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# Analysis of Mangrove (*Rhizophora sp.*) Nursery Operations in Tapulaga Village, Soropia Subdistrict, Konawe Regency

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**Abstract**

*This research is motivated by mangrove nursery business in Soropia District, Konawe Regency is an individual business that needs to be studied about the financial feasibility of mangrove nursery farming, to be developed and benefit the people who do the nursery. The purpose of this study was to know the process of mangrove plant nurseries in Tapulaga Village, Soropia District, Konawe Regency. Analyzing the cost efficiency of mangrove plant nursery farming in Tapulaga Village, Soropia District, Konawe Regency. The analysis method used is income analysis and business feasibility. The results showed the income received by mangrove plant nursery farms in Tapulaga Village, Soropia District. The income received amounted to Rp.5,441,667, with total costs of Rp.4,558,333 and total revenue of Rp.5,441,667. Mangrove plant nursery farming in Tapulaga Village, Soropia District, Konawe Regency has a return cost ratio (R / C) value> 1, seen in mangrove nursery farming obtained an R / C value of 2, meaning that mangrove plant nursery farming in Tapulaga Village is feasible to run or make a profit*

**Keyword: Mangrove Plant Nursery, Income**

## INTRODUCTION

Mangroves are a coastal ecosystem that plays a vital role in maintaining environmental balance and supporting the lives of various organisms. As a transitional ecosystem between land and sea, mangrove forests serve as a habitat for diverse biota, both terrestrial and aquatic. According to Nagelkerken et al. (2008), the upper canopy of mangrove vegetation is utilized by birds, mammals, reptiles, and insects, while the aquatic zones and mangrove root systems serve as habitats for various species of fish, crabs, shrimp, algae, sponges, and bivalves. Therefore, the



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presence of healthy mangroves significantly impacts the conservation of biodiversity as well as the productivity of fishery resources, which serve as a livelihood for coastal communities.

However, mangrove forests currently face various threats due to human activities and environmental changes. Mangrove degradation leads to a decline in the ecological functions of coastal areas, such as reduced aquatic habitat, increased risk of coastal erosion, and decreased fisheries productivity. These conditions directly impact the well-being of communities whose livelihoods depend on coastal resources. Therefore, efforts to rehabilitate and conserve mangrove forests must continue to ensure the sustainability of the ecological and economic functions of mangrove ecosystems.

One key factor in the success of mangrove rehabilitation is the availability of high-quality seedlings in sufficient quantities. Mangrove propagation is the initial stage that determines the success of planting and the growth of mangrove plants in the field. Collecting seedlings directly from natural habitats often faces various challenges, such as inconsistent seedling quality, root damage due to improper collection techniques, and a high risk of mortality after planting. To address these issues, effective and efficient propagation techniques are required. According to Kusmana in Rahmawaty (2006), the use of freshwater and peat soil as a growing medium in mangrove propagation can produce large quantities of seedlings, simplify maintenance, and increase the likelihood of successful seedling growth.

Mangrove degradation is also occurring in Tapulaga Village, Soropia Subdistrict, Konawe Regency. The reduction in the extent and quality of mangrove forests in the area has led to a decline in habitats for fish and other marine life, resulting in decreased catch yields and fishermen's income. On the other hand, the coastal area of Tapulaga Village possesses abundant mangrove fruit potential that has yet to be optimally utilized by the community. In light of these conditions, an initiative emerged from Mr. Bakri to utilize mangrove fruit as raw material for a mangrove nursery business. This activity not only supports coastal environmental rehabilitation efforts but also opens new business opportunities that can increase community income through the utilization of local resources previously considered of low economic value.

The mangrove nursery business in Tapulaga Village needs to be assessed from a financial feasibility perspective to determine its profitability and sustainability. Previous studies have shown that mangrove nursery activities and the utilization of mangroves provide significant economic benefits to the community. Idris et al. (2018) found that mangrove-related activities contributed 19.19% to household income in West Lombok. Furthermore, Dau et al. (2023) reported that the mangrove nursery business in Bontang City is economically viable with an R/C ratio of 2.29 and an ROI of 40.72%, while Banjarnahor et al. (2013) concluded that the mangrove



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nursery business in Deli Serdang Regency is also worth developing based on an R/C ratio greater than one. Nevertheless, studies on the financial feasibility of mangrove nursery businesses in Tapulaga Village remain limited. Therefore, this research is important to determine the level of financial feasibility of mangrove nursery businesses as a basis for sustainable business development and the improvement of coastal communities' welfare.

## METHOD

This study was conducted in December 2023 at the Wahana Lestari Mangrove Nursery Farm in Tapulaga Village, Soropia Subdistrict, Konawe Regency. The research location was selected using purposive sampling, considering that the mangrove nursery business had been operating for five years and possessed a sufficiently large seedling production capacity. Informants were selected using purposive sampling, which involves selecting informants based on specific criteria, with the primary informant being the owner of the mangrove nursery business, who was deemed to possess relevant knowledge and information regarding business operations. The data used in this study consisted of primary data obtained through observation, interviews using a questionnaire, and direct observation at the research site, as well as secondary data obtained from literature, journals, books, and relevant agencies.

Data analysis was conducted using qualitative descriptive methods to describe the conditions of the mangrove nursery business, while financial analysis was used to determine the business's efficiency and profitability through calculations of total revenue ($TR = P \times Q$), total costs ($TC = FC + VC$), net income ($I = TR - TC$), and the Revenue-to-Cost Ratio ($R/C = TR/TC$). The criteria for assessing business feasibility are based on the R/C Ratio, where $R/C > 1$ indicates a viable and profitable business, $R/C = 1$ indicates a break-even condition, and $R/C < 1$ indicates an unviable business or one incurring losses.

## RESULTS AND DISCUSSION

The mangrove nursery business in Tapulaga Village, Soropia Subdistrict, Konawe Regency was established by Mr. Bakrin in 2018 and began to develop intensively starting in 2019. The business was initially inspired by the activities of students participating in the Community Service Program (KKN), who conducted mangrove nursery activities in the village, prompting Mr. Bakrin to study nursery techniques and develop them into a business. Over time, the mangrove nursery business has experienced significant growth in line with the increasing demand for seedlings for mangrove rehabilitation and planting activities. In running the business, all operational costs and the procurement of production equipment are funded by personal capital. The collection of



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propagules or seedlings ( ) is conducted at locations relatively close by to maintain seedling quality and avoid damage caused by transportation over long distances. Seedling production is based on order volume, which simplifies business management and reduces the risk of overproduction. To date, this daily operation has become one of the mangrove cultivation businesses contributing to the supply of mangrove seedlings while supporting efforts to conserve the coastal ecosystem in the Tapulaga Village area.

**Mangrove Plant Production**

Production is the final output of an economic process or activity utilizing various inputs (Sukirno, 2002). The production of the mangrove seedling nursery business in Tapulaga Village, Soropia Subdistrict, Konawe Regency is presented in Table 1.

**Table 1 Fixed Costs of Mangrove Seedling Production in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| No | Mangrove Species | Quantity (trees) | Price (IDR/Tree) |
|---|---|---|---|
| 1 | Mangrove (*Rhizophora sp.*) | 2,500 | 4,000 |
| | Total | 2,500 | 4,000 |

**Source: processed primary data, 2024**

Table 1 shows that the production of mangrove seedlings in Tapulaga Village, Soropia Subdistrict, amounted to 2,500 trees; this production volume was carried out by the mangrove nursery business in accordance with orders from the Tourism Office and the National Disaster Management Agency (BNPB) of Kendari City. According to Rasmiati (2016), production, in this context, can be defined as an activity of transformation carried out by producers, whereby this transformation creates or provides utility for consumers. Furthermore, this utility generates economic value received by the owners of production facilities, paid for by service users as well as production service users, including both the labor force involved in management and the owners. Additionally, the definition of production outlined above encompasses two key aspects: the process of production elements and the benefits for humanity .

1. **Nursery Costs**

According to Choliq et al. (1999), business/project costs are all expenses incurred to generate future income (*return*). The costs referred to in this study are fixed costs and variable costs. Based on interviews with mangrove farmers, the costs incurred fluctuate annually; therefore, costs are set at a constant price.



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**Table 2 Fixed Costs of Mangrove Plant Nurseries in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| Unit Name | Unit | Amount | Depreciation (Rp) |
|---|---|---|---|
| Nets | Meters | 200 | 600,000 |
| Paranet | Meter | 350 | 1,750,000 |
| Raffia Rope | Roll | 2 | 50,000 |
| Hoe | Pcs | 2 | 40,000 |
| Shovels | Pcs | 2 | 43,333 |
| Machete | Pcs | 2 | 60,000 |
| Total | | 558 | 2,543,333 |

**Source: processed primary data, 2024**

Table 2 above shows that the total fixed costs incurred amounted to Rp.5,120,000, with the largest expense being for boats and the smallest for raffia rope. The useful life of the equipment used ranges from 1 to 3 years. Depreciation is calculated annually, with a total depreciation of Rp.2,543,333. This aligns with the statement by Choliq et al. (1999): Investment costs are all expenses incurred from the start of the project until it begins operations. Examples of investment costs include the construction of factory buildings, the purchase of machinery and equipment, labor related to the investment, and so on.

**Table 3 Variable Costs of Mangrove Nursery Operations in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| No | Description | Unit | Amount | Price (Rp) | Total Price (IDR) |
|---|---|---|---|---|---|
| | Polybag | Pcs | 60 | 12,000 | 720,000 |
| | Mangrove seedlings | kg | 10 | 25,000 | 250,000 |
| | Seedling planting wages | Trees | 3 | 15,000 | 45,000 |
| | Variable Costs | | 73 | 52,000 | 1,015,000 |

**Source: processed primary data, 2024**

Table 3 shows the operating costs incurred during the nursery process, with a total cost of Rp.4,558,333, including variable costs of Rp.1,015,000. The investment capital and operating costs of the business are sourced from personal funds. This is consistent with the statement by Choliq et al. (1999), who noted that operational costs include, for example, the purchase of raw materials, electricity and water costs, fuel, and so on.



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**2. Revenue from Mangrove Nursery Farming**

Revenue (TR) refers to everything generated by a business, whether in the form of primary business output, such as the sale of mangrove seedlings. In this study, the mangrove species cultivated was Rhizophora (*Rhizophora sp*.), and revenue was derived solely from the sale of mangrove seedlings. The total revenue received by the mangrove nursery business in Tapulaga Village, Soropia Subdistrict, Konawe Regency is shown in Table 4.

**Table 4 Income from Mangrove Nursery Operations in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| Mangrove Species | Quantity (trees) | Price (IDR/Tree) | Revenue (IDR/Month) |
|---|---|---|---|
| Mangrove (*Rhizophora sp*.) | 2,500 | 4,000 | 10,000,000 |

**Source: processed primary data, 2024**

Table 4 shows that the revenue from the mangrove nursery operated in Tapulaga Village, Soropia Subdistrict, comes from the sale of ready-to-plant mangrove seedlings to mangrove rehabilitation stakeholders (government and companies). Consequently, the profit generated from the mangrove nursery business amounts to Rp.10,000,000 per production cycle.

**3. Income from Mangrove Cultivation**

Income is the difference between revenue (*total revenue*) and all costs (*total cost*) (Soekartawi, 2002). The income received by the mangrove cultivation business in Tapulaga Village, Soropia Subdistrict, Konawe Regency, is shown in Table 5

**Table 5 Income from Mangrove Nursery Operations in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| Mangrove Species | Total Revenue (Rp) | Total Costs (Rp) | Income (Rp/Month) |
|---|---|---|---|
| Mangrove (*Rhizophora sp*.) | 10,000,000 | 4,558,333 | 5,441,667 |

**Source: processed primary data, 2024**

Table 5 shows the revenue received by the mangrove seedling nursery business in Tapulaga Village, Soropia District. The income received was Rp. 5,441,667, with total costs of Rp. 4,558,333 and total revenue of Rp. 5,441,667; the revenue obtained by the mangrove nursery business was calculated as the difference between total revenue and total costs.

This aligns with the view of Aritonang (1993, *as cited in* Siregar, 2009), who states that



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income analysis serves to measure the success of a business activity, identify the main components of income, and determine whether those components can be improved or not. A business activity is considered successful if its revenue is sufficient to cover all production costs. This business analysis provides a detailed account of income and expenses over a specific period.

**4. Ratio (R/C)**

The R/C ratio is the comparison between sales revenue and the costs incurred during the production process until the product is produced. Mangrove seedling farming operations of various scales in Tapulaga Village will be profitable if the R/C value is greater than 1. The higher the R/C value, the greater the profit level that will be obtained from the operation. *The return-cost ratio* obtained by the mangrove seedling nursery business in Tapulaga Village, Soropia Subdistrict, Konawe Regency, is shown in Table 6.

**Table 6 R/C Ratio of Mangrove Seedling Farming in Tapulaga Village, Soropia Subdistrict, Konawe Regency**

| Mangrove Species | Total Revenue (Rp) | Total Costs (Rp) | R/C |
|---|---|---|---|
| Mangrove (*Rhizophora sp.*) | 10,000,000 | 4,558,333 | 2 |

**Source: processed primary data, 2024**

Table 6 shows that the mangrove nursery business in Tapulaga Village, Soropia Subdistrict, Konawe Regency, has a *return-to-cost ratio* (R/C) >1. As seen in the table, the mangrove nursery business achieved an R/C value of 2, meaning that the mangrove nursery business in Tapulaga Village is viable and generates a profit ( ). This is consistent with the opinion of Soekartawi (2002), who states that R/C stands for *Return Cost Ratio*, or is known as the ratio between revenue and costs. Test criteria: if R/C >1, it is viable to undertake; if R/C <1, it is not viable to undertake

**CONCLUSION**

Based on the research findings, it can be concluded that the mangrove seedling nursery business in Tapulaga Village, Soropia Subdistrict, generates revenue. The revenue received amounts to Rp.5,441,667, with total costs of Rp.4,558,333 and total revenue of Rp.5,441,667. The mangrove seedling farming business in Tapulaga Village, Soropia Subdistrict, Konawe Regency, has a *return-to-cost ratio* (R/C) >1. As seen, the mangrove seedling farming business



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achieved an R/C value of 2, meaning the mangrove seedling farming business in Tapulaga Village is viable to operate and generates a profit

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