

The Key Success of Local Staple Food Development Program: a Financial Comparison Study on Rice-Analog "Beras Siger" Business in Lampung

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ARTICLE INFO

Keywords: rice-analog, financial, staple-food, SMEs, beras-siger



Received: April 25, 2022

Received in revised:

May 23, 2022

Accepted: June 16, 2022

Published: June 31, 2022

Open Access

ABSTRACT

The Micro Small, Medium Enterprises (MSMEs) play an important role in the success of community food diversification. Diversification of cassava food into rice substitution is known as analog rice, in traditional terms it is called "tiwul". The Local Staple Food Development Model (MP3L) in Lampung Province introduced tiwul as an rice-analog with the label "beras-siger". This study was conducted to compare and analyze the structure of costs and revenues, as well as the financial viability of Rice-analog that is produced by MSMEs. The research location was Margomulyo Village, Jati Agung sub-district, South Lampung Regency as participants in the MP3L program. Non-participating MSMEs were in the production centers of East Lampung, Central Lampung, and Tulang Bawang districts. The business criteria assessment method from the financial aspect is used to determine the condition of financial feasibility. The results showed that the cost structure for participants and non-program participants differed in the value component of production equipment. The participants of the beras-siger business program are not eligible yet. Financial feasibility could reach through fulfill the production capacity as installed capacity of production equipment. While the non-program participants are financially viable. Non-participant program entrepreneurs are relatively resilient toward the changes in input prices and decreases in output prices. Beras-siger SMEs can be a strong basic for rural bio-industry development.

Keywords: *rice-analog, financial, staple-food, SMEs, beras-siger*

1. Introduction

Food diversification is a part of food security development as a mandate of Food Law No. 18/2012. Food diversification is related to enrichment the local food sources. Dependency on rice as the national staple food brings consequences. The volatility of stock and price of rice will impact food vulnerability. Local staple food development is strategic to support national food security. It could minimize rice dependency through non-rice substitution availability. The availability and continuity stock of local staple food as rice substitution is essential. The availability in the market and accessibility for consumers is a priority. Price and adequate

supply quantity of rice substitution are critical in food diversification. Adequate production capacity meets demand in a sufficient amount, and also at affordable prices is the key to the sustainability of the analog rice as a rice substitution. The well-known analog rice in Lampung is called Beras Siger. Traditionally, Beras Siger in local name is called *Tiwul*.

Beras Siger is an analog-rice mostly produced by MSMEs. Lampung local government has been supporting the local source food development as a food diversification program. They developed a program named Local Staple Food Development Model (LSFDM/Indonesian called MP3L). Beras

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Siger was one of the local staple food in that program. However, Beras Siger technology has not been reached by all MSMEs yet. Prominently in the production centers area of Beras Siger still lacked in accessing the technology, market, and business management. The spread of Beras Siger production technology is limited as the pilot project of the MP3L program. Promotion and transfer of technology have limitations, and it has not yet reached the MSMEs in production centers.

In general, the process production of Beras Siger is still conventional. Mostly, the equipment of Beras Siger production is simple and operates manually. MSMEs are only produced in small amounts, intermittent, and often only to fulfill household consumption itself. The handling of the final product is inadequate, unattractive so that the economic value is still low, nor can it guarantee the supply of product availability in the market. Furthermore, it leads to a low level of business income.

Generally, SMEs have been facing obstacles challenges, especially in the aspect of technological innovation (Adicandra & Estiasih, 2016; Caesarina & Estiasih, 2016; Hidayat et al., 2016; Surfiana et al., 2014); business management, institutions, and marketing (Novia et al., 2013; Pahlevi et al., 2014; Rangkuti et al., 2015). SMEs operate on a small scale level, then also faces limited access to finance (Indarwanta & Pujiastuti, 2011). As a business, Beras Siger MSMEs need a profit for business sustainability. MSMEs require an allocation of economic resources in capital investment and capital for business operations. Investments are financial decisions. The investment aims to maintain or increase the value or provide results with better returns. It is also providing long-term benefits. Careful planning can reduce the risk of business/investment failure. The development of investment in the agribusiness sector, often faced with constraints on providing sufficient and continuous raw materials, productivity, and marketing. These problems arise due to the specific nature of agricultural products. Agricultural output mostly is not durable, rugged to maintain quality, and depends on natural factors such as agro-climate and economic factors constraints.

As a producer, MSMEs are essential to consider the level of profits for sustainability. How is the cost of production allocated? How much revenue and income calculation to determine the business being carried out is profitable and sustainable in the long term? Is it financially feasible? Does the investment provide benefits/advantages in the future? Is the business still profitable under changing conditions of capital prices and interest rates? Does the company have a flexible level of sensitivity to anything that causes an unpredictable situation? These questions are essential to achieving business sustainability in the future.

SMEs allocate investment and operational capital. Investment allocation spends on land, building, and equipment. Budgeting allocations focus on production inputs, labor, and market

access. Analysis of revenue and costs incurred in the production process of Beras Siger SMEs will generate income information (Net benefits). The condition of whether or not the financial aspects of Beras Siger SMEs between participants and non-participants of the MP3L program are essential to explore. A comparative study on the financial feasibility of Beras Siger SMEs between the participant of MP3L and not a participant is necessary. Furthermore, it will ensure the success of food diversification programs based on local resources. Therefore, it is crucial to know the feasibility of the financial comparison between Beras Siger SMEs participants and non-participants in the MP3L program in Lampung.

2. Method

The SME participants and non-participants of MP3L was determine by the case method. The case study approach focuses intensively on a particular object and studies it as a case. Beras Siger SME participant of MP3L Program addressed in Margomulyo Village, Jati Agung District. The non-participant Beras Siger represented by SMEs from the districts of Central Lampung, East Lampung, and Tulang Bawang. The total number of MSMEs involved as respondents were 23 people.

Feasibility analysis is carried out through financial analysis. Business decisions are calculated based on investment criteria, such as NPV (net present value), IRR (internal rate of return), net benefit-cost ratio, and PBP (Pay Back period) (Aring et al., 2018; Chutubtim, 2001; Fitriani et al., 2020; Prasmatiwati & Suryantini, 2011) as followed:

$$NPV = \sum_{t=0}^n \frac{B_t - C_t}{(1+i)^t}$$

Information:

B_t = revenue (production x selling price) in year t

C_t = Production costs in year t

t = economic age or number of years

i = discount rate

$$BCR = \frac{\sum_{t=0}^n \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=0}^n \frac{B_t - C_t}{(1+i)^t}}$$

$$IRR = i + \frac{NPV'}{NPV' - NPV''} \times (i'' - i')$$

$$IRR = i + \frac{NPV'}{NPV' - NPV''} \times (i'' - i')\%$$

Information:

i' = lower value of the first trial (i)

i'' = higher value of the second experiment (i'')

NPV' = the result of the first experiment (NPV) at the level (i') which is lower

NPV'' = Results of the second experiment (NPV) at level (i'') which is higher

3. Result and Discussion

Research respondents who participated in the program addressed Margomulyo Village, Jati Agung District, South Lampung Regency. The owner is Mr. Anggoro. Program participants currently have a program investment grant amount of Rp. 60,715,000. Production technologies introduced are the production process method and the equipment such as grativators, flour machines, chopping machines, and washing machines. Respondents' non-participant program came from several other districts, Lampung Timur, Lampung Tengah, Tulang Bawang, and Metro. The active respondent with continuous production reached 43%, the rest were produced on intermittent Beras Siger production. Intermittent production is usually done only at certain times during the dry season. Beras Siger SMEs in Lampung Timur was the most. Then, the focus of the analysis was only on ten active SMEs. The general demographic description of respondents is presented in the following table.

Table 1. The average condition of a demographic description of respondents

Criteria	Average (year)
Age	46
Education	7
Beras Siger Expertise	10

The average age of the respondents was 46 years. The range was 15-65 years old. Only two respondents were male. Most of them were housewives. It means that the role of homemakers is very dominant in the processing of food products. Meanwhile, the average education level of respondents is primary and secondary school graduates in the first year. It showed that the respondent has not yet fulfilled the 9-year basic education level. The average business experience of the respondents was ten years. It illustrated that the respondents were quite proficient in the processing of Beras Siger processing.

The production capacity of Beras Siger SMEs participant program an average reached 600 kg per month. Meanwhile, non-program participants have a minimum production capacity of 300 kg per month and a maximum of 2,000 kg (Table 2).

Table 2. Beras Siger SMEs production capacity

Capacity	Production (kg/month)
Average	1,042
Minimum	300
Maximum	2,000

Furthermore, based on the sales volume, it is known that an average of 925 kg per month. They market 300 kg per month, and the highest reaches 1,500 kg/month with an average price of RP 9,600/kg. Meanwhile, the average purchase

price from the producer is RP 8,500 / kg. On average, the traders spent marketing costs reaching Rp. 281,250/month. The average net income level of traders is Rp 1,114,700/month (Table 3).

Table 3. Volume, price, marketing costs, and profits of Beras Siger traders

	Sales Volume (kg/month)	Selling Price (Rp/kg)	Buying Price (Rp/kg)	Marketing cost (Rp/month)	Profit (Rp/month)
Active	925	9,667	8,462	281,250	1,114,744
Intermittent	300	9,000	7,000	95,000	600,000
Non-participant	1,500	11,000	10,000	350,000	1,500,000

Meanwhile, consumer preferences for Beras Siger indicated that all respondents chose with considerations of good taste, odor, excellent durability, and attractive packaging.

Table 4. Consumer preferences for Beras Siger

Responses	Attributes			
Taste	Good	Fairly	Less delicious	Not delicious
Odor	Feels decent	Fairly smell	Less smell	Unpalatable
Durability	Excellent	good	fairly	Not good
Packaging	Excellent	attractive	Fairly attractive	Not attractive

The preference of consumers toward Beras Siger attributes affect the buying transaction and the next repeat order. Consumer also concern to product completeness. The completeness of the product has a positive and significant effect on Consumer purchasing decisions (Nurzana & Bustami, 2021).

Determination of the financial feasibility of Beras Siger MSMEs between program participants and non-participants is carried out by considering several assumptions, as follow:

1. Production carried out as much as ten months in one year. This consideration considers the cassava harvest season, which requires a planting period of ± ten months. There is also a dry season situation, which causes insufficient cassava availability as the primary raw material. The scarcity of cassava was calculated in one year for two months. The Beras Siger processed with require a type of cassava that is low in HCN (Hydrogen Cianida). The availability of cassava tended to be challenging to be available in sufficient volume and time. Generally, cassava farmers in Lampung plant cassava with a high HCN variety because it is used for processing tapioca flour. Participant programs are guided by aspects of processing technology that can remove

- HCN levels. Meanwhile, non-participant prefers cassava as an effort to produce delicious traditional Beras Siger production.
- The discount factor is 18%, assuming that the interest rate for consumer credit is 18%.
 - The economic life of the business in the simulation is assumed to be five years. The beginning of the year is assumed to be year 0, so the total expenditure was the amount of business investment.
 - The level of input buying price and selling price of output is assumed to be flat. Then changes in price increases are carried out in the business sensitivity analysis due to both prices.
 - Business sensitivity simulations are carried out in several conditions. There were changes due to an increase in input prices, a decrease in selling prices, then an increase in production, either partially or collectively.

The cost structure for non-participants consists of investment costs of up to Rp 1 million, depreciation costs, and variable costs for cassava an average of 1 ton/month, labor costs, and electricity. The variable cost per month is RP 1,539,600. The average revenue rate per month is RP 2,094,062 of the 247 kg of Beras Siger. The average monthly net income received is RP 554,400 (Table 5)

Table 5. The cost-revenue comparison between a participant/non-participant MP3L program

component	Non-participant	participant program*)
	Production period per month	
Beras Siger (kg)	247	600
Price (Rp/kg)	8.462	10.000
Revenue	2,094,062	
Investment allocation	1,000,000	60,715,000
Depreciation cost	1.581.083	12,218,333
Variable cost/month		
Cassava (ton)	1,076	2,61
Price (RP/kg)	850	1000
Production Employ (HOK)	11	11
Price (RP/HOK)	50.000	50.000
Electricity (RP/month)	100.000	100000
Total Variable Cost (TVC)	1,539,600	3,235,000
Total Cost (TC)	2,539,600	63,950,000
Net Revenue	2.090.114	6.000.000

Based on the results of the financial feasibility analysis of program participants (Table 7), in a 5-year business period, the Beras Siger MSEs were not feasible because of the NPV value <0, Net B / C <0, and IRR <i. In a situation where

there is no increase in production capacity (production is constant), this business is not feasible. Based on the existing conditions, program participants are not financially viable. Beras Siger participants received investment value as a grant from the Local Government. The investment value of up to RP 60 million causes business cash flows for five years to still not fulfill investment value returns (Fitriani et al., 2020). This condition is also faced by cassava SMEs in Indonesia generally. Most of the local cassava SMEs, operated under potential production and are not efficient yet. Production performance of local cassava SMEs was underdeveloped, caused by operating lower than the potential capacity production scale. The productivity could enhance by adequate input allocation and technology improvement. Strengthening the local cassava processed is necessary to improve their productivity (Fitriani et al., 2020; Fitriani et al., 2021).

Based on the simulations conducted to make the Beras Siger of program participants profitable and feasible, it is necessary to provide scale-up production assistance. The business will be achievable if there is an increase in production capacity by at least 20% of the existing condition.

It takes seven years to produce an NPV value of more than 0 (+). The NPV value will achieve under conditions of an increase in the scale of production of at least 20% (Table 8). The production is toke place at the time the research was still not under the optimal installed production equipment capacity. Production takes place below optimal capacity. It happens because the capacity of businesses in allocating production costs (variable) is limited. Beras Siger MSMEs were carried out with the primary consideration of stock availability at home. The production runs under the unpredictable circumstance. The amount of production volume with expanded market conditions does not consider yet. Their production is limited due to considerations of product sales waiting for demand.

Meanwhile, the new market relies on traders who come or go to exhibitions. At the same time, buyer orders are often uncertain in quantity and time. There has been no attempt to penetrate the market through more definite and long-term channels, for example, by looking for agents or market representatives to expand distribution. There is also an exhibition that could potentially boost the market space. Local governments or universities usually hold local food exhibitions. It could be finding potential partners for marketing agents of Beras Siger. Looking for market partners will allow the Siger rice business to focus on increasing the scale of production. Based on these conditions, MSEs must expand new markets to guarantee an increase in the scale-up of beras-siger production. Meanwhile, in the traditional Beras Siger SMEs that spread across various districts were financially viable (Table 8).

Table 6. Financial feasibility analysis of participant program (Rp.000) (Fitriani et al., 2020)

Years	0	1	2	3	4	5
Net Income	-57,950,-	15,431,-	15,431,-	15,431,-	15,431,-	15,431,-
df 18%	1	0.847	0.718	0.609	0.516	0.437
Net B/C	(0.167)					
NPV	(\$8,214,-)					
IRR	10%					

Table 7. Financial feasibility analysis of program *) in simulation scenario production scale-up 20% (Rp. 000) (Fitriani et al., 2020)

Year	0	1	2	3	4	5
Component	month	year				
Beras analog/Tiwul (Kg)	600	720	720	720	720	720
Price output (Rp/kg)	10,-					
Revenue	7,200,-	72,000,-	72,000,-	72,000,-	72,000,-	72,000,-
Investment	60,715,-					
Depreciation cost		12,218,-	12,218,-	12,218,-	12,218,-	12,218,-
Variable cost						
Cassava (kg)	3.132					
Cassava Price (Rp/kg)	1.000					
Production employee (man-day)	11					
Employee fee (Rp/man-day)	50,-					
Electricity (Rp/month)	100,-					
Total variable cost	3,757,-	37,570,-	37,570,-	37,570,-	37,570,-	37,570,-
Total cost	64,472,-	49,788,-	49,788,-	49,788,-	49,788,-	49,788,-
Net income	-57,272,-	22,211,-	22,211,-	22,211,-	22,211,-	22,211,-
NPV	Rp 10,328,542.65					
IRR	27%					

Table 8. Financial feasibility of a non-participant program

Year	0	1	2	3	4	5
Component	month	year				
Beras analog/Tiwul (Kg)	247					
Price output (Rp/kg)	8,462					
Revenue (Rp)		2,094,-	20,940,-	20,940,-	20,940,-	20,940,-
Investment (Rp)						
Depreciation cost (Rp)		139,-	139,-	139,-	139,-	139,-
Variable cost						
Cassava (Kg)	1,076					
Cassava Price (Rp/kg)	850					
Production employee (man-day)	11					
Employee fee (Rp/man-day)	50,-					
Electricity (Rp/month)	100,-					
Total cost	2,539,-	15,535,-	15,396,-	15,396,-	15,396,-	15,396,-
Net Income		-2,539,-	5,405,-	5,405,-	5,405,-	5,405,-
df 18%		1	0.847	0.718	0.609	
Net B/C		3.2				
NPV		12,173,-				
IRR		212%				

The non-participant's program meets the feasible criteria for all investment appraisal indicators. The NPV value reached 12,173,082, Net B/C was 3,2, and the IRR was 122%. The return on investment is achieved by an average production volume of 247 kg/month and an average selling price of Rp 8,420/kg. Cassava's worth as the primary raw material is in the range of Rp 850/kg. The sensitivity analysis was due to increasing input prices and decreasing selling prices. Event of a change in the input price of production up to 20%, the NPV value was Rp 4,012,756, - Decreasing in the selling price (output) by 20%, the NPV value was RP 1,074,000, Although, in conditions of change due to an increase in input prices by 10% and a

decrease in output prices by 10% simultaneously, the NPV value still up for Rp. 4 million. It means that non-participants of Beras Siger SMEs meet the feasible criteria.

3. Conclusion

Based on the conditions above, it is concluded that the Beras Siger MSMEs are very resilient to changes in input and output prices. Then the business is still feasible as a business option for rural households. It is crucial to maintain and strengthen the MSME's business to ensure the resilience of family income sources. The performance of cassava MSMEs agroindustry mostly requires strengthening empowerment, especially to upgrade the experience, knowledge, skill on entrepreneurship ability. Intensive training and internships in developing the product innovation from the process as well as on the form of packaging (Amir et.al., 2018; Paulus, 2018). Sustainable development of local SMEs in rural needs considers the creation of competitive advantage, wealth, and benefits for individuals, organizations, and society. The competitive advantage of a business depends on the achievability of the supply chain management practices. The performance of SMEs's success is linked with the accessibility of communication and information technology (Ariyanto et al., 2020; Fitriani et al., 2019; Juliannisa & Siswantini, 2021; Singh et al., 2010)

4. Recommendation

The cost structure of the Beras Siger for participants and non-program participants is different, especially in the value component of the production equipment used. Siger Rice MSMEs program participants are not financially viable, while non-program participants are very feasible. Non-participant programs are relatively resilient toward the changes in the situation of increasing input prices and decreasing output prices. This condition is a significant capital in strengthening rural bio-industry.

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