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Looking for Factors Affecting Food Security in the Province of Yogyakarta Special Region (DIY) in 2019

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ABSTRACT

1

Food security is closely related to community welfare and poverty. The ultimate goal of food security is to improve human welfare which can be seen from the fulfillment of one's right to food. The type of data used in this study is the data from March 2019 Susenas DI Yogyakarta. The research includes measuring the degree of food security using indicators of household income and nutritional consumption. This study uses a factor analysis of the CFA (Confirmatory Factor Analysis) method. Resilience at the national level is based on resilience at the household level. For this reason, a study on household variables is the focus of the government in realizing food security. This study identifies 13 variables of household characteristics, identification using Confirmatory Factor Analysis (CFA) to classify the variables into factors/dimensions of food security. Based on the results of research, 13 household characteristics variables are divided into 4 factors, namely the Dimension of Food Availability including the level of consumption of calories/capita/day, household BPNT acceptance in quintile 2, rice prices, and expenditure groups per capita with a loading factor of 0.80 are the dominant variables. The Food Stability dimension includes the sex of the head of the household, the number of household members, and the variable of the marital status of the head of the household is the dominant variable with a factor loading of 0.96. The dimensions of access to food to get food consist of the status of the area of residence, the status of the head of the household in the formal sector, the age of the head of the household, and the dominant variable of the education of the head of the household with a loading factor of 0.64. The dimensions of food use include the number of household members experiencing health complaints as the dominant variable with a loading factor value of 0.89 and the number of household members who have been outpatient in the last month.

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Introduction

Food is a primary need (Stein, AJ 2013). Food contains a variety of substances that the body needs, namely vitamins, minerals, protein, and so on. These materials are useful to

ensure a person can live and do daily activities. The guarantee for humans to be able to live healthily and work productively is better known as food security (Rahman, et al, 2002).

In 2019, the Food Security Index (IKP) of the Special Region of Yogyakarta (DIY) reached 83.63 or the best food security status (Food Security Agency of the Ministry of Agriculture, 2019). The IKP DIY is the second-highest after Bali Province. The food security index is measured based on aspects of food availability, aspects of food affordability, and aspects of food utilization. Each of them is measured by a variable that has different weights.

When viewed from the minimum calorie intake to be able to live a healthy and active life, the DIY Prevalence of Undernourishment (POU) data in the same period was 87.13. POU DIY ranks 13th. POU is measured by adjusting individual calorie needs according to gender, age to height, and certain body weight and activities undertaken.

On the other hand, in the last 10 years, the DIY poverty rate has always been lower than the national poverty rate and is still the highest in Java. The poverty rate in DIY in 2019 was 11.70 percent or only 5.13 percentage points decreased from 2009. On average, the poverty rate decreased by 0.57 percentage points per year. This condition is an initial illustration that the slow poverty reduction will hamper the ability of the population to obtain adequate and nutritious food. Income in household members can affect consumption and food security such as energy and protein consumption of household members (Kusumawati, TD, (2013) et al.,). In other words, poverty becomes a problem to achieve food security.

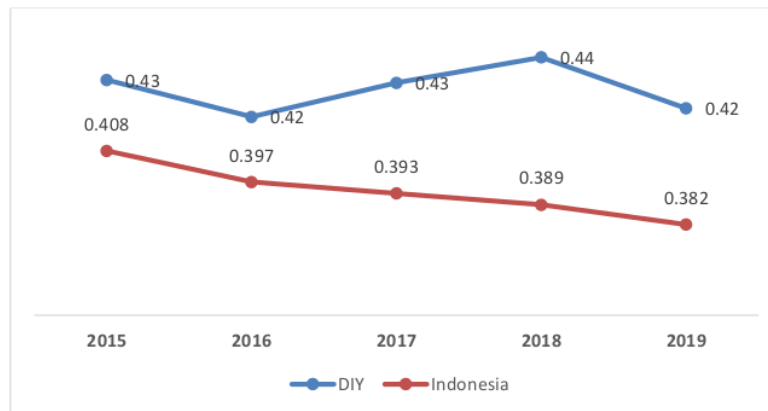


Source: BPS Yogyakarta

Figure 1 Development of Poverty Rates in DIY and National 2010-2019 (%)

Furthermore, apart from poverty, income inequality is still quite high. One measure of income inequality is shown by the magnitude of the Gini ratio. During the last five years, the DIY ratio (2015-2019) has always been higher than the National. In 2019, the DIY ratio was 0.423, while at the national level it was 0.382. The issue of income inequality provides a signal that there is still a fairly high-income gap between the population in the lowest economic group and the population in the upper economic group. This shows that apart from poverty, income inequality is an obstacle to the ability of the lower class population to

access food. The stability of food availability that is evenly distributed among the lower classes is of concern to the government at least.



Source: BPS Yogyakarta

Figure 2 Development of Gini Ratio DIY and Indonesia, 2015-2019

At the international level, food security is still a world concern and is discussed in the main points in the Sustainable Development Goals (SDGs) document. The countries that are members of the United Nations have agreed to end hunger and achieve food security by 2030. This was included in the SGD's 2nd target. Realizing food security is also a development priority in Indonesia. ¹Resilience at the national level is based on resilience at the household level. If a household is food insecure, it is difficult to see it safe at the national level. Household-level food security refers to the ability to access adequate food at any time (Warr, 2014)

The concept of food security is quite diverse. Law of the Republic of Indonesia Number 18 of 2012 concerning food security includes three aspects, namely availability of quantity, safety, and affordability of prices. The distribution of the pillars for food security based on the Indonesian Food Law is availability, accessibility, and stability. ³Meanwhile, ³FAO (Food and Agricultural Organization), 1992 defines food security as a situation when all people at all times have sufficient amounts of safe and nutritious food for a healthy and active life. Food security is explained in 4 pillars, namely food availability, physical and economic access to food, stability of supply and access, and food utilization. (Nurhemi (2014).

To achieve food security at the national level according to Nurhaeni et al, 2014 if it meets the following community:

the fulfillment of food with conditions of adequate availability, with the meaning of food availability in a broad sense, including food originating from plants, livestock, and fish, as well as meeting the need for carbohydrates, vitamins, and minerals, as well as their

derivatives which are beneficial for human growth and health;

the fulfillment of food in a safe condition, that is, free from biological, chemical, and other contamination of objects which can disturb, harm, and endanger human health, as well as safe for religious principles;

the fulfillment of food in an even condition, meaning that the distribution of food must support the availability of food at all times and evenly throughout the country.

the fulfillment of food in affordable conditions, that is, it is easy for everyone to obtain at an affordable price.

Hapsari, NI, & Rudiarto, I. (2017) in a study "Factors Affecting Food Insecurity and Security and Policy Implications in Rembang Regency" explains the dimensions of food security from various sources, namely first, food availability depends on food crop production and food production. This is also influenced by the availability of water in a place and food and food production are also influenced by the availability of water one place and a time (Hammer et al., 2001). Second, access to food according to Hanani (2000) consists of economic, physical, and social access. Economic access consists of income received, job vacancies, and food prices. Physical access is related to infrastructure in the distribution process and social access is more likely to be the selection of household foodstuffs. Third, the dimension of food use consists of two elements, namely the use of food that is accessible to households and the body's ability to absorb nutritional content. The use of this food is strongly influenced by several things, including household food storage and processing facilities, customs, culture, and the level of knowledge of housewives in deciding the type of food, food availability in the family, and individual health in a household (Food Security Council, 2009). Fourth, population density in an area also affects the established food security. In the most marginalized and densely populated areas, households are trapped in a Malthusian situation characterized by low resources, high dependence on external inputs, poor accessibility,

Furthermore, Peter Warr (Australian National University, 2014) distinguishes food security at four levels, namely the global level, the national level, the household level, and the individual level. Peter Warr further stated that resilience at the national level is based on resilience at the household level. If a household is food insecure, it is difficult to see it safe at the national level. Household-level food security refers to the ability to access adequate food at any time. Not only the adequacy of food intake for today but also includes the expectation of future problems and it is not a problem at this time.

Several studies on food security in Indonesia have been carried out. This research, among others, is based on research on the factors that influence food insecurity and security

and the implications of its policies in the Rembang Regency. By Hapsari, NI, & Rudiarto, I. (2017) it is found that the main factor causing food security is the availability of food and the main factor causing food insecurity is socio-economic factors.

Then, research on "Determination of Dimensions and Indicators of Food Security in Indonesia: Review of the Methods of the Food Security Council-World Food Program" by Edmira Rivani in 2011 shows that the dimensions of food security are food availability, physical access, utilization, and socioeconomic. Indicators that deserve to be included in the food security composite index are villages without access to roads, illiterate women, under-standard underweight, under-standard toddlers, households > 5 km from health facilities, and households without access to clean water.

The third is "Factor analysis and mapping of food security in Papua province to support sustainable development goals in Indonesia" by Yalinda Nurul Aini and Fuat Edi Kurniawan in 2019 argued that using the Confirmatory Factor Analysis (CFA) method. The results of the study, 9 indicators were divided into 3 factors, namely the access factor of Food affordability with the percentage indicator of the absence of access to electricity and clean water and the average length of school for girls over 15 years as the dominant indicator (loading factor 0.881). The second factor is the use of Food with the indicator per capita normative consumption ratio, the percentage of children under five with stunting. And the percentage of households with food expenditure above 65 percent is the dominant indicator (factor loading 0.823).

Research methods

The data used in this study came from secondary data from the National Socio-Economic Survey (Susenas) in the Special Region of Yogyakarta in 2019. The unit of analysis in this study was households with a sample size of 3,734 households. A household is a person or group of people who live in part or all of a physical building or census, and usually, live together and eat from one kitchen (BPS, 2016: 41). The list and types of variables used in the study are as follows:

Table 1. Research Variable Definition

No.	Variable Name	Type of Data	Information
1	Marital Status of Head of Household (Status)	Ordinal	Dummy variable 1 = Married 0 = other
2	Gender of Head of Household (jk)	Ordinal	Dummy variable 1 = Male 0 = Female

3	number of household members	Ratio	Soul
4	Household expenditure group (capita)	Ratio	1 = 10 percent of households with per capita expenditure below the lowest 25 percent 10 = 10 percent of households with the highest per capita expenditure
5	Level of consumption of Calories / capita / day) (calories)	Ratio	cal
6	Price of rice (rp / kg) (Price)	Ratio	rupiah
7	Number of household members experiencing health complaints (KH)	Ratio	soul
8	Number of household members who were outpatient in the last month (RJ)	Ratio	soul
9	The highest education of the head of the household (students3)	Ordinal	1 = SD and below 2 = Junior high school equivalent 3 = SMA and equivalent 4 = PT
10	Residential Area Status (kd)	Ordinal	Dummy variable 1 = Urban 0 = Rural
11	Status of the head of the household in employment (formal)	Ordinal	Dummy variable 1 = formal 0 = informal
12	Age of Head of Household (Age K)	Ratio	Dummy variable 1 = age of the head of the household between 15-64 years 0 = other
13	Marital Status of Head of Household (Status)	Ordinal	Dummy variable 1 = Married 0 = other

Data analysis method

This study uses Confirmatory Factor Analysis (CFA) to classify variables into factors/dimensions of food security in DI Yogyakarta. Food security analysis adopts the concept of food security according to the Law of the Republic of Indonesia Number 18 of 2012 and FAO 1992. Food security includes 4 dimensions/constructs, namely the dimensions of food availability, food stability, access to food, food utilization. Each dimension cannot be measured directly. Several variables that are closely correlated will be grouped in a new dimension (factors / latent variables/constructs).

Analysis Model Specifications

Santoso 2012 in Aini etc, 2019 states that factor analysis is a method used to find inter-relationship between several variables that are initially independent of each other so that one or several sets of variables that are less than the initial number of variables can be created.

The relationship between indicator variables and factors can be stated by the following equation:

$$X_i = b_{i1}f_1 + b_{i2}f_2 + \dots + b_{ij}f_j + e_i$$

with

f_j = factor or common factor that cannot be observed directly, with $j = 1, 2, 3, 4$

X_i = Measurable variable, with $i = 1, 2, 3, \dots, 13$

b_{ij} = the value of the coefficient or factor loading of the variable X_i against F_j , with $i = 1, 2, 3, 4$

e_i = error term, with $i = 1, 2, 3, \dots, 13$ or

$$X = bf + e$$

With

X = Measured variable

b = loading factor matrix

f = factor or common factor

The definition of the relationship between measured variables and factors can be written

$$X_i = a_i + e_i$$

with

a_i = common factor

e_i = error term

Where a_i and e_i are uncorrelated and a_i may be correlated with each other so that

$$\text{Var}(X_i) = \text{Var}(a_i) + \text{Var}(e_i)$$

$\text{Var}(a_i)$ is a commonality or variance value that represents the common factor and Var

(e_i) represents the error term factor of the variable $\text{Var}(X_i)$

Rotation

Factor rotation was carried out to obtain a better interpretation of the processed data by factor analysis. The rotation method used is the orthogonal rotation method. Orthogonal rotation is rotation with an axis of rotation perpendicular to each other or at right angles. Using this method, each factor is not correlated or independent between one factor and

another. While the orthogonal rotation method is the Varimax method as follows:

$$s^2 = \left(\frac{1}{n}\right) \sum_{j=1}^m \sum_{i=1}^n b_{ij}^4 - \left(\frac{1}{n}\right)^2 \left(\sum_{i=1}^n b_{ij}^2\right)^2$$

with

b_{ij} = loading factor value in the i th variable and the j -factor

m = number of variables

n = number of factors

Varimax rotation is a perpendicular rotation that aims to increase the interpretation of the factors obtained.

Extraction

Several variables are likely to measure the same factors, the extraction procedure is carried out to squeeze or extract the variables until only a few factors are found at the core.

In factor analysis, variables are grouped based on their correlation. Highly correlated variables will be in a certain group to form an actor, while variables in other groups have a relatively small correlation. In this study, the approach used for factor analysis is Confirmatory Analysis Factor (CFA), which is to confirm statistically the model that the researcher has built.

CFA analysis goes through a series of stages as follows:

Determine the indicators to be analyzed

In this study, there are 13 indicators/variables that will be analyzed to classify into 4 dimensions of food security.

Perform partial correlation calculations using the Kaiser Meyer Oikin test (KMO). The KMO test aims to determine whether all the data that has been taken are sufficient to be analyzed and CFA. KMO value greater than 0.5, will meet the CFA requirements. KMO is calculated using the formula:

$$KMO = \frac{\sum_{i=j} \sum r_{ij}^2}{\sum_{i=j} \sum r_{ij}^2 + \sum_{i \neq j} \sum a_{ij}^2}$$

With,

R_{ij} = correlation between variables i and j

a_{ij} = partial correlation between variables i and j

Conducting a variable feasibility test using the Barlett test of Sphericity method.

Barlett's Test of sphericity is a statistical test to test whether the variables involved are correlated. The hypothesis used is that there is no correlation between variables for the null

hypothesis and there is a correlation between variables for the alternative hypothesis. The KMO and the Barlett test have given the correct conclusions, then the factor analysis is carried out.

Checking the Measure of Sampling Adequacy (MSA). This aims to determine whether the sampling process is adequate or not, which can be seen from the Anti-Image Correlation. The numbers in this matrix represent partial correlations between variables, that is, correlations that are not influenced by other variables. If the MSA value continues < 5 then the variable is excluded from the CFA analysis.

Calculates anti-image matrices. Choose the eigenvalue. The ability of each factor to represent the analyzed variables is indicated by the amount of variance described (eigenvalue). In Total Variance Explained, what needs to be considered is the factor whose eigenvalues are more than 1, this is because the eigenvalues less than 1 are not significant.

Group the variables into 4 factors. The next step is to determine the factor matrix. The factor matrix is presented in tabular form, in this table contains the factor loading or correlation value between each factor and the analysis variables. Not all variables in the factor matrix can be membership determined, therefore rotation is required.

Interpretation of results. Variable grouping based on the loading factor value. The largest loading factor value will determine whether a variable is included in a factor. Valid criteria in CFA analysis or it can be said to be valid if the loading factor is > 0.30 . The method section structure should: describe the materials used in the study, explain how the materials were prepared for the study, describe the research protocol, explain how measurements were made and what calculations were performed, and state which statistical tests were done to analyze the data.

Discussion

This study uses the CFA method. In detail, the CFA method will confirm the food security model/concept proposed by FAO (Food and Agricultural Organization), 1992, and the Law of the Republic of Indonesia Number 18 of 2012. 13 household characteristic variables will explain the food security factor, namely food availability (Food availability), food stability, access to food, food utilization. Each of these factors cannot be measured directly

Validity test

Validate test consists of 2 things, namely the adequacy test of the number of observations (data) and the correlation test between variables (multivariate).

Table 3. KMO and Bartlett's Test scores

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.676
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Bartlett's Test of Sphericity	Approx. Chi-Square	12755,674
	df	78
	Sig.	0,000

Source: Yogyakarta Yogyakarta Susenas Raw Data March 2019

From the KMO and Bartlett's Test tables, the Kaiser-Meyer-Olkin value is 0.676. Thus, the KMO is greater than 0.5 so that from the data adequacy perspective, it has been fulfilled for the factor analysis to be carried out. Next is the value of Bartlett's Test of Sphericity. Table 1 shows the value of Bartlett's Test Sig = 0.0000 or less than alpha, namely 0.05. This means that we reject H_0 so that it can be concluded that there is a correlation between multivariate variables so that factor analysis is feasible to use.

The sample collection process is seen by the value of the Measure of Sampling Adequacy (MSA), this value is to determine whether the sampling process is adequate or not, by looking at the Anti-Image Correlation. Table 4 shows the MSA values of the 13 research variables.

Table 4. Score Measure of Sampling Adequacy (MSA)

No.	Variable Name	MSA	No.	Variable Name	MSA
1	Status	0.807	8	KH	0.747
2	jk	0.632	9	RJ	0.667
3	jart	0.657	10	students3	0.645
4	Capita	0.768	11	kd	0.626
5	calories	0.668	12	formal	0.624
6	BPNT_K	0.534	13	Age K	0.761
7	Price	0.669			

Source: Yogyakarta Yogyakarta Susenas Raw Data March 2019

The MSA testing criteria are as follows:

MSA = 1, this indicator can be predicted without error by other indicators.

MSA > 0.5, the indicator is still predictable and can be analyzed further.

MSA < 0.5, the indicator is unpredictable and cannot be analyzed further

The Anti Image Matrices table shows that for the 13 variables used, all MSA values are more than 0.5. It appears that the MSA values range from 0.534 to 0.807. This means that MSA > 0.5 all variables can be predicted and can be analyzed further.

Factor Validity Test

Factor validity test seen from the values in the extraction column. Estimation of the relationship between variables and new factors that are formed using the Maximum Likelihood method. It appears that the percentage of factors formed in explaining the 13 variables is quite diverse. For example, the newly formed factor can explain the variable of

the marital status of the head of the household by 47 percent, it can explain the sex of the head of the household by 51 percent, it can explain the number of household members by 96 percent and so on. The diversity of extraction values indicates that more than one new factor is formed. Each variable that has a strong correlation will be incorporated into one factor.

Table 5. Value of Communalities

	Initial	Extraction
Status	0.43	0.47
jk	0.49	0.51
jart	0.59	0.96
Capita	0.31	0.35
calories	0.22	0.23
BPNT_K	0.17	0.13
Price	0.35	0.45
KH	0.16	0.21
RJ	0.58	0.92
students3	0.23	0.24
kd	0.49	0.80
formal	0.45	0.55
Age K	0.14	0.19

Source: Yogyakarta Yogyakarta Susenas Raw Data March 2019

Determine the new factors that are formed seen from the Eigenvalues value. The Total Variance Explained table shows that there are 4 cumulative eigenvalues of 4. Thus the dimensions/factors that are formed are under the number of dimensions in food security according to the Law of the Republic of Indonesia Number 18 of 2012 and FAO 1992. Factor 1 which will later be formed will be able to explain the variation of data by 23.544 percent. Factor 2 will be able to explain the data variation by 15.66 percent. Factor 3 can explain the variation of data by 11.18 percent and factor 4 will be able to explain the variation in data by 10.125 percent.

Table 6. Total Variance Explained Value

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cum %	Total	% of Variance	Cum %	Total	% of Variance	Cum %
1	3.061	23.544	23.544	2.291	17.624	17.624	1.733	13.328	13.328

2	2.036	15.661	39.204	1.690	12.999	30.623	1.519	11.684	25.012
3	1.454	11.182	50.387	1.264	9.722	40.345	1.496	11.511	36.523
4	1.316	10.125	60.512	.782	6.014	46.359	1.279	9.836	46.359
5	.975	7.501	68.013						
6	.776	5.966	73.980						
7	.744	5.725	79.705						
8	.709	5.453	85.158						
9	.568	4.368	89.525						
10	.477	3.666	93.191						
11	.324	2.492	95.683						
12	.302	2.320	98.003						
13	.260	1.997	100.000						

Extraction Method: Maximum Likelihood.

Source: Yogyakarta Yogyakarta Susenas Raw Data March 2019

CFA is used when the main purpose is to identify the factors that underlie a construct. The basic principle of factor analysis (Marisca, 2014) is to extract several common factors from the original group of variables so that:

- There are fewer factors than many of the original X variables.
- Most of the information (variety) of the original variable X is stored in some factors.

With rotation, the value of the factor loading or the correlation value between each factor and the analysis variables will be obtained. The value of the biggest loading factor for each variable will determine where the variable will be incorporated into a particular factor. Table 7 shows the value of the factor loading before and after rotation. The rotation used is the varimax orthogonal rotation. The numbers on the rotation factor matrix, 4 new factors are formed. Each of these variables has 4 loading factor values spread over 4 factors.

Table 7. Loading Factor Value Before and After Rotation

No.	Variable Name	Before rotation				After Rotation				Reluctant to factors
		F1	F2	F3	F4	F1	F2	F3	F4	
1	Status	0.96	0.19	-0.05	-0.02	0.96	-0.13	0.13	0.04	1
2	Jk	0.68	0.19	-0.07	0.01	0.70	-0.07	0.05	0.07	1
3	Jart	0.57	-0.15	0.25	0.23	0.42	-0.39	0.36	0.09	1
4	Capita	-0.45	0.84	0.10	-0.03	-0.18	0.80	-0.06	0.50	2
5	calories	-0.11	0.53	0.03	0.40	-0.14	0.56	-0.10	-0.02	2
6	BPNT_K	-0.17	0.43	0.07	-0.13	-0.03	0.46	0.00	0.15	2
7	Price	-0.32	0.38	-0.02	-0.31	0.00	0.35	-0.05	-0.09	2
8	KH	0.30	-0.12	0.84	-0.01	0.11	-0.08	0.89	-0.03	3
9	Rj	0.24	-0.14	0.69	-0.05	0.07	-0.08	0.73	-0.08	3
10	students3	0.13	0.25	0.04	0.37	0.00	0.20	-0.05	0.64	4
11	Kd	-0.21	0.27	0.02	0.35	-0.17	0.07	-0.05	0.46	4
12	Formal	0.10	0.25	-0.02	0.34	0.14	-0.05	0.03	0.44	4
13	Age K	-0.11	0.22	-0.01	-0.27	0.13	-0.03	-0.03	0.41	4

Source: Yogyakarta Yogyakarta Susenas Raw Data March 2019

From the table above, a relationship between variables and factors can be made based on the loading factor value. The following is the mathematical relationship between the variables and the factors of the rotation result:

$$X_1 = 0.96F_1 - 0.13F_2 + 0.13F_3 + 0.04F_4$$

$$X_2 = 0.70F_1 - 0.07F_2 + 0.05F_3 + 0.07F_4$$

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$$X_{13} = 0.13F_1 - 0.03F_2 - 0.03F_3 + 0.41F_4$$

Variables will be incorporated into one particular factor if the loading factor value is greater than 0.30 Hair (2010). The results of the rotation of the orthogonal varimax method show 13 variables with the largest loading value of more than 0.30 so that the 13 variables will be distributed in 4 dimensions of food security. Second, the variable provision is included in which factor is based on the largest factor loading value of the 4 formed factors. In detail, it can be seen that the variables of the marital status of the head of the household, the sex of the head of the household, and the number of household members, the biggest factor loading value is in the factor column 1. This shows that the three variables are included in factor 1. Then factor 2 includes the percentile average, per capita expenditure average, calorie consumption, and BPNT revenue. Factor 3 consists of the variable number of household members who experience health complaints and the variable number of households who are outpatient. Factor 4 includes the education variable of the head of the household, the status of the area of residence, the work status of the head of the household, and the age of the head of the household.

Based on the variables incorporated in the factors, the names of each factor that affect food security in Yogyakarta Province are as follows.

No.	Factor	Name	Variable
1	Factor 1	Food stability (stability)	<ul style="list-style-type: none"> Marital Status of Head of Household Gender of Head of Household number of household members
2	Factor 2	Food availability (Food availability)	<ul style="list-style-type: none"> household expenditure groups Level of consumption of Calories/capita/day Receipt of household BPNT in quintile Food prices (rice)

3	Factor 3	Utilization of food (food utilization)	<ul style="list-style-type: none"> Number of household members experiencing health complaints Number of household members who were outpatient in the last month
4	Factor 4	Access to food (Access to food)	<ul style="list-style-type: none"> The highest education of the head of the household Residential Territory Status Status of the head of the household in employment Age of Head of Household

The dimension of food stability, the most dominant variable is the status of the head of the household with a factor loading of 0.96. The dimension of food availability, the per capita expenditure group with a factor loading of 0.80 is the dominant variable. In the dimension of food use, the most dominant variable is the number of household members who experience health complaints with a loading factor of 0.89. The dimension of access to food is the education of the head of the household with a loading factor value of 0.64.

Conclusion

The concept and scope of dimensions regarding food security are quite diverse. The dimension of food security requires a variable that can explain the concept of food security in more detail. Meanwhile, realizing food security at the national level begins with efforts to improve food security at the household level. Thus, increasing food security will be more targeted if it is based on household characteristics that can explain each food security factor.

The results of the food security analysis using the CFA method obtained a set of variables incorporated in the 4 dimensions of food security coverage. Here are the variables in each factor/dimension:

1. The dimensions of food stability include the marital status of the head of the household, the sex of the head of the household, and the number of household members. The dimension of food availability, the most dominant variable is the status of the head of the household with a factor loading of 0.96.
2. Food Availability Dimensions include household expenditure groups Calorie consumption/capita/day) Household BPNT revenues in quintile 2 and rice prices. Dimensions of food access, per capita expenditure group with a loading factor of 0.80 are the dominant variables
3. The dimensions of access to food to obtain food consist of the status of the area of residence, the status of the head of the household in the formal sector, the age of the head of the household, and the education of the head of the household. The dimension of access to food with the dominant variable of education for the head of the household is a loading factor of 0.64
4. The dimensions of the use of food to obtain food consist of the number of household members experiencing health complaints, the number of household members who have been outpatient in the last month. In the dimension of food use, the most dominant

variable is the number of household members who experience health complaints with a loading factor of 0.89.

Suggestion

Efforts to achieve food security in DIY in 2030 can be achieved through realizing food security from the household level. This can be done by:

1. Optimizing food security targets by taking into account household characteristics that can explain the dimensions of food security. These characteristics include the following:
 - The dimension of food stability includes household characteristics, namely the marital status of the head of the household, the sex of the head of the household, and the number of household members.
 - Dimensions of food availability includes household expenditure groups (Calorie consumption/capita/day), Household BPNT receipts in quintile 2 and rice prices.
 - The dimensions of access to food to obtain food consist of the status of the area of residence, the status of the head of the household in the formal sector, the age of the head of the household, and the education of the head of the household.
 - The dimensions of the use of food to obtain food consist of the number of household members experiencing health complaints, the number of household members who have been outpatient in the last month.
2. Explanation of the results of this research can be combined with the mapping of the food security status of each region.

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