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Feasibility analysis of white oyster mushroom cultivation in UD. Yusy Berkah Abadi Banyuwangi

I Imroni^{1,3}, M Y Hardiansyah^{2,4}, R R Bachtiar³, A Istanti³, Halil³, S W Utami³
and N E Dungga⁴

¹ Agricultural Economics, College of Bio-Resources and Agriculture, National Taiwan University, Taipei 10617, Taiwan

² Global Agriculture Technology and Genomic Science, International College, National Taiwan University, Taipei 10617, Taiwan

³ Agribusiness, Politeknik Negeri Banyuwangi, Banyuwangi Regency, East Java 68461, Indonesia

⁴ Department of Agronomy, Agrotechnology Study Program, Faculty of Agriculture, Universitas Hasanuddin, Makassar 90245, Indonesia

Email: yusrilhardiansyah1@gmail.com

Abstract. A company called UD. Yusy Berkah Abadi makes fresh white oyster mushrooms and oyster mushroom logs. This business is situated in Banyuwangi District's Setail Village, Genteng Sub-district. This study aimed to examine the financial and non-financial viability of oyster mushroom cultivation and the viability of sensitive oyster mushroom cultivation. Market, technical, managerial, legal, and environmental aspects comprise the non-financial aspects. In contrast, financial aspects include NPV, IRR, R/C Ratio, B/C Ratio, BEP, and Payback Period, followed by sensitivity analysis in which the price was increased by 10%, decreased by 5%, the production was increased by 10%, decreased by 5%, the production cost was decreased by 10%, and the production cost was increased by 1%. The findings of this study suggested non-financial aspects of UD. Yusy Berkah Abadi was estimated based on all aspects, while financial aspects were feasible based on the value of NPV -IDR. 24.685.810, IRR 2%, and BEP units and rupiah of oyster mushroom logs 37.312 pcs and IDR. 93.285.481. Meanwhile, non-financial aspects were determined to be unfeasible.

1. Introduction

One of the horticultural products, mushrooms, have a high nutritional value and are utilized as an alternative cuisine for vegetarians. The natural environment is quite favorable for mushroom production in Indonesia, and there are also plenty of resources to make substrates or plant logs for mushrooms [1]. Banyuwangi regency is well renowned for its alluring tourism, which also has many promising agriculture potentials, including for the cultivation of mushrooms. In general, Banyuwangi has two kinds of mushrooms that usually the farmer planted, such as oyster mushroom and straw mushroom. There is the data of mushrooms in Banyuwangi:



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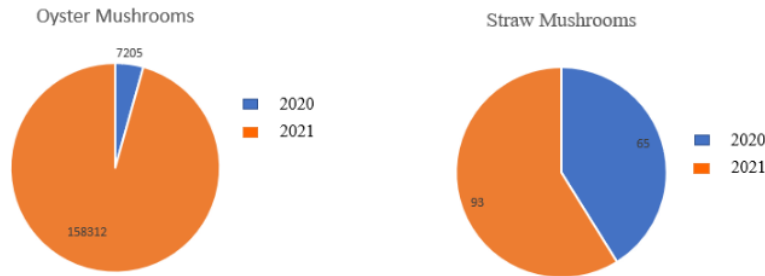


Figure 1. Harvest area of oyster mushrooms and Straw mushrooms in Banyuwangi in ha [2]

Based on the data by Central Bureau Logistics (BPS) in 2022, In Banyuwangi regency has a huge potential to develop the oyster mushrooms products, because the harvest area of the oyster mushroom is more beneficial than straw mushrooms. There are several subdistricts in Banyuwangi that plant oyster mushroom, as example Genteng subdistrict. Genteng Subdistrict, the largest production of oyster mushroom, in Banyuwangi has several home industries or companies that produce potential oyster mushroom, such as UD. Yusy Berkah Abadi, Asari, Sakur, Bajuri and Kamim have varying productivity levels. The production and the number of baglog for each company in 2018 are contrasted below:

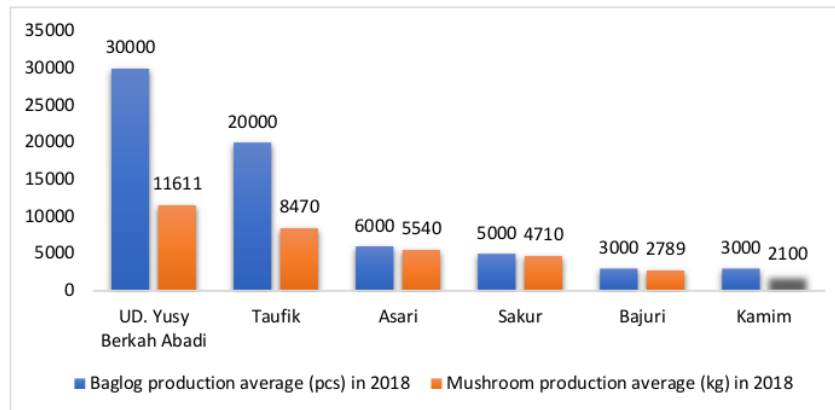


Figure 2. Total baglog and production of white oyster mushrooms in several SMEs (Small and Medium Enterprise) in Genteng subdistrict in 2018.

With a manufacturing capacity of over 30,000 baglogs and 11,611 kg of white oyster mushrooms, UD. Yusy Berkah Abadi has the most excellent baglogs and production output, and Taufik in the second position, has a large gap from UD. Yusy Berkah Abadi by producing 20000 baglogs and 8470 kg of fresh white oyster mushrooms. Asari, Sakura, Bajuri and Kamim have a small capacity production compared to UD. Yusy Berkah Abadi and Taufik. Those capacity productions do not have a massive difference between baglog and fresh white oyster mushroom production. This study aims to Find out about financial and non-financial factors that help decide whether the firm should be sustained, expanded, or discontinued is the goal of a business feasibility analysis [3]. According to Mulyawati (2016) [4] profit-making is the primary business goal, so there must be adequate management of the firm's financial and non-financial elements since the risk caused by a company grows as it grows. The benefits of conducting this non-financial analysis include learning about business administration, environmental sustainability, benefits obtained by the surrounding community, and complete business

licensing so that the industry can last long enough without harming others [4]. If the non-financial analysis is not conducted, it will result in uncertainty in aspects of the business, so the company will be delayed and may even stop [6]. To conclude, the feasibility is important to avoid the risk of loss, good implementation, good planning, supervision and easy to control [7].

2. Study methods

Between April and July 2019, the study was carried out at the UD. Yusy Berkah Abadi white oyster mushroom farming is located in Setail Village, Genteng Subdistrict, Banyuwangi Regency, East Java Province. Given that UD. Yusy Berkah Abadi is a white oyster mushroom growing company with a sizable amount of experience and breadth, and this place was purposefully chosen. Kotane, Inta (2015) [8] stated for deciding the feasibility analysis business, we use non-financial and financial feasibility analysis and sensitivity evaluation to predict the business will survive in some circumstances, such as changes in selling prices and production and production cost.

2.1 Non-Financial feasibility analysis

For non-financial analysis, several aspects should be considered that the company is worth it or not as follows:

Table 1. Non-financial analysis.

Aspects	Examination
Market aspects	Sulastri (2016) [9] stated market aspects it is worthy if; <ol style="list-style-type: none"> High product demand. The market strategy has been used. Market opportunity.
Technical aspects	Husnan and Muhammad (2014) [6] technical aspects, it is worthy if; <ol style="list-style-type: none"> The business is close to markets, has raw materials availability, good electricity and water resources, employment resources, a proper climate, and good transportation facilities. The production process is efficient. Having a good layout business related to the production process. Machines and tools.
Management aspects	Kotler (2017) [10] stated the management aspects are worthy if; <ol style="list-style-type: none"> An excellent structural organization. Having a clear job description. A fixed schedule.
Law aspects	Sayuti (2008) [11] stated the law aspects are worthy if; <ol style="list-style-type: none"> A clear-of-form business entity. A business has legality and several certifications.
Environmental aspects	Sayuti (2008) [11] stated the environmental aspects are worthwhile if; <ol style="list-style-type: none"> A business does not have adverse effects. There is good environmental management.

2.2 Financial feasibility analysis

The financial feasibility analysis of white oyster mushrooms will be conducted at UD. Yusy Berkah Abadi for a five-year (2014-2018), such as Net Present Value (NPV), Internal Rate of Return (IRR),

2

R/C ratio, B/C ratio, Break Even Point (BEP), and Payback Period. The following are the requirements for investment eligibility:

2.2.1 Value Net Present (NPV)

$$NPV = \sum_{t=0}^n \frac{B^t - C^t}{(1+i)^t} \dots\dots\dots (1)$$

B^t = Benefit of the t-year, C^t = Cost of the t-year, n = economic life, I = interest rate, t = time period

2.2.2 Internal Rate of Return (IRR)

$$RR = i_1 + \frac{NPV_1}{(NPV_1 - NPV_2)} (i_2 - i_1) \dots\dots\dots (2)$$

NPV1 = positive NPV, NPV2 = negative NPV, i1 = interest rate that produces a positive NPV, i2 = interest rate that produces a negative NPV.

2.2.3 R/C ratio

$$R/C \text{ Ratio} = \frac{TR}{TC} \dots\dots\dots (3)$$

TR = Total Revenue, TC = Total Cost.

2.2.4 B/C ratio

$$B/C \text{ Ratio} = \frac{\text{Benefit}}{\text{Cost}} \dots\dots\dots (4)$$

Benefit = Benefit (Profit), cost = Cost (Cost).

2.2.5 Break Even Point (BEP)

BEP analysis can be calculated in 2 ways, namely:

2.2.5.1 Sales in Units

$$BEP = \frac{FC}{P - V} \dots\dots\dots (5)$$

FC = Fixed Cost, VC = Variable Cost, P = Selling Price per Unit

2.2.5.2 Sales in Rupiah

$$BEP = \frac{FC}{1 - \frac{VC}{P}} \dots\dots\dots (6)$$

FC = Fixed Cost, VC = Variable Cost, P = Sales.

2.2.6 Payback Period

$$\text{Payback period} = n \frac{a-b}{c-b} \dots\dots\dots (7)$$

n = last year where the number of cash flows still cannot cover the initial investment, a = amount of initial investment, b = cumulative amount of cash flows in t-year, c = cumulative amount of cash flows in year ke-t+1

2.3 Sensitivity evaluation

Sensitivity analysis is performed by varying the magnitude of the significant factors, which can be considered separately or in conjunction with other vital variables and a particular known or expected percentage [12], [13]. How much the sensitivity of changes in these factors affects the feasibility results has then been evaluated [14]. For this study, we used three types of presumptions below.

1. If the price goes up by 10% and down by 5%.
2. If the production is 10% higher and 5% lower.
3. If the manufacturing process is a 1% rise and a 10% decrease.

3. Results and discussion

3.1 Analysis of non-financial analysis

3.1.1 *Market aspects.* Given the increasing demand for white oyster mushrooms and the market opportunity for baglog and white oyster mushrooms, it can be inferred from research on market aspects that occur at UD. Yusy Berkah Abadi that demand for these products is extremely high. Market strategies were evaluated using the 4C method, which includes co-creation, currency, communal activation, and conversations [10]. According to Yusy Berkah Abadi, the commercial element of UD has been deemed realistic considering the relevant factors.

3.1.2 *Technical aspects.* According to UD. Yusy Berkah Abadi's technical research, the location of the business includes a 3.7 km distance between the market. The place of business and raw materials availability is derived from the subdistrict where the company is located and its surroundings, the labour supply is simple to obtain by utilizing the surrounding community, and the climate is suitable for growing white oysters. Modern enough to simplify the manufacturing process, the technological features at UD. Yusy Berkah Abadi is proclaimed practical and can be extended or expanded even further in the future. For the technology, since the firm has a chance to improve it, it will have an agriculture supporting system to collect several information from the field, so it will be easy for the farmer could evaluate the plants progress [15].

3.1.3 *Management aspects.* The organizational structure is reasonable and conforms to the functional organizational structure, the division of duties. Responsibilities have been carried out and divided appropriately, and there is a clear schedule of activities, according to the findings of UD. Yusy Berkah Abadi's management research. UD. Yusy Berkah Abadi's managerial facets are promising. From those, it can be concluded that the firm has a good management aspect as a company [16].

3.1.4 *Legality factors.* According to research on the legal side of UD, Trading Business (UD) is how the firm is legally constituted, and TDP, SIUP, and NPWP commercial licenses make it simpler to conduct business operations and activities. These legals are original from the Indonesian government by following the requirements for the business field. These suggest that UD. Yusy Berkah Abadi's legal aspects are worth running.

3.1.5 *Environmental factors.* According to Yusy Berkah Abadi's research on environmental issues at UD, this company creates trash in the form of baglog powder and baglog plastic bags. Baglog plastic bags are utilized as fuel during the steaming process, and baglog powder waste is used as organic fertilizer for the plants of company owners and the neighbourhood (baglog steaming). Because they do not have a significant negative impact on the environment and able to manage the waste, so it is a best location [16].

3.2. Financial analysis

Pasaribu (2012) [17] stated that an analytical method had been developed to assess a project to obtain a fundamental benchmark in investment feasibility, namely with investment criteria that can draw several conclusions about whether the net benefit is an investment opportunity. Following are the results of the financial analysis of UD's business feasibility below.

Table 2. Financial of white oyster mushroom cultivation business UD. Yusy Berkah Abadi.

Subjects	Unit	Years				
		2014	2015	2016	2017	2018
Production total (Y)						
• Mushroom baglog	Pcs	7,360	15,400	18,950	25,100	31,250
• Fresh white oyster mushroom	Kg	8,604	12,448	14,349	12,984	12,685
Prices (Py)						
• Mushroom baglog	IDR	2,500	2,500	2,500	2,500	2,500
• Fresh white oyster mushroom	IDR	10,000	10,000	10,000	10,000	10,000
Business revenues						
• Capital			100,000,000			
• Mushroom Baglog	Pcs	18,400,000	38,500,000	47,375,000	62,750,000	78,125,000
• Fresh white oyster mushroom	Kg	86,040,000	124,480,000	143,490,000	129,840,000	126,850,000
Total revenue	IDR	104,440,000	268,340,000	190,865,000	192,590,000	204,975,000
Fixed costs (FC)	IDR	31,830,000	46,230,000	46,230,000	46,230,000	46,230,000
Variabel costs (VC)	IDR	12,979,000	21,532,150	26,440,588	32,418,125	39,408,163
Total costs (FC + VC)	IDR	44,809,000	67,762,150	72,670,588	78,648,125	85,638,163
First Investment (2011)	IDR					50,000,000
Investment costs (2016-2018)	IDR	4,129,000	33,279,000	25,869,000	6,329,000	6,399,000
Total production costs	IDR	48,938,000	101,041,150	98,539,588	84,977,125	92,037,163
Profit	IDR	55,502,000	167,298,850	92,325,412	107,612,875	112,937,837

Source: Primary Data Processed, 2019.

In Table 2, the highest total cost was in 2018, IDR. 85,638,163 it was also followed by the most increased production for baglog and fresh white oyster mushrooms, which had the highest show compared to other periods. However, for the lowest production, revenue and profit happened in 2014, with only 7,360 for baglog and 8,604 for fresh oyster mushrooms, IDR. 104,440,000 and IDR. 55,502,000, respectively. Meanwhile, the highest profit happened in 2015, with IDR. 167,298,850 because the company had just received fresh money from the bank to support the business as capital. For prices, it did not have many changes because for minority products, mushroom products, it is hard to have significant changes, so the prices remain the same, even though there is a high demand on the market. So, [2] decide whether the business is worth it, the financial calculation should be analyzed using NPV, IRR, R/C Ratio, B/C Ratio, BEP and payback period.

Table 3. Calculation of financial analysis.

Subjects	NPV	IRR	R/C Ratio	B/C Ratio	BEP		Payback Period
					Rupiah	Unit	
Jamur Tiram	-24,685,810	2%	2.25	1.25	67,064,871	6,707	2 years 10 months
Baglog					93,285,481	37,312	

Source: Primary Data Processed, 2019

Financial analysis, which includes NPV, IRR, R/C Ratio, B/C Ratio, BEP and payback period, produces a value of -IDR. 24,685,810, IRR is 2%, and BEP Baglog units and rupiah are 37,312 pcs and IDR. 93,285,481 is declared ineligible because the resulting value does not match the criteria, namely, the NPV is declared feasible at $NPV > 0$, and the IRR is declared possible if the IRR is $>$ the predetermined interest rate [18], [19]. The value of the R/C ratio was 2.25, and the B/C ratio was 1.25 which is more than one; the BEP for oyster mushrooms and rupiah was 6,707 kg and IDR. 67,064,871, while the payback period is two years and ten months. It can be stated that the feasibility analysis of UD. Yusy Berkah Abadi is suitable for investment because the investment is significant and profitable [20].

3.3 Sensitivity analysis

3.3.1 *Sensitivity analysis when prices increase (10%) and prices decrease (5%).* The use of price sensitivity is because price is a variable that very often changes following market developments [17]. This results in uncertainty about the changes that will occur in the future [22]. The following is the result of a sensitivity analysis of increasing and decreasing prices:

Table 4. Price sensitivity analysis results increase (10%) and prices decrease (5%).

Variable	NPV (IDR)	IRR (%)	R/C Ratio	B/C Ratio	PP	BEP	
						Unit	IDR
Prices (+10%)	29,318,421	26	2.44	1.44	2 years 6 months	5,857	64,425,315
Prices (-5%)	-55,635,326	-1	2.14	1.14	3 years	31,048	85,382,639
						7,231	68,694,294
						41,499	98,565,784

Source: Primary Data Processed, 2019

The results of price sensitivity up and down show a significant comparison from each aspect of the analysis because changes in prices are highly unpredictable. When the price rises by 10%, the profit is generated by UD. Yusy Berkah Abadi will be even higher, whereas if the price drops by 5%, UD will get the profit of Yusy Berkah Abadi will be less and less [21,22]. A decreased value of 5% is a decreased limit value if UD. Yusy Berkah Abadi wants to make a profit, but more than 5% of this business will experience a loss. From here, the company can decide the best price to get a good profit on their business [23].

3.3.2 *Sensitivity Analysis when Production Increases (10%) and Decreases (5%).* Production is one of the variables that often changes in a business due to factors of raw materials, human resources, technology or other factors that cause these changes to occur [24]. This results in uncertainty about the changes that will occur in the future. Following are the results of the sensitivity analysis of increasing and decreasing production:

Table 5. Results of sensitivity analysis of production increase (10%) and production decrease (5%).

Variable	NPV (IDR)	IRR (%)	R/C Ratio	B/C Ratio	PP	BEP	
						Unit	IDR
Production (+10%)	12,224,366	19	2.37	1.37	2 years 7 months	6,707	67,063,788
Production (-5%)	-47,092,953	-1	2.17	1.17	3 years	37,312	93,285,480
						6,707	67,064,244
						37,312	93,283,882

Source: Primary Data Processed, 2019

The results of the sensitivity analysis when production is increased by 10%, the acceptance and profit earned by UD. Yusy Berkah Abadi will continue to grow. This increase in production can be achieved with proper maintenance processes and the continuous availability of raw materials. Meanwhile, if production has decreased by 5% of usual output, then the business will still experience profits provided that the industry can only reduce output by 5%.

3.3.3 *Sensitivity analysis when production costs decrease (10%) and increase (1%).* This production cost very often occurs with significant changes caused by the availability of these materials or tools, so that it will result in unexpected changes in the future. Following are the results of the sensitivity analysis of increasing and decreasing production costs:

Table 6. Results of sensitivity analysis of production costs decrease (10%) and production costs increase (1%).

Variable	NPV (IDR)	IRR (%)	R/C Ratio	B/C Ratio	PP	BEP	
						Unit	IDR
Production cost (-10%)	33,870,624	28	2.50	1.50	2 years	6,417	64,172,743
					8 months	33,868	84,667,545
Production cost (+1%)	-28,897,969	-1	2.23	1.23	2 years	6,737	67,370,034
					10 months	37,708	94,249,674

Source: Primary Data Processed, 2019

The results of the sensitivity analysis when production costs are reduced by 10%, the acceptance and profit earned by UD. Yusy Berkah Abadi will increase. This is because the production costs required by UD. Yusy Berkah Abadi is quite high, so if there is a decrease in production costs, the costs incurred will also be small, whereas if production costs are increased by 1% then the business still has a profit, but the value of the investment made cannot be covered properly, so it will result in the business suffers a loss. Duffy, Michael (2009) [25] states that budget changes in a business are related to costs incurred and income earned. If the budget changes up or down with the price of the same product it will result in higher profits.

4. Conclusion

The study has three results to conclude if UD. Yusy Berkah Abadi is worth it to run or not. This business is feasible to run based on non-financial aspects consisting of market, technical, management, legal, and environmental aspects. Moreover, Based on the financial part of UD. Yusy Berkah Abadi, which includes NPV –IDR. 24,685,810, IRR 2%, BEP unit 2 and rupiah baglog of white oyster mushrooms 37,312 pcs and IDR. 93,285,481 is not feasible, while the R/C ratio is 2.25, the B/C ratio is 1.25 and the BEP unit, and white oyster mushroom rupiah is 6,707 kg and IDR. 67,064,871. Meanwhile, the payback period of two years and ten months is feasible. So that this business is not feasible in terms of the investment that has been made, while in the short term, this business still generates profits. The most important part, the sensitivity analysis carried out on several scenarios used, namely a decrease in price and production by 5% and an increase in price and output by 10%, which shows that reducing prices and production must be carried out by UD. Yusy Berkah Abadi has a maximum of 5%, if it is more than that, then this business will experience a loss; meanwhile, if the company gets a decrease in production costs by 10%, then the business will get a bigger profit, and if production costs increase then the limit for an increase in production costs is 1 %, if more than 1% then the business can suffer losses.

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