Realizing Regional Food Security Through Community Food Business Development in East Nusa Tenggara Province, Indonesia

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ABSTRACT

This study aims to formulate a regional food security model based on the relationship between characteristics of the area of production, consumption and entrepreneurship with the performance of community food business development (PUPM) in the Province of East Nusa Tenggara (NTT). The research sample consisted of 93 rice farmers, 96 rice consumers and 30 business people representing the Association of Farmers' Groups (Gapoktan) and the Indonesian Farmers Shop (TTI) owners, accounting for the total respondents to 219 people. Data analysis was using Smart-PLS. The results of the analysis show that the performance of the PUPM in NTT which is influenced by the characteristics of the production, consumption and entrepreneurship areas has only been achieved at a sufficient level. The analysis also shows that the new PUPM activities in NTT are able to fulfill aspects of access and stability, while the availability aspect is still very small. Nevertheless, this study has proven that the regional food security model in NTT can be realized through community food business development activities.

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Keywords:
Food security; regional characteristics; production; consumption; entrepreneurship

1. Introduction

The province of East Nusa Tenggara (NTT) is one of the provinces in Indonesia that has little rainfall, that is, only experienced a wet season for four months (BPS NTT, 2018). NTT consists of small islands with various tribes, languages and customs. This has led to differences in natural conditions, especially planting land and agricultural commodities. Communities in this region will adjust to their natural conditions, causing the emergence of various traditions, including the food consumed. Hence, the cultural and value factors that exist in the community are very important in influencing the behavior of the community, especially farmers (Palis, 2006).

At first corn was the staple food of the NTT community. However, along with the government's policy to plant rice, the consumption of staple food shifted from corn to rice. Even now the government has encouraged people to return to various local staple foods so as not to become dependent on rice, but people in most parts of NTT still

choose rice as their staple food. Thus, sustainable agriculture for food crops, especially rice, needs to get the government's attention because it will determine people's food security and at a macro level can affect national food security and the nation's economy (Munusamy *et al.,* 2017).

Food security is still one of the development goals in the agricultural sector which includes the dimensions of food security namely availability, access, utilization and stability (Meethot and Bennett, 2018).

The results of research conducted by Purwantini (2014), and Permatasari *et al.* (2016) show that NTT is one of the regions in Indonesia that has a level of food insecurity and has decreased food security levels. Yousaf *et al.* (2018) explained that there is a positive relationship between food security and household income. Food price volatility can cause economic and political shocks. This condition in the long run can affect investment interest and the level of economic growth (Ayinde *et al.,* 2016). Accordingly the issue of availability, access and stability of food prices is one of the objectives to be achieved in realizing food security. The Indonesian government has formed Community Food Business Development (PUPM) activities in many provinces including NTT to support food security realization.

PUPM activities are expected to be able to overcome the problem of food security in Indonesia including supply and rice price stability, integrated distribution channel and market price information availability. PUPM activities involve producer farmers, rice consumers and business actors consisting of the Association of Farmers' Groups (*Gapoktan*) who act as Community Food Business Institutions (LUPM) and Indonesian Farmer Shop (TTI) owners who are partners of *Gapoktan*. Both *Gapoktan* and TTI function as markets in the countryside because they are located close to farmers in the countryside and are expected to be able to move the economy in the village and create stability in food prices in the countryside. The role of the market in strengthening rural markets is a key element in strategies to improve food security and food quality (Sibhatu and Qaim, 2017). Policies to achieve price stability through market strengthening by involving business players, namely *Gapoktan* and TTI, are a form of strengthening rural markets to improve food security and food sovereignty.

This study aims to formulate a regional food security model based on the relationship between characteristics of the production, consumption and entrepreneurship with the performance of community food business development (PUPM) in NTT. The results of this study are beneficial for the government and stakeholders who have an interest in policy making in order to realize food security.

2. Research Methods

2.1. Research Sites

Research locations in NTT Province were determined purposively in six districts that have carried out PUPM activities, namely in Kupang District, North Central Timor, Southwest Sumba, West Manggarai, Manggarai, and Ende. Figure 1 shows the location of the study.
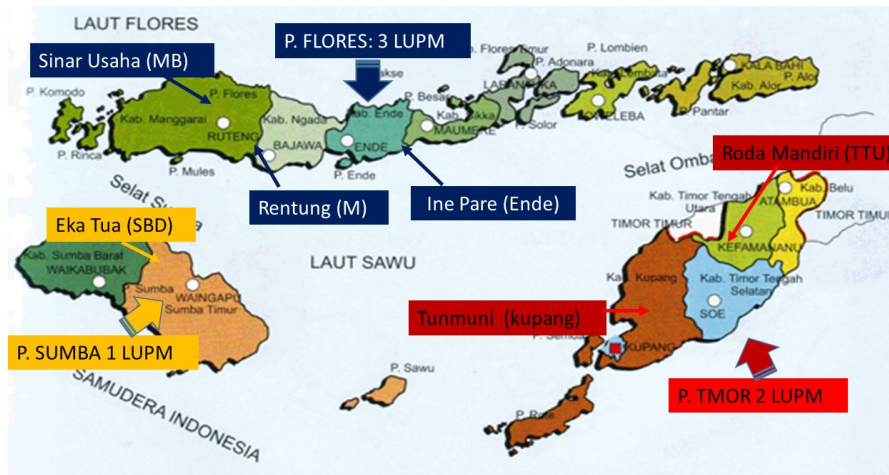
Figure 1. Research location
(*Source*: https://goo.gl/images/yUck9Y)

The study population consisted of three groups involved in PUPM activities namely: 1) Rice farmers who are members of Gapoktan, 2) Gapoktan administrators and TTI owners; 3) Rice consumers who are TTI customers. The sample of farmer households amounted to 93, proportionally distributed to each Gapoktan and determined using the Slovin Formula (Sevila et al., 2007). The size of the consumer sample was set by 96 people referring to the opinion of Lemeshow et al. (1997). While the Gapoktan and TTI samples were taken by census, where the number of samples in each Gapoktan was three people consisting of the chairman, secretary and treasurer. The number of TTI samples was 12 people consisting of TTI owners, totaling sample of Gapoktan and TTI were 30.

2.2. Research Variables

The research variables consist of four variables, namely the characteristics of the production area (X1), the characteristics of the consumption area (X2), the characteristics of the entrepreneurial area (X3), and variable of PUPM performance (Y). Each variable is formed by a number of indicators based on the results of research conducted by previous researchers. Production variable (X1) consists of seven indicators, namely land area (X11), productivity (X12), amount of production sold (X13), cropping pattern (X14), capital (X15), labor (X16), and management (X17) (Soekartawi, 2001; Falola et al., 2014; Yousaf, 2018). The consumption characteristic variable (X2) consists of six indicators namely product (X21), source of product consumed (X22), price (X23), place (X24), personal (X25), and motivation (X26) (Kotler et al., 2008; Shi et al., 2015; Kabir, 2018). Characteristics of entrepreneurship variable (X3) consists of six indicators, namely confidence (X31), task-oriented and outcome (X32), risk-taking (X33), leadership (X34), originality (X35), future-oriented (X36) (Marbun, 1993; Coca et al., 2016; Nobile and Husson, 2016; Ahmed, 2017; Sheshi and Kërçini, 2017; Amornpinyo, 2018). The performance variable of PUPM (Y) consists of three indicators, namely an increase in the success of farming (Y1), the ease of accessing consumers at affordable prices (Y2), and an increase in profits of business actors (Y3) (Ferdinand, 2000; Chin, 2016). The empirical model of the relationship between variables and indicators can be seen in Figure 2.
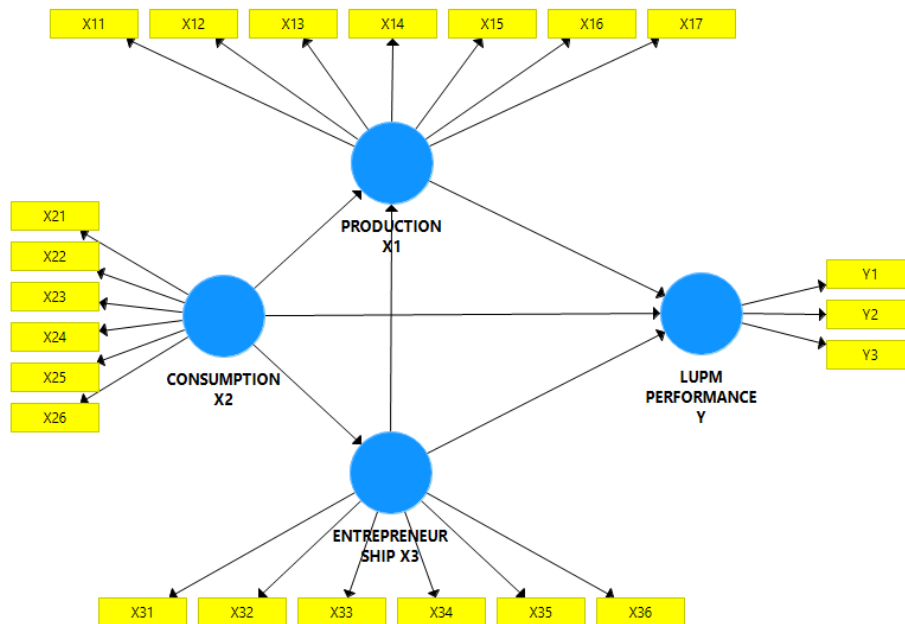
Figure 2. The empirical model of research

2.3. Data Analysis

Data were analyzed using Smart-PLS program, which consisted of outer model analysis and inner model analysis (Ringle et al., 2015). Outer model analysis is used to check the validity and reliability of indicators that measure constructs or latent variables while the inner model aims to see the relationship between latent constructs (causal path) by looking at the estimation of path parameter coefficients and their significance to test the hypotheses that have been set. In this study, the inner model was analyzed using bootstrapping technique and evaluated by observing the R-square value (R^2) obtained from the goodness of fit model test and Q-Square value (Q^2) from the predictive relevance model test. The value of Q^2 is based on the coefficient of determination (R^2) of all endogenous variables which aims to measure how well the observation value produced by the model. The magnitude of Q^2 has a value with a range of $0 < Q^2 < 1$, the closer to the value of 1 means the model is getting better (Ghozali, 2008; Monecke and Leisch, 2012; Sanchez, 2013; Hair et al., 2014).

2.4. Hypothesis

The proposed hypothesis is that the characteristics of area of production, consumption and entrepreneurship simultaneously affect the performance of PUPM in NTT. Hypothesis testing is done by *t*-test statistic (*t*-test*) and probability value. In testing the hypothesis using the statistical value of alpha significance of 5%, the acceptance criteria of the hypothesis is if t-statistics>t table, for the number of respondents as much as 219 people t table value of 1.651 and for acceptance of the hypothesis using probability if the value of p<0.05.

3. Results and Discussion

3.1 The Test Results of The Outer Model and Inner Model

Testing the outer model begins with convergent validity testing by looking at the value of the outer loading, with the acceptance criteria if the value of the outer loading >0.700 (Ghozali, 2008; Hair *et al.,* 2014). Figure 3 shows the results of the outer loading test and a valid indicator is obtained.
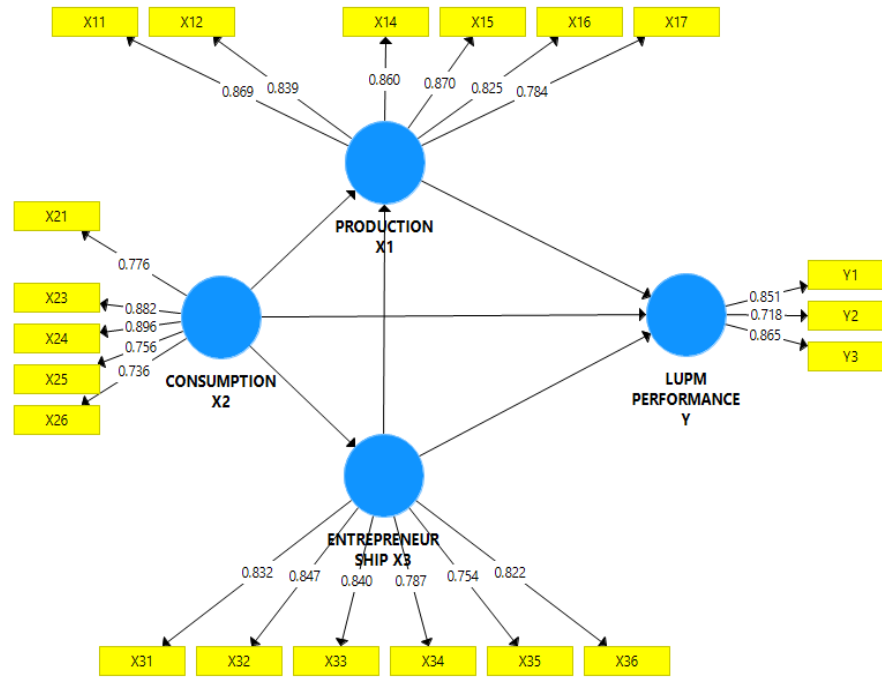

Figure 3. Outer model analysis result

Based on Figure 3 shows that the amount of production sold (X13) and the source of the product that is consumed (X22) is an invalid indicator so that it is removed from the model. Furthermore, discriminant validity analysis is done on the outer model, which is the cross loading value, the average variance extracted (AVE) and the AVE root. Acceptance criteria if the value is for cross loading >0,700, AVE and root AVE >0,500. The results of cross loading testing analysis obtained the same value with the outer loading value (Figure 3) so that it meets the validity requirements because the croos value is >0,700 (Ghozali, 2008; Hair et al., 2014). The results of the analysis of AVE and root AVE values show values >0.500 so that said valid discriminant is shown in Table 1.

Table 1. AVE and AVE root values

Variable variables	AVE	AVE Root	Description
Production Characteristics (X1)	0,709	0,842	Valid
Consumption Characteristics (X2)	0,659	0,812	Valid
Entrepreneurship Characteristics (X3)	0,663	0,814	Valid
PUPM Performance (Y)	0.662	0.814	Valid

Source: Primary data processed, 2018

Furthermore, reliability testing was carried out to prove the accuracy, consistency and accuracy of instruments in measuring constructs. The reliable conditions for reflective indicators are composite reliability and Cronbach's alpha values >0,700 (Ghozali, 2008; Hair et al., 2014). The results of the reliability testing analysis meet reliable requirements, namely the value >0,700 shown in Table 2, thus all the instruments used can be used to evaluate the inner model.

Table 2. Values of composite reliability and Cronbach's alpha research variables

Variable	Composite Reliability	Cronbach's Alpha	Description
Production Characteristics (X1)	0.936	0.918	Reliable
Consumption Characteristics (X2)	0.906	0.869	Reliable
Entrepreneurship Characteristics (X3)	0.922	0.900	Reliable
PUPM Performance (Y)	0.854	0.741	Reliable

Sources: Primary data processed, 2018.

Inner model evaluation is done to examine the relationship between latent construct by testing the determinant coefficient (R^2) and prediction relevance (Q2) on the endogenous construct and testing hypotheses through a bootstrapping process to predict causality relationships between variables. The test results of the determinant coefficient are presented in Table 3.

Table 3. The coefficient of determination

Effect	Against	R Square
Consumption Characteristics (X2) Entrepreneurship Characteristics (X3)	Production Characteristics (X1)	0.307
Consumption Characteristics (X2)	Entrepreneurship Characteristics (X3)	0.302
Production Characteristics (X1) Consumption Characteristics (X2) Entrepreneurship Characteristics (X3)	PUPM Performance (Y)	0,569

Source: Primary data processed, 2018

Table 3 shows that the performance of PUPM is influenced by the relationship between the characteristics variables of production, consumption, and entrepreneurship with the amount of R2= 0.569. This means that the variable characteristics of the area of production, consumption and entrepreneurship is explained by influence the performance of PUPM in NTT by 56.9%. According to Ghozali (2008), if the value is 0.33<R2<0.67, it indicates a moderate relationship. The test of prediction relevance (Q2) is 0.569>0, it is means that the model has good prediction relevance. According to Ghozali (2008), if the Q2>0.35 means the predictive relevance is strong, and it shows that the latent variable in the structural model is able to predict the model well accordingly the research hypothesis can be tested. The results of hypothesis testing analysis appear in Table 4.

Table 4. Path coefficient, t-statistics and p-value structural model

Effect	Against	Line Coefficient	t-stat (1,651)	p-value (0.05)	Note
Production Characteristics (X1)	PUPM Performance (Y)	0.330	7.715	0.000	Sig
Consumption Characteristics (X2)	PUPM Performance (Y)	0.321	6.430	0.000	Sig
Entrepreneurship Characteristics (X3)	PUPM Performance (Y)	0.271	5.619	0.000	Sig
Consumption Characteristics (X2)	Production Characteristics (X1)	0.420	6.517	0.000	Sig
Consumption Characteristics (X2)	Entrepreneurship Characteristics (X3)	0.550	11.393	0.000	Sig
Entrepreneurship Characteristics (X3)	Production Characteristics (X1)	0,197	2,855	0,002	sig

Source: Primary data processed, 2018

Table 4 shows that the variable characteristics of production, consumption and entrepreneurship have a positive effect on PUPM performance. Likewise, the influence between variables obtained that consumption characteristics variables have a positive effect on the characteristics of production and entrepreneurship variables, while entrepreneurship variables have a positive effect on production variables. It can be proved that the proposed hypothesis is accepted, namely the characteristics of the area of production, consumption and entrepreneurship simultaneously affect the performance of PUPM in NTT.

The results of this study prove that the role of PUPM in NTT can increase its role in achieving food security in NTT through the development of the characteristics of the areas of production, consumption and entrepreneurship. Development of the characteristics of the production area that is able to increase the production of rice farming by taking into account the characteristics of the area which is dry land with the area of land owned between 0,5-1 Ha, and the limited production facilities. Development of the characteristics of the consumption area is carried out by taking into account the availability of rice and the purchasing power of consumers who are families with income/month of Rp.500,000, - Rp.1,000,000, and having a number of 1-5 dependents. While the development of entrepreneurial area characteristics is done by increasing the number and ability of Gapoktan and TTI to develop their businesses so that they can benefit and be sustainable. This is consistent with the results of an analysis of PUPM performance (Y) where the increase in business profits for business actors (Y3) is the most important compilation indicator compared to indicators of increasing production and farmers' income (Y1) and the ease of accessing consumers at affordable prices (Y2).

3.2 The Relationship Between PUPM Performance and Regional Food Security in NTT

The findings of this study prove that the regional food security model based on the relationship between the characteristics of the area of production, consumption and entrepreneurship with the performance of community food businesses in NTT can be a solution for realizing regional food security in NTT. The results of the analysis to the performance of PUPM in NTT influenced by the characteristics of the production, consumption and entrepreneurship areas have only reached an adequate level where the value of R2=0.569, This is an indication that the performance of PUPM is not full yet to be able to realize regional food security.

In order to realize regional food security through PUPM activities, the PUPM performance must be improved. PUPM performance can be improved by improving the variables that influence and the variable compiler indicators to make aspects of availability, access and stability are better achieved. Finding from this research exposes that PUPM activities through food availability only accounts for 0.01% of rice consumption in NTT in 2017 (BPS NTT, 2018). Meanwhile, the access aspect show the amount of rice supplied by TTI from Gapoktan and sold to consumers in 2017 was 99.18%. The stability aspect from PUPM activities is able to keep price difference at amount of Rp.1,100./kg between market and TTI price. This price difference is meant a lot to the consumers where the average market price was Rp.9.000. In summary, the existing PUPM activities are able to meet the aspects of food access and price stability but not yet to the availability aspect. Thus the existing PUPM activities are able to produce food access and price stability. The aspects related to rice from Gapoktan to TTI that will be distributed to the community are still very small. Thus, for certain aspects of PUPM activities for businesses that will provide profits for the continuity of the business.

4. Conclusion

The performance of PUPM in NTT is achieved at a sufficient level which is influenced by the characteristics area of production, consumption and entrepreneurship so that they are not fully able to realize regional food security. To be able to realize regional food security through PUPM activities, the performance of existing PUPM must be improved, especially on the characteristics of the entrepreneurial region in order to provide business benefits and sustainability for business people.

In order to improve the performance of PUPM and to better realize regional food security in NTT, it is suggested to the Ministry of Indonesian Agriculture to increase association of farmer's groups and farmer shops to get involved in PUPM in the regions to absorb more production as well as distribution to the consumers. Consequently, this will bring to more funding to be available. Evaluation of PUPM is also required to be adapted to regional characteristics in each region.

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