FARMER BEHAVIOR IN CREATING VALUE-ADDED AGROINDUSTRY OF PORANG TUBER IN DAGANGAN SUB-DISTRICT MADIUN REGENCY

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Abstract: The limitations possessed by porang farmers in Dagangan Sub-district, Madiun Regency have made porang farmers can only rely on primary commodity production, resulting in relatively small benefits. This study aims to identify the factors that influence porang farmers' behavior in creating value-added and to examine the amount of value-added in the production of porang chips. This study employed a descriptive method with a quantitative approach. Purposive was used as a non-random sampling technique. This study employed a descriptive method with a quantitative approach. Purposive was used as a non-random sampling technique. The first problem formulation used structural equation modeling (SEM) to discover the factors that influence farmers' behavior in creating value-added. Meanwhile, the Hayami method was used to calculate the amount of value-added created, and finally, the results of interviews were studied to assess farmers' understanding. The results of the SEM test on 32 respondents indicate that the predisposing factor had no significant influence on farmers' behavior in creating value-added. However, the other two factors, namely enabling factors and reinforcing factors, had a significant effect on farmers' behavior in creating value-added. The value-added analysis utilizing the Hayami method yielded a conversion of 1.6 with a profit of 52.67% from the production of porang chips. Farmers' understanding of value-added is quite good although it could be improved further with skills training as well as motivational encouragement in the form of facilities and infrastructure.

Keywords: Farmer Behavior, Value-added, Porang

1.   Introduction

Fluctuations in the price of wet porang in the last 5 years have increased since 2017 with a selling price of Rp.4000-Rp.6000/Kg until its peak in 2020 reached a price of Rp.12000-Rp.13000/Kg. The price has increased along with the increasing foreign demand to meet food needs and as a basic material for factories. However, in 2021, the end of the selling price experienced a significant decrease due to the increasing number of porang producers or farmers, which affected the function of high supply. In addition, due to farmers' literacy regarding the agricultural economy which is still lacking regarding the agoindustry

of porang so that the selling value of porang agricultural products decreases due to the uncontrolled quality of porang tubers to the increasing competition of porang producing countries.

Figure 1: Price Fluctuations in Porang Bulbs in the Last 5 Years
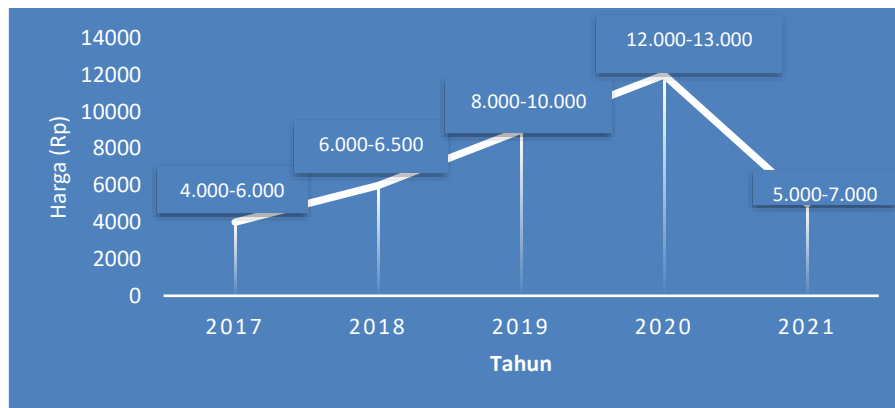
Source: Secondary Data

Farmers in Dagangan Sub-district, Madiun Regency, are still selling porang in the form of seeds and tubers. Farmers' limitations lead to the perception that value-added to agricultural products is difficult and time-consuming. As a result, porang farmers can only rely on factories or industries to distribute their crops.

The current phenomenon in Dagangan Sub-district, Madiun Regency is certainly driven by farmer behavioral factors that are still reluctant to create value-added agricultural commodities for agricultural product processing industries (agro-industry). If agriculture is solely used for cultivation (on-farm agribusiness), the value-added created will be relatively small. However, value-added agriculture will increase if it is processed further to the downstream sector (off-farm agribusiness), which produces various processed products.

2. Review of Literature
Agroindustry in Agribusiness Systems
The agricultural-based industrial sector (agroindustry) is the national economy's backbone and the primary source of revenue for the majority of Indonesians. The demand for applied labor is one of the critical factors for agroindustry growth to face future challenges in the era of globalization and free trade. The availability of applied labor that already understands the values of local wisdom is expected to strengthen economic independence at the national and international levels (Arifin, 2016;2).

Farmer Behavior
Humans have unique behaviors that characterize each individual, namely behavior that differs from other humans. The existence of external stimuli makes humans behave that cause certain reactions, thus a certain stimulus will result in specific reactions. Behavior is defined as an activity that is carried out with consciousness from within the organism and based on inner motivation which in this context is human (Diliarosta 2021; 1).

Notoatmodjo explains Lawrence Green's concept that behavior is influenced by 3 factors (Dilarosta, 2021;6):

1.   Predisposing factors, namely a special tendency toward a certain situation or development, as well as the tendency to accept or reject something based on the experience and norms they have. These factors include a person's knowledge and attitude towards a stimulus or an acquired stimulus.

2.   Enabling factors are factors that cover various skills and resources, where skills and resources are critical for behavior change. These factors include the availability of facilities and infrastructure or facilities to support the occurrence of a person's behavior.

3.   Reinforcing factors are external factors that are demonstrated by the attitudes of people in the surrounding environment. These factors include the attitude and behavior of community leaders and religious leaders. It is the attitude and behavior of a person's role that makes everything they do imitated. According to Fatmasari and Restuhadi (2015;41) in their journal, several factors have been tested to influence farmer behavior, including age, education level, farming area, experience, business motivation, level of subsistence, business capital, competency of extension workers (communication skills, adaptation, understanding the wishes of farmers, experienced, and willing to encourage farmers), and competence of farmer group administrators.

Value-Added Products

The value-added of agricultural products is the added value of a commodity due to a processing process that results in physical and quality, transportation, or storage changes in production. When a commodity experiences a change in value for the better, there is a margin difference from the change in the process. Margin is the difference between the value of the product and the price of raw materials only. This margin covers the components of production factors used, namely labor, other inputs, and processing entrepreneurs' remuneration (Hayami et al., 1987 in Zaini et al., 2019; 10).

To calculate the value-added of a product that goes through the production process from raw materials to finished materials, you can use the 1987 Hayami Method in the following table:

Table 1: Calculating Value-Added with the Hayami Method

No	Variable	Unit	Value
1	Material Price	Rp/Kg	(1)
2	Product Price	Rp/Kg	(2)
3	Total value-added per Kg of output	Rp/Kg	(3) = (2)– (1)
I	**Output, Input, and Price**		
4	a. Output (sales volume)	Kg	(4a)
	b. Input (sales value)	Rp	(4b)
5	Basic Raw Materials	Rp	(5)
6	Direct Labor	Man-day	(6)
7	Conversion Factor		(7) = (4b) / (5)
8	Direct labor coefficient	Rp/Man-day	(8) = (4B) / (6)
9	Labor average wage	Rp	(9)
II	**Revenue and Value Added**		
10	a. Production cost	Rp	(10a)

	b.	Operating costs	Rp	(10b)
11	a.	Value-Added	Rp	(11a) = (4b)-((5)+(10a)+(10b))
	b.	Value-Added Ratio	%	(11b) = (11a)
III	**Retribution for the Owner of Production Factors**			
12	Margin		Rp	(12) = (4b) – (5)
13	a.	Contribution of other input costs	%	(13a) = ((10a)+(10b)/(12)) x 100%
	b.	Profit	%	(13b) = ((11a)/(12)) x 100%

Source: Hayami 1987

The advantages of added value with the Hayami Method are:

a.   Can be applied outside the processing system, that is, the marketing system

b.   It can be known the amount of added value, output value, and productivity

c.   It can be known the amount of recompense for the owners of production factors.

From the value-added analysis can be known the amount of remuneration received by employers and labor. Value-added analysis is also useful to find out how much additional value is contained in the resulting unit of output (product added value). In principle this added value is a gross profit before deducting fixed costs (Purba, 1986 in Valentina, 2009;30).

3.   Methodology

To ensure that researchers get data that is following this research focus, the technique of determining the subject in this study used a non-random technique, namely purposive sampling, which is a technique of taking data not based on random, but on considerations to achieve a specific target or focus. This research included 32 participants from 17 villages in the Dagangan Sub-district.

Based on the problems studied, the method used in this study was a descriptive method with a quantitative approach. The Structural Equation Modeling (SEM) model was used to examine how far the factors influence farmers' behavior in creating a value-added go.

To calculate the value-added obtained from processing porang tubers into porang chips, the Hayami method was utilized. To determine farmers' understanding of creating value-added using the Lawrence Green concept, which states that behavior is influenced by predisposing, enabling, and reinforcing factors, then the results of interviews and open questionnaires were analyzed quantitatively and presented in descriptive form.

4.   Observations and Results:

Factors Influencing Farmer Behavior in Creating Value-Added

This research included 32 respondents, all of them were porang farmers from the Dagangan Sub-district. The experience of farmers in porang farming between 3 years is 37.5% and the rest is 4 or more years. All respondents are male with ages between 30 – 74 years, where 65.6% of them have an elementary school educational background.

Thes first test is measurement model test (outer model) will be carried out to show the results of validity and reliability tests. In this study, a validity test was carried out to find out whether the construct was qualified to continue as a study or not. Here are the results of the outer model test that shows the outer loading value using the SmartPLS 3.0 analysis tool.

Tabel 2: Cross Loading Values

Indicators	Predisposisi Factors	Enabling Factors	Reinforcing Factors	Farmer Behavior Creat Value Added
X1.1	0.938	0.429	-0.108	-0.296
X1.2	0.809	0.286	-0.003	-0.255
X1.3	0.883	0.485	-0.206	-0.387
X1.4	0.789	0.255	-0.000	-0.227
X1.5	0.963	0.403	-0.136	-0.301
X2.1	0.394	0.852	-0.239	-0.386
X2.2	0.263	0.744	-0.054	-0.372
X2.3	0.0372	0.733	-0.217	-0.299
X3.1	-0.162	-0.221	0.829	0.555
X3.2	0.096	0.040	0.759	0.425
X3.3	-0.173	-0.280	0.733	0.512
Y1	-0.277	-0.356	0.404	0.748
Y2	-0.247	-0.410	0.642	0.723
Y3	-0.320	-0.228	0.405	0.740
Y4	-0.151	-0.301	0.357	0.718

Source: Primerly Data (Measurement Test Outer Model SmartPLS 3.0)

Table 2 shows that the cross loading value in the variable construct tested in this study is greater than the cross loading value with other constructs. The values can be read on the numbers illuminated in yellow. So that the model proposed in this study has been qualified to proceed to the next stage.

Tabel 3: Average Variance Extracted Values

Variabel	AVE
Predisposisi Factors	0.772
Reinforcing factors	0.606
Reinforcing Factors	0.600
Farmer Behavior Creat Value Added	0.536

Source: Primerly Data (Measurement Test Outer Model SmartPLS 3.0)

Based on the results shown in table 3 the AVE root value for each variable consisting of predisposing factors, enabling factors, reinforcing factors and farmer behavior creates added value is known to be greater than 0.5. Thus it can be stated that each variable has a good discriminant validity and can proceed to the next stage

Tabel 4: Composite Reliability Values & Cronbach's Alpha Values

Variabel	Composite Reliability	Cronbach's Alpha
Predisposisi Factors	0.944	0.926
Reinforcing factors	0.821	0.674
Reinforcing Factors	0.818	0.667
Farmer Behavior Creat Value Added	0.822	0.721

Source: Primerly Data (Measurement Test Outer Model SmartPLS 3.0)

Based on the results of data in table 4, it can be seen that the composite reliability value of all research variables consisting of predisposing factors, enabling factors, strengthening factors and farmer behavior

creates added value > 0.6. Meanwhile, Cronbach's Alpha values for the enabling factor variables and reinforcing factors have values lower than 0.7, which means they are still within the tolerant limit. So that in this study to assess reliability looking at the value of composite reliability, so it can be concluded that all variables have a high level of reliability.

The secon test is inner model aims to predict the relationship between latent variables based on the theory. In testing the inner model in this study, the results of the R-Square will be explained. The R2 value categories are 0.67 high, 0.33 moderate, and 0.19 low (Ghozali & Latan, 2015;81). Based on the data processing that has been done using the smartPLS program, the R-Square value is obtained as follows:

Table 5: R-Square Value

R-Square Value	R-Square Adjusted Value
0.547	0.498

Source: SmartPLS 3.0 Inner Model Test

The results of table 5 show that the R-Square value is 0.547 and the R-Square Adjusted is 0.498. This value indicates that the variable of farmer behavior in creating value-added changes can be explained by the variables of predisposing factors, enabling factors, and reinforcing factors in the medium category as much as 54.7%. While the remaining 45.3% is explained by other variables not described in this study. To find out whether a hypothesis is accepted or rejected, it can be done by taking into account the significance values between constructs, t-statistics, and p-values. In this way, measurement estimates and standard errors are no longer reliant on statistical assumptions, but empirical observations. In the bootstrap resampling method in this study, the hypothesis is accepted if the significance value of t-values is greater than 1.96 and or the p-values are less than 0.05, then Ha is accepted and Ho is rejected, and vice versa.

Table 6: Bootstrapping Direct Effect Test Results

Item	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics ($\lvert O/STDEV \rvert$)	P-Value
Predisposing Factors → Farmer Behavior	0.160	0.157	0.143	1.122	0.263
Enabling Factors → Farmer Behavior	0.264	0.290	0.134	1.971	0.049
Reinforcing Factors → Farmer Behavior	0.573	0.585	0.143	5.243	0.000

Source: SmartPLS 3.0 Bootstrapping Test

Based on calculations using bootstrap or resampling, the test results of the estimated coefficient of X1 against Y bootstrap results are 0.157 with a t-count value of 1.122 < 1.96 and a standard deviation of 0.143. Then the p-value is 0.263 > 0.05 so that H_0 is accepted and H_a is rejected or which means that the

direct influence of predisposing factors on farmer behavior in creating value-added is not statistically significant.

Based on calculations using bootstrap or resampling, the test results for the estimated coefficient of X2 against Y bootstrap results are 0.290 with a t-count value of 1.971> 1.96 and a standard deviation of 0.134. Then the p-value is 0.049 < 0.05 so H_0 is rejected and H_a is accepted or which means that the direct influence of enabling factors on farmer behavior in creating value-added is statistically significant.

Based on calculations using bootstrap or resampling, the test results for the estimated coefficient of X3 against Y bootstrap results are 0.585 with a t value of 5.243 > 1.96 and a standard deviation of 0.143. Then the p-value is 0.000 < 0.05 so H_0 is rejected and H_a is accepted or which means that the direct effect of reinforcing factors on farmer behavior in creating value-added is statistically significant.

Calculating the Amount of Value-Added

In addition to value-added, Hayami's calculation model also analyzes labor income, company profits, and can also see the margin obtained from the processing. In detail, the value-added calculation using the Hayami method can be seen in the following table:

Table 7: Calculation of Value-Added

No	Variable		Value
1	Material Price		Rp 3.000,00 /Kg
2	Product Price		Rp 30.000,00 /Kg
3	Total value-added per Kg of output		Rp 27.000,00 /Kg
I	**Output, Input, and Price**		
4	a.	Output (sales volume)	8 Kg
	b.	Input (sales value)	Rp 240.000,00
5	Basic Raw Materials		Rp 150.000,00
6	Direct Labor		2 Man-day
7	Conversion Factor		1,60
8	Direct labor coefficient		Rp 120.000,00 Man-day
9	Labor average wage		Rp 20.000,00
II	**Revenue and Value Added**		
10	a.	Production cost	Rp 22.598,19
	b.	Operating costs	Rp 42.598,19
11	a.	Value-Added	Rp 47.401,81
	b.	Value Added Ratio	12,34%
III	**Retribution for the Owner of Production Factors**		
12	Margin		Rp 90.000,00
13	a.	Contribution of other input costs	47,33%
	b.	Profit	52,67%

Source: Calculated Data

Production results for the production of 50 kg of wet porang tubers at Rp150,000 produce an average output of 8 kg with a selling price of Rp30,000/kg, so the output is Rp240,000. The conversion factor

shows the amount of finished product obtained from 1 kg of raw materials, with an average conversion factor of 1.6. The conversion factor can be less than 1 or more than one. If the conversion factor is more than 1 then in the production process an increase in the volume of agroindustry output is greater than the volume of raw materials and vice versa.

The average coefficient of direct labor used both in the family and outside, from the analysis of the sales value divided by labor for one production process is Rp120,000/man-day, with wages paid directly to workers an average of Rp20.000/50kg of raw material. Revenue, costs that must be incurred in the porang chip production process can be known based on the sum of inputs (raw materials), labor costs, input/support contributions, and depreciation costs of Rp42,598.19. Value-added is the result obtained from the reduction in the value of sales with the total cost incurred. So, it can be seen that the value-added porang chip is Rp47,401.81 with a value-added ratio of 12.34%, meaning that for every 50 kg of porang tubers, 12.34% of the value-added is obtained.

Farmers' Understanding in Creating Value-Added Porang Agroindustry

Farmers have a quite good understanding of value-added, but it is not optimal. The results of farmer interviews can explain what value-added is and the impact of creating value-added. In addition, farmers can also explain the content of porang that can be used, such as glucomannan, and the content of porang that must be removed, such as oxalic acid. In terms of skills and experience, farmers do not have good skills and experience in creating value-added porang tubers. Of the total farmers who became respondents in Dagangan Sub-district, only 9.4% had ever created value-added for porang tubers.

The facilities and infrastructure in the Dagangan Sub-district have not been able to encourage the behavior of farmers to create value-added. Meanwhile, agricultural loans provided by financial institutions have not been completely utilized since farmers are concerned about the risk of default owing to uncertain agricultural results.

The fact in the field so far based on the findings of the factors that can encourage farmer behavior in a certain direction is the reinforcing factor where the biggest indicator is community leaders. Community leaders are considered capable of providing examples and direct impacts that can be followed by farmers. In addition to facilities and infrastructure, complexity, relative advantages and the time required to create value-added are the main considerations for farmers. Farmers tend to immediately want to get profits from their farming business so selling in primary form is still a solution as a form of sustainable farming.

5.   Conclusion

Exogenous variables of predisposing factors have no significant effect on farmer behavior in creating value-added. From the answers, respondents have fairly good knowledge and an open attitude, but respondents' experience in generating value-added porang is still insufficient.

Exogenous variables of enabling factors have a significant effect on farmer behavior in creating value-added. respondents agreed that bank finance in the form of low-interest loans is sufficient to assist farmers in creating value-added porang. However, the village's current infrastructure is less supportive to create value-added.

The exogenous variable of reinforcing factors has a significant effect on farmer behavior in creating value-added. From the answers, respondents agreed that influential community leaders and the ability of field extension workers in the village environment were able to change the behavior of farmers to create value-added porang.

The production yield for the production of 50 kg of wet porang tubers resulted in an average conversion factor of 1.6 with the profit obtained from the production of porang chips of 52.67%. The profit is derived from the division between the value-added by the margin. From the large number of profits, it shows that the production of porang chips for farmers in the Dagangan Sub-district is profitable for porang chip processing farmers.

6. Discussion

This study proves that predisposing factors have no significant effect on farmer behavior in creating value-added. Meanwhile, enabling and reinforcing factors are proven to influence farmer behavior in creating value-added in the Dagangan Sub-district. In addition to quantitative proof, in the interview, there are several findings and facts about the condition of farmers directly in responding to the factors being studied. As a result, the researchers with several considerations to conduct comparative research with different commodities for value-added analysis to make this research complete and can be used for comprehensive decision making.

This research model can be redeveloped by adding paths between variables and adding several other variables that may have a major influence on farmer behavior in creating value-added. Based on the results of the R-Square which are classified as moderate, it is appropriate to add some relevant variables and indicators that have not been studied in this research.

In addition, researchers also hope that related institutions, both private and in this case companies, with CSR programs and the government of the plantation and fishery department of Dagangan Sub-district, can provide direction, learning, guidance, and evaluation which are expected to produce real outputs and outcomes for porang farmers in the Dagangan Sub-district.

Related to the biggest factor that can influence farmer behavior is the strengthening factor of the competence of facilitators and community leaders who are deemed capable of pushing farmers to participate in creating value-added. So for decision makers, it is expected to improve the performance of extension workers. Empowerment, real benefits, and strong involvement are all options.

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