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OPPORTUNITIES FOR DEVELOPING STRAW MUSHROOM (VOLVAVIERRA VOLVACEA) IN ASAHAN REGENCY

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Abstract: The agricultural sector plays a vital role in achieving food self-sufficiency and enhancing farmers' income. Among various agricultural products, vegetables, including mushrooms, have seen notable growth in production. Straw mushroom (Volvariella volvacea) cultivation holds significant economic potential in Indonesia due to its high market price, abundant availability of raw materials, and expansive market opportunities. These factors contribute to the promising future of straw mushroom farming. This study aims to analyze the income generated from straw mushroom farming and assess its feasibility. The research area was selected purposively to focus on regions with high potential for straw mushroom cultivation. Using total sampling, data were collected from all relevant participants, comprising both primary and secondary data. A Break-Even Point (BEP) analysis was employed to determine profitability and feasibility. The findings revealed a total revenue of IDR 4,314,200 per two-month harvest cycle, resulting in a net income of IDR 2,900,563. The BEP production value was calculated at 38.16 kg, while actual production reached 217 kg, significantly exceeding the BEP. This demonstrates that straw mushroom farming is not only profitable but also sustainable, presenting a compelling opportunity for expansion and economic growth in the agricultural sector.

Keywords: Agricultural sector, food self-sufficiency, straw mushroom, Volvariella volvacea, profitability.

Introduction

The development of the agricultural sector is essential for achieving food self-sufficiency and improving the income of society, particularly farmers. Among vegetable commodities that have shown increasing production is mushrooms. Known in English as "mushrooms," they belong to the fungi or mold group. Mushroom cultivation has promising prospects in Indonesia due to favorable natural conditions in a tropical country, with humidity levels ranging from 70–90% and an average temperature of 30°C. Additionally, raw materials for creating mushroom substrates or logs are abundant. Globally, there are approximately 600 species of mushrooms consumable by humans; however, only 200 species are commonly consumed, and 35 of these have been commercially cultivated. These edible mushrooms include oyster mushrooms, wood ear mushrooms, and straw mushrooms. Straw mushrooms serve as an alternative to meet the demand for high-protein foods (Lestari et al., 2018).

In recent years, the demand for straw mushrooms has increased alongside public awareness of the importance of healthy eating habits. According to Sari (2023), the consumption of straw mushrooms in Indonesia has risen significantly, particularly among urban communities seeking alternative protein sources. Yuliawati (2016) reported that the demand for straw mushrooms in Indonesia reached 17,500 tons annually by 2015. The cultivation of straw mushrooms presents

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promising opportunities for development. The downstream development of straw mushroom enterprises has considerable potential in production centers, fostering integration and marketing opportunities in both domestic and international markets. However, developing straw mushroom cultivation requires specific strategies to address various internal and external factors (Nur et al., 2020).

Saputra (2014) highlighted several reasons why straw mushroom cultivation is a profitable business, including increasing market demand, simple cultivation techniques, easily accessible raw materials, short harvest cycles, the ability to convert media waste into compost, and ample business opportunities. In North Sumatra Province, mushroom production development is still limited, with only a few areas contributing to mushroom supply. These areas include Binjai, Tebing Tinggi, Deli Serdang, and Asahan (BPS Sumut, 2020).

According to Prasetyo (2023), straw mushroom cultivation can serve as a promising source of income for farmers, particularly in rural areas. In Asahan Regency, communities in Air Batu, Tinggi Raja, Teluk Dalam, and Pulo Bandring districts engage in straw mushroom farming. Straw mushroom farming in Asahan Regency began due to favorable market potential. This motivates the community to engage in straw mushroom farming as a supplementary income activity. Most people in Asahan Regency work as farmers, traders, farm laborers, and others. The income generated from straw mushroom farming contributes additional household income, supporting the economy of farmers engaged in this cultivation.

One way to evaluate the development potential of this commodity is to analyze the profitability and feasibility of straw mushroom farming, following established criteria such as the Benefit-Cost (B/C) ratio and Break-Even Point (BEP). Based on this background, several key questions arise: What are the cost components of straw mushroom cultivation? What is the production and profit obtained by farmers? And how feasible is straw mushroom cultivation in Asahan Regency?

Literature Review

Straw mushroom cultivation can be carried out using various methods, including the use of agricultural waste as a growing medium. This approach not only reduces waste but also improves resource efficiency (Widianto, 2024). Utilizing organic waste as a medium for straw mushroom cultivation minimizes pollution while enhancing agricultural productivity (Rahman, 2022). For instance, the use of oil palm empty fruit bunches (EFB) as a growing medium is more advantageous than using straw. Using EFB as a growing medium is highly recommended compared to straw (Ulfami et al., 2018). Straw mushrooms are a high-nutritional food source with growing market demand (Nurlaela and Suhaeni, 2022). Their consumption is also beneficial for alternative medical purposes, such as treating anemia, cancer, hepatitis, and other conditions (Indocement, 2020). Straw mushroom cultivation in Indonesia began in 1995, although the practice of mushroom farming dates back to before the 18th century in China (Saputra, 2014).

Environmental geographical factors also influence the success of straw mushroom cultivation. Optimal temperature conditions for growing straw mushrooms range between 30°C and 35°C (Ulfami et al., 2018), making them well-suited for cultivation in South and Southeast Asia, including Indonesia. However, production levels are often unstable, leading to low yields.
Efforts to improve straw mushroom productivity include providing training and outreach to farmers about proper cultivation techniques. Outreach programs are targeted not only at farmers already engaged in mushroom farming but also at those who have not yet ventured into it, encouraging

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them to start cultivation. Such programs are conducted by agricultural extension workers and other related parties to equip farmers with the knowledge needed for effective application (Mariyani et al., 2023).

Farm Management Concepts

Farm management is the study of how individuals allocate available resources effectively and efficiently to achieve high profits within a specific timeframe. Effective resource allocation refers to farmers utilizing their resources optimally, while efficiency implies producing an output that exceeds the input (Darwis, 2017).

Production Concept

Production involves activities aimed at increasing the utility of goods or creating new items that are more beneficial in meeting needs. Production is not limited to manufacturing but also includes storage, distribution, transportation, retailing, and repackaging or other related activities.

Production Cost Concept

Farm production costs are generally classified into two categories: fixed costs and variable costs. Fixed costs are expenses that remain relatively constant and are incurred regardless of the production volume, such as land rent, taxes, agricultural tools, and irrigation fees. These costs are not dependent on production levels. Variable costs, on the other hand, fluctuate based on the amount of production achieved. Researchers may classify certain expenses as fixed costs depending on their study objectives (Ariyono, 2018).

Revenue

Farm revenue is defined as the total value of farm products within a specific period, whether sold or unsold. Total farm expenditure refers to the value of all inputs consumed during production, excluding the labor of the farmer's family. Farm expenditure encompasses both cash and non-cash expenses.

Income

Farm cash income is the difference between revenue and cash expenses. It measures the farm's ability to generate money and is a preliminary step in evaluating potential farm debt (Soekartawi in Zulfahmi, 2011).

Method

Research Area

The research area was determined purposively in Asahan Regency, considering that this region is one of the centers for straw mushroom production with significant potential for further development. The primary production areas in Asahan Regency include Air Batu, Tinggi Raja, Teluk Dalam, and Pulo Bandring districts.

Sampling Method

The sampling method used in this study was total sampling, where all members of the population were included as samples. In this research, the entire population, consisting of seven

farmers, was used as the sample.

Types of Data

This study employed both qualitative and quantitative data. Quantitative research emphasizes objective phenomena, analyzed through numerical methods, while qualitative data provided contextual insights. Data sources were divided into two categories based on their grouping:

1. Primary Data: Directly obtained from respondents through field observations and interviews.
2. Secondary Data: Collected from relevant documentation, records, and prior studies.

Data Collection Methods

Data collection methods in this research included:

a. Field Observation: Direct observations of the farming practices.
b. Interviews: Conducted with respondents using structured questionnaires.
c. Documentation: Reviewing records of past events and relevant documents.

Data Analysis Methods

The data analysis in this study involved the following techniques:

a. Total Cost (TC)

The total cost is calculated using the formula:

$TC = FC + VC$

b. Total Revenue (TR)

Total revenue is determined using the formula:

$TR = P \times Q$

c. Net Income (π)

Net income is calculated as:

$\pi = TR - TC$

a. Feasibility Analysis

Benefit-Cost Ratio (B/C Ratio)

The B/C ratio measures the profitability of the farming activity and is calculated as:

B/C Ratio = Total Revenue / Total Cost

A B/C ratio greater than 1 indicates that the business is profitable and feasible.

d. Break-Even Point (BEP)

The BEP determines the production level at which total costs equal total revenue, ensuring no profit or loss. It is calculated as:

BEP Unit = FC / (P - VC)

Results and Discussion

Sample Characteristics

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The study involved a total of seven respondents, with an average farming experience of 1.6 years. The average mushroom cultivation area (kumbung) was 160.71 m², ranging from the smallest area of 112 m² to the largest area of 220 m².

Production Costs of Straw Mushrooms

Production costs refer to the expenses incurred during the cultivation process. In the case of straw mushroom farming, these costs include both fixed and variable expenses.Fixed costs are expenses that remain unaffected by the scale of production. These include costs such as depreciation of equipment and infrastructure. Variable Costs (VC): Variable costs depend on the scale of production and fluctuate based on the volume of output.

The total production cost incurred for one production cycle (two months) was IDR 1,413,548. This amount includes depreciation costs and variable costs. Depreciation of equipment totaled IDR 188,962 per production cycle (two months). Depreciation of the kumbung infrastructure, with an average area of 160.71 m², was IDR 444,444. The variable costs included expenses for preparing the growing medium (composting), amounting to IDR 780,143.

The detailed breakdown of fixed and variable costs for one production period of two months is as follows:

Table 1. Cost Analysis for Mushroom Production

No		Component	Cost
1	**Fixed Costs**	**equipment depreciation.**	
		a. Drum	31.230,16
		b. Blower	9.523,81
		c. Sprayer	19.940,48
		d. Flashlight	13.392,85
		e. Bucket	1.386,90
		f. Thermometer	11.833
		g. Scale	1.190,47
		h. Hose	9.111,11
		i. Cart	14.047,62
		j. Tarp	55.476,19
		k. Pump	17.083,33
		l. Hoe	1.023,81
		m. Pipe	3.809,52
	Total Fixed Cost		**188.962**
	Kumbung depreciation		**444.444**
2	**Variable Costs**	Growing medium	350.000
		a. Oil palm waste	350.000
		b. Bran	68.571
		c. Dolomit	21.285
		d. Molasses	20.000
		e. M4	22.000
		f. Seeds	258.286
		g. Net	40.000

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Total	**780.142**
Total Variable Costs	**1.413.548**

Source: Primary Data Processed in 2024

Revenue from Straw Mushroom Farming

The revenue is calculated based on the prevailing selling price of IDR 20,000 per kilogram, with a total production cost of IDR 1,413,548. This is presented in Table 2 below:

Table 2. Straw Mushroom Production Results for One Period

Sample	Cultivation area (m^2)	Production (kg)	Revenue (IDR)	Income (IDR)
1	112	160	3.200.000	1.786.452
2	220	300	6.000.000	4.586.452
3	220	250	5.000.000	3.586.452
4	112	200	4.000.000	2.586.452
5	189	300	6.000.000	4.586.452
6	160	150	3.000.000	1.586.452
7	112	150	3.000.000	1.586.452
Total	1125	1510	30.200.000	20.305.164
Average	160,71	215,71	4.314.285	2.900.738

Source: Primary Data Processed in 2024

Based on Table 2, the average cultivation area is 160.71 m^2, with an average daily production of 8.85 kg of straw mushrooms. The harvest period lasts 20–25 days per month, resulting in an average production of 215.71 kg.

Income from Straw Mushroom Farming

The income is calculated by subtracting the total production costs from the total revenue. A business is considered profitable when revenue exceeds total costs; conversely, if total costs exceed revenue, the business is considered to be operating at a loss.

The revenue from straw mushroom farming in the study area was IDR 4,314,200, with total production costs amounting to IDR 1,413,548. Thus, the income earned by farmers from straw mushroom farming in the research area was IDR 2,900,738 per production cycle over a two-month period.

Feasibility Analysis of Straw Mushroom Farming

B/C Ratio

The Benefit-Cost Ratio (B/C Ratio) demonstrates the profitability of a business by comparing the benefits (income) to the costs incurred. If the calculated B/C Ratio is greater than 1, the business is profitable and feasible to continue. Conversely, if the B/C Ratio is less than 1, the business is considered not viable

B/C Ratio = Income / Total Production Cost
= IDR 2.900.738 / IDR. 1.413.548
= 2,05

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Based on the calculation, the B/C Ratio is 2.05, which is greater than 1. This indicates that straw mushroom farming is both feasible and profitable. The results show that the benefits obtained exceed the costs incurred. Each unit of cost produces greater benefits, demonstrating that straw mushroom farming adds value for farmers and is worth pursuing.

BEP (Break Even Point)

The Break-Even Point (BEP) is the production or sales level at which the total costs incurred equal the total revenue earned, resulting in zero profit or loss.

$$BEP \text{ unit} = FC/\ P{-}VC$$

$$\text{BEP Unit} = \text{Rp. } 633.494/\ \text{Rp. } 20.000/\ \text{kg} - \text{Rp. } 3.616$$

$$= \text{Rp. } 633.406\ /\ \text{Rp. } 16.384/\text{kg}$$

$$= 38{,}66\ \text{kg}$$

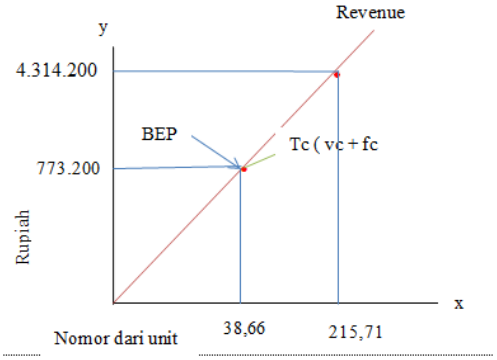

Figure1: Break-Even Point (BEP) of Straw Mushroom Farming

Based on the figure above, the BEP is achieved at a production level of 38.66 kg, with revenue of IDR 773,200. The actual production reached 215.71 kg, generating revenue of IDR 4,314,200, significantly exceeding the break-even point. This indicates that straw mushroom farming has strong potential for further development.

Conclusions

Conclusions

Based on the research conducted on the analysis of straw mushroom farming in the study area, the following conclusions can be drawn:

1. The revenue from straw mushroom farming in Asahan Regency is IDR 4,314,200, with a net income of IDR 2,900,738 per harvest cycle of two months.
2. Feasibility analysis indicates a break-even production point (BEP) of 38.16 kg and a Benefit-Cost Ratio (B/C Ratio) of 2.05.

Recommendations

1. To Farmers:
   Farmers in the research area are advised to enhance their production levels to better meet consumer demand, thereby increasing profitability. Maintaining product quality should also

remain a priority to ensure market competitiveness.

2. For Future Development:
   Farmers are encouraged to innovate continuously and establish partnerships with supermarkets, grocery stores, and restaurants to expand market reach and enhance product visibility, which could result in higher selling prices.
3. To Government and Relevant Agencies:
   It is recommended that government authorities, particularly in Asahan Regency, increase support for agricultural entrepreneurs, particularly straw mushroom farmers. Assistance should focus on improving production capacity and quality, enabling the region to establish itself as a key production center for straw mushrooms in the future.

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