fluctuations, limited capital, and stagnation in the number of business actors in several villages(Watang *et al*., 2025). Therefore, it is necessary to evaluate the factors that affect the stability of the number of breeders as well as strategic efforts to encourage increased participation and business sustainability in the areca nut agricultural sector.

Production dominance does not automatically reflect the efficiency and sustainability of the farming system. Data shows that there is an imbalance in productivity between regions in Jambi Province, even within the same district. Production dependence on certain sub-districts creates a production concentration risk. In addition, stagnation of production in some villages in the past three years indicates that land expansion has not been fully followed by an increase in innovation-based productivity. One of the strategic factors in increasing productivity is the quality of seeds (Harini, 2020). The superior variety of Pinang Betara that has been released nationally has the characteristics of faster growth and higher yield potential than ordinary local varieties. Theoretically, the use of certified superior seeds should increase farmers' productivity and income in the long run. However, the adoption of superior seeds does not stand alone; It requires an efficient breeding system, a controlled cost structure, and adequate access to capital.

On the other hand, the seed breeding business is not a risk-free activity. Seed production requires investment in planting media, maintenance, labor, and waiting time before the seeds are ready to be sold. Initial observations show that there is a significant variation in production costs between farmers, while the selling price of seeds is relatively uniform. This condition raises fundamental questions about the cost efficiency and financial feasibility of the captive business. In addition, the structure of the areca nut market, which is still dominated by collector traders (toke), shows the asymmetry of price information and the relatively weak bargaining position of farmers (Nurwardani, 2008). Price variations based on the quality of post-harvest processing show that added value is largely determined by the process and quality standards. In the context of seedlings, certification is the main differentiating factor, but not all breeders have the capacity to meet these standards consistently.

Theoretically, farmer income is influenced by a combination of production factors such as land area, capital, labor, and output prices. A number of previous studies have concluded that these variables have a significant effect on the income of areca nut farmers. However, most studies focus on areca nut production for consumption, not on seed breeding efforts as an upstream subsystem of agribusiness. In fact, the long-term sustainability of production is largely determined by the quality of the initial inputs, namely seeds and seedlings (Nurwardani, 2008; Purwaningsih & Irawan, 2026). Based on research conducted by (Ramadhan *et al*., 2023) in the Sungai Berals Village, Kecamatan Mendahara Ulu, Jambi and (Suryati, 2017) that the area of land, capital, and labor has a significant effect on the income of Pinang. Then research conducted by (Hardyaningtyas & Hernawati, 2023) said that market prices have a significant effect on farmers' income. Thus, there is a gap in the study in the economic analysis of the breeding business of superior areca nut seeds, especially in production centers such as Betara District. There have not been many studies that comprehensively analyze the cost structure, income level, and financial feasibility of areca nut seed breeding business in the framework of export-oriented agribusiness.

The urgency of this research lies in two main aspects. First, practically, the results of the analysis can be the basis for decision-making for farmers and policymakers in developing sustainable nursery systems. Second, academically, this research enriches the agricultural economics literature by placing seed breeding as a separate unit of analysis, not just part of primary production. Based on this context, this study is directed to analyze the cost structure, income level, and financial feasibility of the certified betel nut seed breeding business in Betara District, West Tanjung Jabung Regency.

2 | BACKGROUND THEORY

This research is based on production theory, production cost structure, farm income, and business financial feasibility. The four concepts are combined to explain how the combination of land production, labor, capital, and management factors affect the areca nut seed production process, the cost structure that arises, and the revenue obtained. Production theory emphasizes the selection of efficient input combinations to produce optimal output (Sukirno, 2018; Joesron & Fathorrazi, 2012), while cost and revenue theory explains that profit is the difference between total revenue and total cost (Oppier *et al*., 2021). In the context of breeding betel nut seeds in Betara District, the integration of these concepts is used to assess whether the nursery business is not only technically feasible, but also efficient and financially profitable.

Production Theory

The integration of classical production theory with the production function approach and cost efficiency analysis provides a strong conceptual foundation in understanding the dynamics of areca nut seed breeding business. Production theory places production activities as the process of transforming inputs into outputs through a combination of production factors such as labor, capital, and natural resources (Sukirno, 2018). Within this framework, producers are seen as rational decision-makers who seek to choose alternative input use to achieve optimal production levels under certain cost constraints (Abdulah, 2023). In line with that, production is not only interpreted as a technical process of producing goods, but also as an economic activity that combines various inputs to produce output at minimum cost (Joesron & Fathorrazi, 2012), through a process that takes place repeatedly and is organized according to market needs (Heizer, 2014). In a more formal analysis, the function of production explains the relationship between capital and labor in determining the level of output (Sukirno, 2018). In the short term, when one of the factors is considered fixed, the law *of diminishing return* applies, where the additional input of the variable ultimately results in an additional decreasing output. This concept is clarified through the relationship between Total Product (TP), Marginal Product (MP), and Average Product (AP) as explained by Almaliawati and Asfia (2014). Thus, production efficiency is determined not only by the amount of inputs used, but by the proportion and intensity of their use. Furthermore, the isoquant–isocost approach emphasizes that producer efficiency is achieved at the tangent point between the isoquant and isocost curves, which reflects the *Least Cost Combination* (LCC) condition (Sukirno, 2018; Debertin, 1986). At that point, manufacturers are able to maximize output at a certain cost or minimize costs for a certain level of output. This perspective shows that the success of production does not only depend on technical capacity, but also on the ability to allocate resources optimally. By integrating production theory, production function, the law of diminishing yields, and the concept of efficiency through isoquant-isocost, this study places the areca nut seed breeding business as an economic activity that is not only technical, but also rational and economically measurable. Seed production is understood as the result of the interaction between production factors, managerial processes, and resource allocation decisions. Therefore, analysis of the combination of inputs, cost structures, and output levels is key to assess whether the seed breeding business has run efficiently and is close to the equilibrium conditions of producers as described in the theory of production economics.

Production Factors

The factor of production is all resources provided by nature or created by humans that are used to produce goods and services. Thus, every element that supports the process of creating value or increasing the value of a good can be categorized as a factor of production (Umam, 2023). In economic activities, the existence and quality of production factors determine the ability of a business unit to produce output. Umam (2023) grouped the factors of production into land, labor, and capital. Meanwhile, Sukirno (2018) differentiates production factors into four types, namely capital, labor, land and natural resources, and entrepreneurial expertise. Labor as one of the factors of production is not only understood as the number of people involved in the production process, but also includes the expertise and skills possessed. Based on their level of education and skills, the workforce is differentiated into manual labor, skilled labor, and educated labor. Manual labor generally does not have any special education or skills; skilled workforce acquires skills through training or work experience; while the educated workforce has a relatively high level of education and expertise in certain fields (Sukirno, 2018). In the context of the seed breeding business, the quality of labor is crucial because the precision in the seeding process, germination transfer, fertilization, and pest control greatly determines the success rate and quality of the seeds produced. Capital as a factor of production includes all goods produced that are reused to produce other goods and

services. Soil and natural resources include land, water, and environmental conditions that support the production process. Meanwhile, entrepreneurial skills play a role in organizing and coordinating the other three factors of production so that the production process runs effectively and efficiently (Sukirno, 2018). Thus, the production of areca nut seeds is not only determined by the availability of physical inputs, but also by the managerial ability to optimally combine these factors. The relationship between the factors of production and the level of output is explained through the function of production. Sukirno (2018) formulates the function of production as the relationship between input and output which can be simply stated in the form.

$$Q = f\,(K,L,R,\ldots)$$

Where (Q) is output, (K) capital, (L) labor, and (R) natural resources. In general mathematically speaking, the production function can be written as Y = f(x1, x2, x3, ...,xn) which indicates that the output is the result of a combination of various inputs. In production analysis, three possible output scales are known, namely increasing returns to scale, constant returns to scale, and decreasing returns to scale, which describe how changes in all inputs affect output changes. At an increased scale, additional inputs result in proportionally larger additional outputs; at a constant scale, additional inputs result in comparable additional output; while on a decreasing scale, additional inputs result in smaller additional outputs. In the short term, when one of the factors is considered fixed, the relationship between variable inputs and outputs is explained through the concepts of Total Product (TP), Marginal Product (MP), and Average Product (AP). TP indicates the total output generated from the use of a particular input; MP indicates additional output due to the addition of one input unit; while AP shows the average output per unit of input. The pattern of the relationship between TP, MP, and AP reflects the law of diminishing output, where in the initial stage the additional input increases the output significantly, but after passing a certain point the additional output becomes smaller and smaller (Sadono Sukirno, 2018). In the areca nut nursery business, the production function is reflected in the seeding stage to the seeding stage. The production process starts from the seeding of certified areca nut seeds, which takes about 1.5–3 months until it is ready to be transferred to a polybag with a germination power level that can reach 90 percent. The enlargement stage involves the use of polybags, planting media, routine watering, weeding, fertilization of NPK or foliar fertilizer, as well as regular pest and disease control. Any additional labor, production facility capital, and maintenance inputs will affect the quantity and quality of seeds produced. Thus, the TP, MP, and AP curves in the context of nurseries are not just theoretical concepts, but become analytical tools to assess whether the addition of inputs such as additional labor or increased fertilization doses is still at the productive stage or has entered a phase of yield decline. The integration between the theory of production factors and production functions emphasizes that the success of areca nut seed breeding business is highly determined by the ability to manage a combination of inputs proportionally, so as to achieve an efficient and sustainable production level.

Production Cost Theory

Production costs are understood as all economic sacrifices incurred to process raw materials into finished goods that are ready to be marketed, so that they are directly attached to the production process. In the framework of cost accounting, production costs are commonly grouped into three main components, namely raw material costs, labor costs, and factory overhead costs (Putra, 2021). This division confirms that production is determined not only by the availability of physical inputs, but also by the cost structure that accompanies the utilization of those inputs. Emphasized that overhead costs include expenses that are difficult to measure directly in product units, such as manufacturing costs or other production support costs(Viborg Andersen *et al*., 2007). In line with that, Carter and Usry (2009) explained that production costs are the sum of three cost elements, namely direct raw materials, direct labor, and factory overhead costs. This formulation is important because it places production costs as a key indicator that determines operational efficiency as well as the basis for calculating cost of goods. Practically, every company or business unit has an interest in understanding and controlling production costs because profits are greatly influenced by the accuracy of the calculation of the costs sacrificed to produce output. Thus, an understanding of production cost theory is a prerequisite for business actors to be able to calculate the expenses needed to produce products, assess business feasibility, and formulate rational production decisions. In a broader context, production costs can be understood as the total cost sacrificed from the process of procurement inputs to products to consumers. Costs are the main object of recording, classification, summarizing, and reporting in cost accounting because they reflect the monetary measurement of resources used to achieve a specific goal, whether it is producing goods or providing services. However, the term "cost" needs to be defined more specifically according to the needs of the analysis, because the concept of cost can be different when used for determining cost of goods, performance evaluation, and decision-making.

The element of cost of production basically consists of direct raw material costs, direct wages, and indirect factory costs or factory overhead. Direct raw material costs and direct wages are often classified as *prime costs*, while direct wages and factory overhead form conversion *costs* that describe the expenditure to convert raw materials into finished goods. First, the cost of raw materials is the cost inherent in the main ingredient that can be directly identified in the finished

product. Direct raw materials are generally variable because they move as production volumes change. Theoretically, the cost of raw materials directly includes the purchase price of raw materials plus the entire cost of obtaining and preparing them into the production process, such as transportation, loading and unloading, warehouse, and insurance. In addition, indirect raw materials or auxiliary materials are also known, which are materials that have a relatively small value but are still part of the production process. Second, labor costs directly refer to wages paid to workers who directly handle the processing of raw materials into finished products. Rayburn (2008) states that the cost of direct labor is the wages received by workers who convert materials from raw to finished products. Carter (2009) emphasized that direct labor is labor that converts raw materials directly into finished products and can be appropriately charged to certain products. In practice, especially in highly automated manufacturing companies, the identification of direct labor often faces obstacles because workers can quickly switch roles between direct and indirect tasks; In addition, the portion of direct labor in the total cost of production is sometimes insignificant, making cost separation less efficient. Third, factory overhead costs include indirect material costs, indirect labor, as well as all other manufacturing costs that cannot be charged directly on certain products. From this definition, it can be concluded that overhead is the total cost of the production department outside of direct raw materials and direct labor.

In economic and managerial analysis, the cost of production can be differentiated into explicit costs and implicit costs. Explicit costs are real expenses in the form of payments to the owners of the factors of production, while implicit costs are the estimated value of the own factors of production used in the production process. Implicit costs are basically calculated through *opportunity cost*, which is the best value of the alternative use of the resources sacrificed. In addition, cost theory also knows several important terms. Accounting costs include real expenses as well as depreciation or depreciation so that after deducting from income it will generate accounting profits. Economic cost is a measure of cost that includes the best alternatives that are sacrificed. Incremental costs are related to additional costs due to changes in output or other decisions such as technology adoption or production of new products. The sunk cost is a cost that has been incurred in the past and is irrelevant for short-term decisions because it cannot be recovered.

In the short term, there is at least one fixed *input*. Consequently, short-term costs consist of fixed *costs (FC)* and variable costs (*VCs*). Fixed costs are costs that do not change in amount even if the volume of production rises or falls; The total is called *the total fixed cost (TFC).* In contrast, variable costs change according to the output level; the total is called *the total variable cost (TVC).* Total short-term costs (*TCs*) are the total costs that occur in short-term production. In the practice of cost analysis, TC is understood as the sum of TFC and TVC, so that the shape of the TC curve will follow the TVC but start from the TFC point. From this structure, the size of the cost per unit is then derived: average fixed cost (AFC) as TFC divided by output, average variable cost (AVC) as TVC divided by output, and average cost (AC) as TC divided by output. Another important measure is marginal cost (MC), which is a change in total costs due to the addition of one unit of output. Since the addition of output does not change the TFC, the change in the MC is essentially affected by the change in the TVC.

In contrast to the short term, in the long term all factors of production are variable, so the distinction between fixed and variable costs becomes irrelevant. The entire cost is treated as a variable cost. In this condition, the company can change production capacity, so that the main issue is no longer just controlling costs on existing capacity, but choosing capacity that minimizes average costs. Long-term cost analysis is illustrated through the *long-run average cost curve (LRAC),* which shows the minimum average cost for different levels of output when a firm is free to adjust its capacity. The LRAC curve is typically U-shaped and is a sheath that alludes to various short-term average cost curves, so its tangents reflect the combination of capacity and output that results in minimum costs in the long run. With this framework, production cost theory not only explains the cost component, but also provides a conceptual basis for assessing business efficiency, establishing production strategies, and making the most rational capacity decisions according to the company's conditions and goals.

Revenue

Revenue is an important element in assessing the economic performance of a business because it reflects the results obtained from production and sales activities. In economic studies, income is often distinguished between *revenue* (gross receipts from sales) and *income* (net income after deducting costs). In general, income can be interpreted as an inflow of assets or an increase in economic value obtained from the main business activities. The level of income is greatly influenced by the number of production factors owned, prices in the market, and the ability to manage the business. Soekartawi (2022) explained that increasing income will affect consumption patterns and welfare levels, so that income is often used as an indicator of economic progress in a household or region. In the context of farming, income is the difference between total revenue and total production costs incurred during a business period. According to Soekartawi (2011) in (Widiarsih *et al*., 2024), revenue is formulated as TR = P × Q, while net income (NI) is formulated as NI = TR – TC, where TC consists of fixed costs and variable costs. Thus, the analysis of farmland income not only measures the amount of revenue, but also assesses the efficiency of cost management and the feasibility of the business in generating profits.

3 | METHOD

This study uses a survey approach with descriptive-quantitative research characteristics. The survey approach was chosen because this study aims to obtain a factual picture of the condition of the certified areca nut seed breeding business through the collection of data directly from respondents. This research was conducted in Betara District, West Tanjung Jabung Regency, during the research time period. The population in this study is all certified areca nut breeders and areca nut breeders in the research coverage area. The sample of this study was carried out using a non-probability sampling technique, with a purposive sampling approach. This technique was chosen because not all members of the population met the research criteria. The selection of respondents is based on certain considerations relevant to the purpose of the study, so that the sample taken is truly representative substantively. The sample criteria in this study are: 1) Farmers are owners of certified areca nut seed breeding and seed breeding businesses. 2) Have been running a business for at least two years, and 3) Carry out certification activities for the seed products and seeds produced. From the five certified breeder units, three respondents were selected who met these criteria.

The data used in this study consisted of primary data and secondary data during the 2022–2024 period. Primary data were obtained directly from respondents through structured interviews using questionnaires arranged based on research objectives. This data includes information regarding the use of production inputs, cost structure, number of seed production, selling prices, as well as technical and managerial aspects of the business. Secondary data was obtained from the Jambi Provincial Central Statistics Agency (BPS), the Jambi Provincial Plantation Office, and other related agencies. The secondary data used includes land area, production, and areca nut productivity at the provincial and district levels, especially in West Tanjung Jabung Regency. This data serves as a contextual foundation to understand the position of the seed breeding business in the regional areca nut production structure. The data analysis techniques in this study will be carried out in two descriptive approaches used to comprehensively describe the condition of the areca nut seed breeding business in Betara District, including technical, marketing, managerial, and socio-economic aspects. Meanwhile, quantitative analysis is used to calculate the structure of costs, revenue, and financial feasibility of the business.

4 | RESULTS AND DISCUSSION

4.1 Results

Based on empirical findings obtained from certified betel nut seed breeders. The presentation of results is focused on the analysis of the structure of production costs, acceptance rates and revenues. The findings of this study are as follows.

4.1.1 Cost Structure Incurred in Areca Seed Breeding Farming Business in Betara District, Tanjung Jabung Barat Regency

Farming costs are all expenses used in farming activities. In this study, farming costs are all costs incurred by farmers who breed seeds and areca nut seeds in one year. These costs include fixed costs and variable costs. Fixed costs are costs that are not used up in one production process. The fixed cost itself is in the form of equipment depreciation costs and land rent. Variable costs are costs that are consumed in one production process which depends on the scale of production such as the cost of using seeds, fertilizers and pesticides, labor costs outside the family and within the family, planting media costs, packaging costs, and certification costs in seed breeding and areca nut seed farming businesses. The total cost of production is obtained from the sum of fixed costs with variable costs. The costs calculated in this total production cost are fixed costs and variable costs. The average total cost of production in the research area can be seen in Table 1 below.

Table 1. Average Total Cost in Certified Areca Nut Breeding Farming Business

Cost Description	Average (Rp)
Fixed Cost (Hatchery)	
1. Land Lease	9.500.000
Quantity	9.500.000
Variable Cost (Seeding)	
1. Seeds	42.889.500
2. Fertilizer	737.000
3. Pesticides	935.000
4. Workforce	5.360.000
5. Packaging	19.553.772
6. Certification	27.017.822
Quantity	65.556.093

Total Hatchery Cost	71.889.427
Fixed Costs (Nursery)	
1. Land Lease	5.125.000
2. Tool shrinkage	537.014
3. Workforce	18.000.000
Quantity	11.662.014
Variable Cost (Nursery)	
1. Pupuk	11.238.000
2. Pesticides	198.333
3. Workforce	32.663.133
4. Planting Media	32.983.133
5. Packaging	11.157.875
6. Certification	11.577.417
Quantity	99.715.225
Total Nursery Costs	111.377.239
Total Cost of Farming	183.266.666

Source: Primary Data Processing Results, 2025

Based on table 1, it can be seen that the cost elements consist of 2, namely fixed costs and variable costs, fixed costs consist of land rental costs, depreciation costs and fixed labor costs, while in variable costs there are 7 costs, namely the cost of using seeds, fertilizers, pesticides, labor outside the family and within the family, planting media, packaging costs to certification costs. The average total cost incurred by respondent farmers in the research area in seeding activities is Rp. 71,889,427/year while in nursery activities is Rp. 111,377,239/year. The total average farming cost of the respondent farmers is Rp. 183,266,666/year.

4.1.2 Farm Business Revenue

Revenue is an important component in calculating income. The amount of total revenue that will be received by farmers for every rupiah that has been spent in breeding farming activities is influenced by the amount of seed and seed production produced and the price of the production unit produced. The larger the production and the more expensive the selling price of the product, the greater the total revenue that will be received by farmers. And vice versa, if the smaller the production amount and the lower the selling price of the product, the lower the total revenue that will be received by farmers. The average selling price of seeds is Rp. 700/grain and the selling price of seeds is Rp. 5,000/stem. The average income in certified seed breeding and areca nut seedlings can be seen in Table 2.

Table 2. Average Farmer Income

Average Production	Average Price	Average Acceptance
295.759 (item)	700	207.031.067
97.025 (stem)	5.000	485.125.000
Quantity		692.156.067

Source: Primary Data Processing Results, 2025

Based on Table 5.10, it is known that the average seed production in the research area during the year is 295,759 grains. The average price of seeds is Rp. 700/piece. The average seed receipt of breeder farmers is Rp. 207,031,067/year. Meanwhile, the average seed production in a year is 97,025 stems with a selling price of Rp. 5,000/stem. The average seed revenue is Rp. 485,125,000/year. The total revenue of farmers breeding seeds and areca nut seeds is Rp. 692,156,067/year.

4.1.3 Farming Income

Soekartawi (2011) Farm income is the difference between the revenue and the total cost incurred by farmers during the production process. The income referred to here is the income obtained by farmers from the results of their farming in one year. Farm income is carried out to calculate how much income farmers receive in farming business which is reduced by the total cost. The amount of income of farmers breeding seeds and areca nut seeds in the study area can be seen in Table 3.

Table 3. Average Farmer Income

Description	Average
Seeding	

Total Revenue	207.031.067
Total Cost	71.889.427
Revenue	135.141.640
Nursery	
Total Revenue	485.125.000
Total Cost	111.377.239
Revenue	373.747.761
Farm Income	508.889.401

Source: Primary Data Processing Results, 2025

Based on Table 3, it is known that the total farm revenue consists of total seed and seed receipts, which is Rp. 692,156,067/year. The total cost of farming consists of the total cost of seeding and seedling, which is Rp. 183,266,666/year. The total average income of farmers in the study area is Rp. 508,889,401/year so it can be said to be profitable. This research is in line with previous research by Nur Imdah Minsyah, *et al* (2019) regarding the analysis of betel nut breeding business in the peatland of Tanjung Jabung Barat in Jambi Province with a revenue of Rp. 13,500,000 and the use of production costs of Rp. 4,598,000 so that an income of Rp. 8,902,000 was obtained.

Table 4. Income Breakdown per Farmer

Breeder Farmer	Income in Nursery (Rp)	Total Income (Rp)
Tuesday	563.422.243	894.723.343
Mairas	459.371.241	511.226.906
Murdianto	98.449.798	120.717.953
Average	373.747.761	508.889.401

Source: Primary Data Processing Results, 2025

Based on Table 4, it can be seen that the highest income of breeder farmers is Mr. Mardi of Rp. 894,723,343/year while the smallest is Mr. Murdianto of Rp. 120,717,953/year. The average income of breeder farmers is Rp. 508,889,401/year. The average income is the average income in 1 year, which means that the average income of farmers per month is Rp. 42,407,450. Certified betel nut seed breeding and seed breeding businesses have considerable potential. The potential of this farming business is to produce products in the form of quality areca nut seeds and seedlings with seed quality certificates obtained. In addition, the areca nut variety that is cultivated in this breeding activity is the first national superior variety in Indonesia, namely betel nut. Areca nut has many advantages, one of which is having a high production of around 130 areca nuts per bunch. The advantages of areca nut make areca nut in great demand to be cultivated. The high interest in cultivating betel nut plants will increase the demand for certified betel nut seeds and seedlings so that certified betel nut seed breeding and seedling farming businesses have great potential to be developed.

4.1.4 The areca nut seed breeding farming business is financially feasible to run in Betara District, West Tanjung Jabung Regency

The ratio of income to costs (R/C ratio) is used to indicate how many rupiah of farm revenue will be obtained by seed breeder farmers from every rupiah spent on farming activities. The R/C ratio value can be used as a measure in assessing the efficiency of a farming business.

Table 5. Average R/C Scores of Farmers

Sample Farmer Name	Total Farm Income (Rs)		Total Farm Income (Rp)	R/C
	Total Farm Business Revenue (Rs)	Total Cost of Farming (Rs)		
Tuesday	1.193.333.100	298.609.757	894.723.343	4,0
Mairas	675.304.500	164.077.594	511.226.906	4,1
Murdianto	207.830.600	87.112.647	120.717.953	2,4
Quantity	2.076.468.200	549.799.998	1.526.668.202	10,5
Average	692.156.067	183.266.666	508.889.401	3,5

Source: Primary Data Processing Results, 2025

Based on Table 5, it shows that the average R/C ratio of certified seed and areca nut breeders in the research area is 3.5, which means that breeding farming activities in the research area can be said to be efficient and feasible because >1. The R/C value of the ratio is obtained from the result of the division of the total revenue and the total cost. The highest

R/C value was in breeding farming by Mr. Mairas at 4.1 while the smallest R/C value was in breeding farming by Mr. Murdianto at 2.4. The average R/C value of farmers is 3.5 which means that every Rp. 1 cost incurred by farmers for farming activities will provide revenue of Rp. 3.5.

4.2 Discussion

From the results of the study, it can be seen that the overview of farms breeding seeds and areca nut seeds is fully certified which includes the total cost, revenue, income, and level of business feasibility using R/C ratio analysis. The cost structure shows that the total average cost incurred by farmers in one year is IDR 183,266,666, consisting of seeding costs of IDR 71,889,427 and nursery costs of IDR 111,377,239. The composition of costs shows that variable costs dominate expenditures, especially in seed components, planting media, labor, packaging, and certification. This shows that the captive business is greatly influenced by the scale of production and the intensity of operational activities, so that the efficiency of input management is an important factor in maintaining business profitability. In terms of revenue, the average total revenue of breeder farmers reached Rp 692,156,067 per year, which came from seed sales of Rp 207,031,067 and seed sales of Rp 485,125,000. The largest contribution comes from nursery activities, which provide higher added value than hatcheries. With a total cost of IDR 183,266,666, an average income of IDR 508,889,401 per year or around IDR 42,407,450 per month is obtained. The income obtained from areca nut seed breeding farming is quite large and shows that breeding activities provide significant benefits for respondent farmers.

The amount of income indicates that the breeding business has good economic prospects to continue to be developed. Efforts that can be made by breeders to increase income are by maximizing land use in seeding activities and increasing the land area in nursery activities. Nursery activities generally utilize the yard of the house. Based on observations in the field, there are still yard lands that have not been optimally utilized and have the potential to be developed as additional nursery areas. The increase in the area of nursery land will increase seed production capacity, which ultimately has a direct impact on increasing the income and income of breeders.

In the certification activity, there is support from the government in the form of budget assistance for the field team's accommodation costs. Although the assistance provided does not completely cover the entire cost of certification, its existence is enough to help reduce the burden of farmers' expenses, especially for the accommodation component. However, the costs incurred by breeder farmers are still relatively large, especially in the components of labor costs, planting media, packaging, and certification. These components are the dominant factor in the cost structure and require careful management so as not to reduce profit margins. In general, areca nut seed and seed breeding activities in the research area have sufficiently followed the references from the Minister of Agriculture regarding the production, certification, circulation, and supervision of areca nut seeds. However, there are still some technical aspects that are not fully in accordance with applicable regulations, so it is necessary to increase coaching and assistance so that quality standards can be met consistently.

Based on the business feasibility analysis using the R/C ratio, an average score of 3.5 was obtained. This value is greater than one (R/C > 1), which means that every Rp 1 spent on farming activities will generate revenue of Rp 3.5. Thus, it can be concluded that certified betel nut seed breeding and seedling farming in Betara District is financially feasible to be pursued and further developed. The high R/C ratio value shows that this business is not only profitable, but also efficient in the use of production costs, so that it has good sustainability potential if supported by more planned business management and strengthening market access. Thus, although the income obtained by breeders in the research area is relatively profitable and the captive farming business is feasible to continue to operate, its long-term sustainability still requires strengthening cost efficiency, increasing managerial capacity, diversifying risks, and optimizing land use. Without improvements in these aspects, the current high profit level has the potential to become unstable in the event of changes in prices, policies, or market conditions.

5 | CONCLUSIONS AND FUTURE WORK

Certified seed breeding and areca nut breeding farms in the research area have an average use area of nursery land of 1,533 m2. The source of seeds comes from the plant-producing blocks that belong to oneself and others. The average production of certified seeds in a year is 403,564 seeds. The average use of seeds to be used as ready-to-plant seeds for a year is 107,806 seeds. The average production of certified seeds and seedlings produced and marketed was 295,759 grains and 97,025 stems, respectively. The average income obtained by breeders in the research area is Rp. 692,156,067,- The total average cost incurred by breeder farmers is Rp. 183,266,666,- The average income received by farmers in the research area is Rp. 508,889,- Certified seed and areca nut breeding farming in the research area is feasible to be done with an R/C Ratio of 3.5.

This suggests that increasing nursery capacity has greater potential in driving revenue growth. Although in aggregate this business is profitable, there is a significant variation in income between farmers. These differences indicate that business scale, managerial skills, and cost management efficiency are important factors that affect

profit levels. In addition, the dependence on certain cost components and certification support from the government shows that business sustainability still requires strengthening cost management and increasing the internal capacity of farmers. Overall, certified areca nut seed breeding and areca nut breeding businesses have good prospects for development, especially by optimizing land use, increasing production cost efficiency, and strengthening business management to be able to maintain profit levels in the long term. And there is a need for further development in the breeding business of certified areca nut seeds and seedlings from the number of breeders because with the increase in the number of breeders, it is assured that it can support the research area to become a certified areca nut seed breeding sector and can improve the welfare of farmers who run this farming business.

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