



Food Security Model Based on Consumer Characteristics in East Nusa Tenggara Province

Reyna Virginia Nona^(✉) and Estherlina Sagajoka

Department of Development Economics, Faculty of Economics, Flores University, Ende, Indonesia

reynamayosuku@gmail.com

Abstract. Food is a basic need of every human being in the world, so that the problem of food is a global problem and the responsibility of all parties. This study aims to examine the characteristics of rice consumers who are consumers of premium rice produced by LUPM which is a government establishment. The LUPM function is carried out by Gapoktan which then partners with Toko Tani in distributing rice for consumers. PUPM was formed by the government with the aim of maintaining stability and food availability for low-income people. This study aims to formulating a regional food security model based on the relationship between the characteristics of production, consumption and entrepreneurship areas with the performance of the community's food business in NTT Province based on consumer perceptions. The research locations are in six areas in NTT namely Ende, Manggarai, West Manggarai, Southwest Sumba, North Central Timor and Kupang, which have Farmer Shops designated by the government as LUPM partners. Farm in six randomly selected government-defined blood. The distribution of sampling is done proportionally. The data analysis technique used is descriptive statistics and non-parametric statistics, namely Partial Least Square (PLS). The results of the structural model analysis based on consumer perceptions of rice show empirically strong evidence to accept the proposed hypothesis, namely the characteristics of production, consumption and entrepreneurship areas simultaneously affect the performance of PUPM in NTT Province in realizing food security. Therefore, in order to achieve good PUPM performance, it is necessary to pay attention to consumer characteristics so that food security for the NTT community can be realized.

Keywords: food security · consumer · rice · region characteristics

1 Introduction

Food is a basic need and human right. One of the important food ingredients in Indonesia is rice, this is because almost all Indonesian people consume rice and make it a staple food. Apart from being a staple food, rice is also an important food because almost 60% of Indonesia's population works as rice-producing farmers. Rice is not only needed for consumption but is also a source of income and employment [1]. In addition, rice also has a strategic role in strengthening food security, economic security, and national security

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and political stability [2]. Thus, a stable supply and price of rice, its availability at all times, evenly distributed at an affordable price is the hope and aspiration of development, especially in the food sector.

Consumers are also one of the parties that need attention in food policy, this is because the food produced is used by consumers to meet their needs, and this is related to consumer behavior. Consumer behavior is the process and activity when a person relates to the search, selection, purchase, use, and evaluation of products and services to satisfy needs and wants. Consumer behavior also reflects the things that underlie consumers to make purchasing decisions. For low-involvement goods, the decision-making process is carried out easily, while for high-involvement goods, the decision-making process is carried out with careful consideration [3]. Buyer behavior is an orderly process in which individuals interact with their environment for the purpose of making market decisions about goods and services [4]. Specific behavior of individuals in the market is influenced by internal factors such as needs, motives, perceptions and attitudes as well as external or environmental influences such as family, social groups, civilization, economy and business influences. Consumer behavior model can be defined as a simplified schema or framework to describe consumer activities [5]. The rice consumption pattern of the Indonesian people cannot be drastically changed because it is related to the culture of the people who are already so attached, so that food security, especially rice, is an important thing in the policies of the Indonesian Government.

In order to meet the needs of rice according to consumer expectations, the first step that must be considered by producers and traders is consumer behavior. For business actors, consumer behavior will become an important basis in marketing so that they can target buyers more focused because business actors can describe in detail the targeted consumers. Purchase decisions for a product are strongly influenced by consumer behavior. Purchasing decisions are consumer actions in fulfilling wants and needs which are the process of determining attitudes or purchases of goods and services, to understand consumer behavior in purchasing requires a process because every time humans experience changes. Changes that will directly affect consumer behavior patterns include geographic, demographic, psychographic and behavioral factors. Variable segmentation of geography, demographics, psychographics and consumer behavior consisting of several indicators can also affect purchasing decisions because consumers have different characteristics of needs.

Community Food Business Development Program (PUPM) is one of the government policies that is expected to be able to overcome the problem of food security in Indonesia. PUPM involves rice farmers, rice consumers and business actors consisting of the Association of Farmers Groups (Gapoktan) who act as Community Food Business Institutions (LUPM) and the owners of Indonesian Farmer Shops (TTI) who are partners of Gapoktan. Rice produced by Gapoktan/LUPM is premium rice in packaging provided to meet food needs, especially rice for low-income people who live close to the Farmer Shop. However, Gapoktan also sells to the market if the stock is available in large quantities. PUPM is expected to realize food security which includes aspects of availability, access and price stability.

Based on statistical data that about 70% of the people of NTT Province work in the agricultural sector. The agricultural sector provides the largest contribution to PDRB in

every district and city in NTT Province [6]. The agricultural sector is a potential sector that needs to be developed and prioritized in budgeting in all districts/cities in NTT in order to increase people's per capita income which will have an impact on increasing PDRB and economic growth [7].

Previous studies have shown that NTT is one of the provinces that is still experiencing food security problems [8–10]. In addition, the existing PUPM activities in NTT have only been able to meet the dimensions of food access and price stability, but have not been able to meet the dimensions of food availability target [11]. One aspect of regional characteristics that can affect food consumption, especially rice, is consumer characteristics. Therefore, this study specifically focuses on consumer perceptions of PUPM performance which includes aspects of the characteristics of production, consumption and entrepreneurship areas. On that basis, this research was conducted with the aim of formulating a regional food security model based on the relationship between the characteristics of production, consumption and entrepreneurship areas with the performance of the community's food business in NTT Province based on consumer perceptions.

2 Research Methods

A. Research Sites

This study focused on six districts that have carried out PUPM activities, namely Kupang, North Central Timor (TTU), Southwest Sumba (SBD), West Manggarai, Manggarai, and Ende. The population of rice consumers in each TTI is unknown because most TTI do not record consumers who buy rice, so the sample size is determined using the formula according to [12], and the sample amounted to 96.

B. Research Variables

The variables used in this study include:

1. Variable Characteristics of Production Areas (X1) there are seven indicators namely land area (X11), productivity (X12), amount of production sold (X13), cropping pattern (X14), capital (X15), labor (X16) and management (X17).
2. Variable Consumption Characteristics (X2) there are six indicators namely product (X21), source of product consumed (X22), price (X23), place (X24), personal (X25), motivation (X26).
3. Variable Entrepreneurial Characteristics (X3) there are six indicators namely self-confidence, (X31) task and result oriented (X32), dare to take risks (X33), leadership (X34), originality (X35), and future oriented (X36).
4. Variable (PUPM Performance Y) there are three indicators, namely increasing farmers' success in farming activities (Y1), consumers' ease of accessing rice at affordable prices (Y2), increasing Gapoktan farming profits and Farmers' Shops (Y3).

C. Data Analysis

The data is analyzed technique used in this study is descriptive statistical analysis and non-parametric statistics, namely data analysis techniques that use a variance-based approach or known as Partial Least Square (PLS). Descriptive statistical method is used to describe the identity of consumers of premium rice consumers for LUPM products. In order to achieve the research objectives of regional food security modeling through the development of community food businesses based on consumer perceptions, non-parametric statistical analysis is used, namely Partial Least Square (PLS) and using the Smart-PLS application.

D. Hypothesis

The hypothesis proposed in this study is that the characteristics of the area of production, consumption and entrepreneurship simultaneously affect the performance of PUPM in realizing food security in NTT Province.

3 Results and Discussion

A. Characteristics of Rice Consumers

The results of research on the characteristics of consumers of rice produced by LUPM show that based on gender 56.25% or 54 consumers are women, and this is because housewives are responsible for purchasing household needs, so that they always come to Toko Tani to buy rice are women. If traced from the type of work involved, the results showed that the types of work of rice consumers in TTI consisted of housewives, builders, traders, farmers, and shop assistants. The results showed that 31.25% or 30 people were housewives. The results showed that the group of farmers who became consumers of rice in TTI were smallholders whose land was 0.25 ha and had large family responsibilities.

The distribution of consumer respondents based on education level is known that the most consumers are 46.88% or 45 people with junior high school education. However, there are a number of 2.08% or 2 people who have a bachelor's degree. 77.08% or 74 consumers are in adulthood, but there are still 7.29% or 7 consumers are teenagers (17–25 years old) who need a lot of carbohydrates for their body growth.

The results of research on the characteristics of rice consumers based on the number of family dependents, it is known that rice consumers have 1–5 dependents. The highest number of dependents is 3–4 people, which is 54.17% or 52 people. However, there is a small percentage, namely 6.25% or 6 consumers who have 5 dependents. This shows that the demand for rice in consumer households is quite large. The results of research on the characteristics of rice consumers based on the number of needs for consumption of rice/kg/day are known that the most respondents need 2 kg of rice/day, namely 43.75% or 42 people.

The results of research on the characteristics of rice consumers based on the level of income per month are known that the amount of consumer income per month ranges from Rp. 500,000 to Rp. 3,000,000. Most consumers are those who have a total income/month ranging from Rp. 500,000 to less than Rp. 1,000,000 which is 62.50% or 60 people.

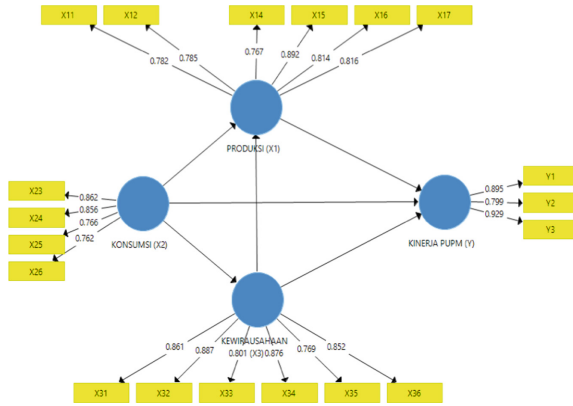


Fig. 1. Outer Model Analysis Result

B. The Test Results of the Outer Model and Inner Model

The outer model test is carried out with acceptance criteria if the outer loading value is >0.700 [13, 14]. Figure 1 shows the results of the outer loading test and a valid indicator is obtained.

Figure 1 shows that X13, X21 and X22, are invalid indicators, so they are omitted from the model. Based on the results of the analysis of rice consumers’ perceptions of the characteristics of the production area shown in Fig. 1, it is known that capital (X15) is the indicator that has the highest value with an outer loading value of 0.877 so that it is the indicator that has the greatest influence on the characteristics of the production area.

Based on the results of the analysis of consumer perceptions of rice on consumption characteristics, it is known that the price indicator (X23) is the indicator with the highest value with an outer loading value of 0.909 so that it is the indicator that has the greatest influence on consumption characteristics.

Rice consumers’ perceptions of entrepreneur characteristics are known that the task and result-oriented indicator (X32) is the indicator that has the highest value with an outer loading value of 0.886 so that it is the indicator that has the greatest influence on entrepreneurial characteristics.

Rice consumers’ perception of PUPM performance is known that the indicator of increasing business profits of business actors (Y3) is the indicator that has the highest value with an outer loading of 0.932 so that it is the indicator that has the greatest influence on PUPM performance.

Furthermore, discriminant validity analysis was carried out on the outer model by looking at the value of cross loading, average variance extracted [15] and AVE roots. The acceptance criteria are if the cross loading value >0.700 , AVE and AVE roots >0.500 [13, 14]. The results of the analysis show that the cross loading value on all indicators is >0.700 , so that all indicators used are discriminantly valid. The results of the calculation of the AVE value and the AVE root are shown in Table 1.

Table 1. AVE Value and AVE Root of Research Variables Based on Consumer Perception

Variable	AVE	AVE Roots	Description
Production Area Characteristics (X1)	0,657	0,810	Valid
Consumption Characteristics (X2)	0,660	0,813	Valid
Characteristics of Entrepreneurship (X3)	0,709	0,842	Valid
PUPM Performance (Y)	0.768	0,876	Valid

Source: Analysis results, 2018

Table 2. The Value of Composite Reliability and Cronbach's Alpha of Research Variables Based on Consumer Perceptions of Rice

Variable	<i>Composite Reliability</i>	<i>Cronbach's Alpha</i>	Description
Production Area Characteristics (X1)	0,920	0,895	<i>Reliabel</i>
Consumption Characteristics (X2)	0,886	0,827	<i>Reliabel</i>
Characteristics of Entrepreneurship (X3)	0,936	0,919	<i>Reliabel</i>
PUPM Performance (Y)	0,908	0,848	<i>Reliabel</i>

Source: Analysis results, 2018

Based on the results of the AVE test and the AVE root on the characteristic variables of the production, consumption, entrepreneurship and PUPM areas, it is above the tolerance limit value of 0.500 so that the instrument for each variable is said to be a valid discriminant.

The next stage is the reliability test of a construct with reflective indicators which is carried out by means of composite reliability and Cronbach's Alpha. The value of composite reliability and Cronbach's Alpha is said to be good, if the value is above 0.60 thus indicating that discriminant validity has been achieved [13, 14]. The results of testing composite reliability and Cronbach's Alpha measurement model in this study indicate that all the variables tested are reliable so that the latent variables used have good composite reliability and have high reliability values. All instruments of rice consumers' perceptions of the characteristics of the area of production, consumption, entrepreneurship and PUPM performance used in this study have met the criteria or are suitable for use in measuring the overall latent variables and can then be used to evaluate the inner model or evaluate the structural model. Table 2 shows the Composite reliability and Cronbach's alpha values as follows:

The evaluation of the structural model (inner model) aims to see the relationship between the latent construct (causal path) with the estimated path parameter coefficients and their significance level to test the established hypothesis. The structural model of this study was analyzed using the bootstrapping technique [16] and evaluated by taking into account the R-square (R^2) value obtained from the goodness of fit model test and the Q-Square (Q^2) value from the predictive relevance model test. The value of Q^2 is

Table 3. The Coefficient of Determination Based on Consumer Perception of Rice

Influence	To	R Square
Consumption Characteristics (X2) Characteristics of Entrepreneurship (X3)	Production Area Characteristics (X1)	0,714
Consumption Characteristics (X2)	Characteristics of Entrepreneurship (X3)	0,598
Production Area Characteristics (X1) Consumption Characteristics (X2) Characteristics of Entrepreneurship (X3)	PUPM Performance (Y)	0,686

Source: Primary Data Processed, 2018

based on the coefficient of determination (R^2) of all endogenous variables which aims to measure how well the observation value generated by the model is. The magnitude of Q^2 has a value with a range of $0 < Q^2 < 1$, the closer the value to 1 means the better the model. [13, 14].

The results of the analysis of the coefficient of determination (R^2) of the structural model based on consumer perceptions of rice are presented in Table 3.

Based on Table 3, it is known that the variable characteristics of the production area can be explained by the variables of consumption and entrepreneurial characteristics of 0.714 or 71.4% while the rest is explained by other factors not examined. The entrepreneurial characteristic variable can be explained by the consumption characteristic variable of 0.598 or 59.8%, while the rest is explained by other factors not examined. The performance variable of PUPM can be explained by the characteristics of the area of production, consumption and entrepreneurship variables of 0.686 or 68.6% while the rest is explained by other factors not examined. The structural model based on the coefficient of determination test shows a strong model, because the value of $R^2 > 0.67$ [13, 14].

Based on the value of the coefficient of determination (R^2), the endogenous variable PUPM Performance (Y), the Q value can be calculated as follows:

$$\begin{aligned}
 Q^2 &= 1 - (1 - R^2) \\
 &= 1 - (1 - 0.686) \\
 &= 0.686
 \end{aligned}$$

After obtaining the Q^2 value of 0.686, the structural model based on consumer perceptions of rice shows an acceptable suitability and has strong predictive relevance, because the value is >0.35 [13, 14]. The latent variable in the structural model is able to predict the model well and thus can be used to test the hypothesis of this study.

Based on the results of the structural model analysis, hypothesis testing can be carried out by looking at the estimated path coefficient and critical point values that are significant at the level of significant probability value (p value) $<5\%$ and with a t-statistic value >1.662 , then the proposed hypothesis can be accepted.. The results of the path coefficient and hypothesis testing can be seen in Table 4.

Table 4. Path Coefficient, t-Statistic and p Value Structural Model Based on Consumer Perception of Rice

Effect	On	Coefficient	t-stat (1.662)	P value (0.05)	Description
Production Area Characteristics (X1)	PUPM Performance (Y)	0,368	4,171	0,000	Sig
Consumption Characteristics (X2)	PUPM Performance (Y)	0,307	3,698	0,000	Sig
Characteristics of Entrepreneurship (X3)	PUPM Performance (Y)	0,223	1,945	0,026	Sig
Consumption Characteristics (X2)	Production Area Characteristics (X1)	0,204	2,213	0,014	Sig
Consumption Characteristics (X2)	Characteristics of Entrepreneurship (X3)	0,773	15,215	0,000	Sig
Characteristics of Entrepreneurship (X3)	Production Area Characteristics (X1)	0,677	8,010	0,000	Sig

Source: Primary Data Processed, 2018

The results of the analysis also show the relationship between the three exogenous variables, namely the consumption characteristic variable (X2) has a direct and significant influence on the production area characteristic variable (X1) where the path coefficient value is positive and has a t-statistic value = 2.213 > 1.662 and p-value = 0.014 < 0.05. The consumption characteristic variable has a direct and significant influence on the entrepreneurial characteristic variable (X3) where the path coefficient value is positive and has a t-statistic value = 15.215 > 1.662 and p-value = 0.000 < 0.05. The entrepreneurial characteristic variable (X3) has a direct and significant effect on the production area characteristic variable (X1) because it has a positive path coefficient value and has a t-statistic value = 8.010 > 1.662 and p-value = 0.000 < 0.05.

The results of the path coefficient analysis, the critical point value of t-statistics and p-value also aim to answer the proposed hypothesis. The results of the structural model analysis based on consumer perceptions of rice show strong empirical evidence to accept the proposed hypothesis, so that based on consumer perception analysis shows that the characteristics of production, consumption and entrepreneurship areas simultaneously affect PUPM performance in NTT Province.

4 Conclusion

Based on the description and empirical evidence that has been discussed about indicators that influence consumption characteristics variables, it is known that the indicators of place, rice price, product, personal and motivation are important indicators that compile and influence consumption characteristics variables in order to realize regional food security through PUPM activities in NTT.

The indicators of capital, price, task and result oriented, as well as increasing business profits of business actors are important indicators to improve PUPM performance through the characteristics of production, consumption and entrepreneurship areas. These indicators would be a priority in various policies related to food security in NTT based on consumption characteristics.

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