Avalaible online at http://journals.ums.ac.id, Permalink/DOI: 10.23917/jep.v23i1.17648

Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan, 23 (1), 2022, 63-78

The Determinants of Food Consumption Expenditure in Central Java

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Received: December 2021 | Revised: February 2022 | Accepted: June 2022

Abstract

Food consumption is a basic human necessity that should be fulfilled. Although the investment level tends to increase in Central Java, the open unemployment rate also tends to increase. It is worrying that this condition will affect the society prosperity reflected by food security status. This research aims to analyze the consumption expenditure development in Central Java, identify the food consumption expenditure determinants, and formulate the food consumption fulfillment strategies. This research has quantitative characteristics by using the secondary data of Statistical Central Bureau. The research result shows the consumption expenditure proportion between food and non-food is nearly similar and tends to increase each year. The determinants, which affect the food consumption expenditure positively and significantly, are the non-food consumption expenditure, the gross domestic regional product (GDRP) of constant price, and the poverty rate. The food consumption fulfillment strategies in Central Java are directed by sustainability schemes covering economic, social, and environmental dimensions. The implementations are to strengthen the food security dimensions, the society income enhancement, the value chain optimization, the adoption of technology and knowledge, and the local food resources utilization.

Keywords: economic, food consumption, sustainability, food security
JEL Classification: C33, E21, O11

How to Cite: Nurjati E. (2022). The Determinants of Food Consumption Expenditure in Central Java, 23(1), 63-78. doi:https://doi.org/10.23917/jep.v23i1.17648

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1. Introduction

Society prosperity is one of the national development priority schedules. The society prosperity means as a society's necessity fulfillment condition both basic and complementary necessities of social and economic aspects, i.e., food and non-food consumption expenditures, health, education, etc. The Recommended Dietary Allowances (RDA) is the main indicator for showing the society prosperity rate calculated by calory and protein intake amount (BPS, 2021g). There are some of society's economic prosperity determinants, i.e. the household income, the Gross Domestic Regional Products (GRDP), the inflation, the national political condition, the pandemic, the Human Development Index, etc. (Kusumayanti et al., 2018; Ndakularak et al., 2014).

Food consumption is one of society's necessities which should be fulfilled because it affects health and nutrition status directly. Furthermore, food inadequacy causes malnutrition (Arlius et al., 2017). The FAO data (2021) stated the percentage of malnutrition inhabitants in the latest five years in Indonesia does not show a significant decrease (Figure 1). The effort for fulfilling the food consumption is a crucial schedule that should be conducted by the government because it involves society's life sustainability (Nurpita et al., 2018).

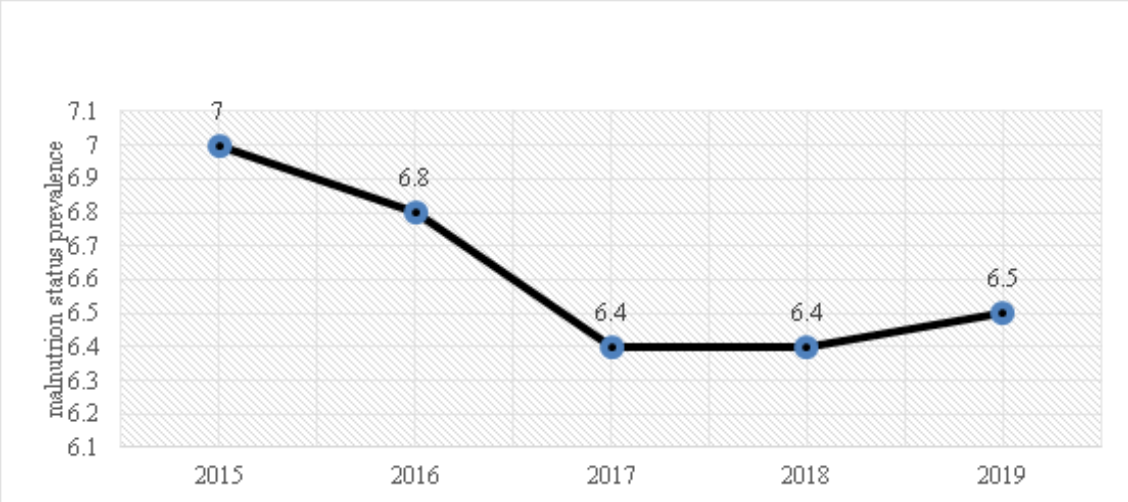

Figure 1. Malnutrition status prevalence in Indonesia from 2015 to 2019 (Source: FAO, 2021)

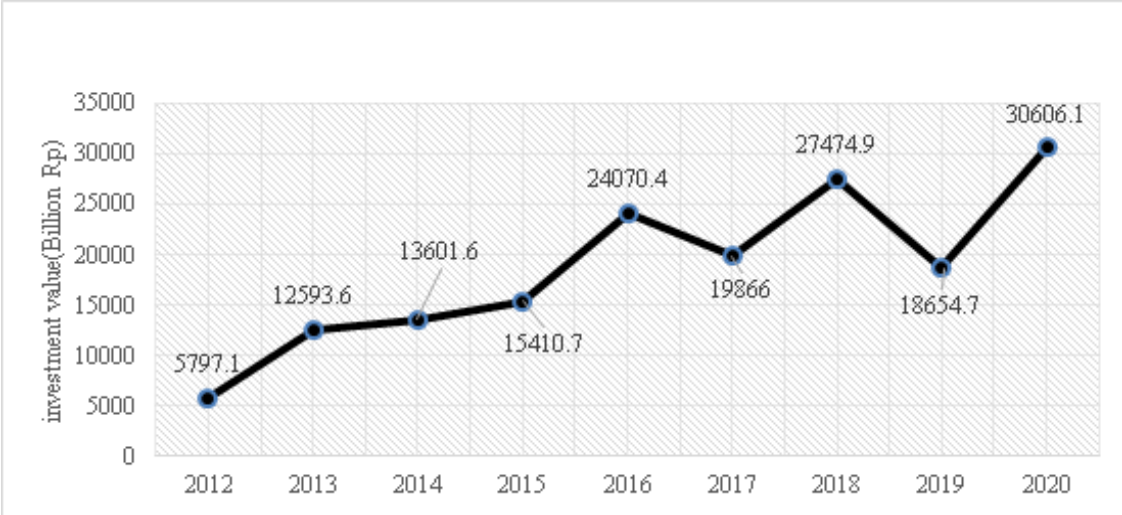

Figure 2 The investment value in Central Java in period 2012 to 2019, Source: ((BPS, 2021e)

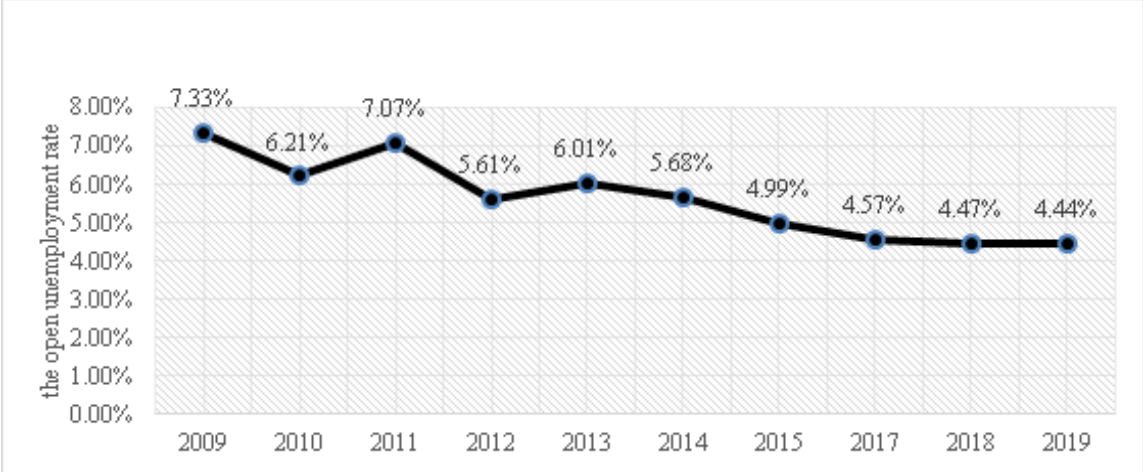

Figure 3 The open unemployment rate in Central Java in the period 2009 to 2019, Source: (BPS, 2021f)

Central Java is a province classified as the three densest inhabitant numbers in Indonesia, after West Java and East Java (BPS, 2021a). As one of the densest provinces in Indonesia, the investment value in Central Java tended to increase from 2012 to 2020 (BPS, 2021e) (Figure 2). The investment is conducted massively in various sectors both productions and services, i.e. chemical industries, transportations, warehouses, telecommunications, food and beverages industries, agriculture, fisheries, animal husbandries, forestries, etc. Yet, because the labor absorption rate in Central Java is still low, the open unemployment rate is still high (Figure 2). It is worrying that the condition will affect the society's nutrition intake rate reflected by the food consumption expenditure rate (Mayasari et al., 2018).

The household consumption expenditures are affected by some factors, i.e., both economic and non-economic factors. The influencing economic factors are household income, household wealth, and government policies in decreasing the income distribution imbalance. Meanwhile, non-economic factors are society's socio-cultural factors, i.e., geographic condition, eating habit pattern, family value system, and ethical change. The demographical factors which affect the household consumption expenditure are inhabitant numbers and composition. Household consumption is essential to consider because it is the main factor of national income donator (Illahi et al., 2019). The demographical social factors which affect the food consumption expenditure are housewife education, family numbers, and social loan of food (Sinaga et al., 2014).

The turmoil of social, economic, and political conditions often causes food consumption expenditure diversion because they affect the demands and supplies of both food and non-food product, the household income, the food product price, the food and non-food inflation, the poverty rate, etc. Yet, fundamentally the household food consumption expenditures are affected by some factors, including both micro factors, i.e. household welfare conditions, and macro factors, i.e. national economic conditions and politics (Efendi, 2017; Rusnani, 2013).

Many types of research that analyze the food consumption expenditure determinants have been conducted. Yet, some research using economic dimension approaches should be utilized for obtaining the initial view in Central Java which has some problems in the developing economic sector. Therefore, this research used economic dimension approaches, i.e. the Gross Domestic Regional Products (GRDP), the non-food consumption expenditures, the inflation, and the poverty rate. Furthermore, as a food security strategy formulation effort in Central Java, it is essential to estimate the food consumption expenditure determinants to obtain the influencing factors. Afterward, the food consumption fulfillment strategy formulation was conducted by analyzing research results and literature reviews. Therefore, this research aims: 1) To analyze the consumption expenditure development in Central Java, 2) To analyze the determinants which affect the food consumption expenditures in Central Java, and 3) To formulate the food consumption in Central Java.

2. Research Method

This research is quantitative research by using the secondary data of Statistical Central Bureau or Badan Pusat Statistik (BPS) of Central Java Province. The Central Java Province was selected as the research object based on situational analysis as follows: 1) Central Java is the five densest province in Indonesia (BPS, 2019) and 2) high investment, but the open unemployment rate is also high (BPS 2021e; BPS 2021f). The amount of investment should reduce the level of poverty due to the increased availability of jobs. The declining poverty rate is reflected in the increasing level of food consumption expenditure. However, on the other hand, in Central Java, the high level of investment does not necessarily reduce the number of open unemployment which is feared will affect the level of poverty and the level of food consumption expenditure. The research was conducted from September to October 2021 by using the secondary data of the Statistical Central Bureau or Badan Pusat Statistik (BPS) of Central Java Province.

For obtaining the first aim of the research, i.e. to analyze the food and non-food consumption expenditure in Central Java, descriptive analysis was conducted. For obtaining the second aim of the research, i.e. to analyze the food consumption expenditure determinants, the panel data regression was conducted. The panel data used consist of time series, i.e. monthly variable data needed during the period 2012 to 2019, and the cross-section of 35 regencies and cities in Central Java. The data analyzed were food consumption expenditure per capita by rural areas (Rp) as a dependent variable. Meanwhile, the non-food expenditure per capita per month by rural or urban areas, the Gross Domestic Regional Products (GRDP) of constant price (thousand Rp), the inflation rate (%), and the poverty rate (%) as independent variables. The panel data model in this research analysis is as follows:

$$FoodCon_i = \beta_0 + \beta_1 NonFood_i + \beta_2 GRDP_i + \beta_3 Inf_i + \beta_4 Pov_i + e \quad (1)$$

where:

FoodCon = The food consumption expenditure per capita by rural or urban areas (Rp)

$NonFood_i$ = The non-food consumption expenditure per capita by rural or urban areas (Rp)

$GRDP_i$ = The Gross Domestic Regional Products (GRDP) of constant price (thousand Rp)

Inf_i = The inflation rate (%)

Pov_i = The poverty rate (%)

e = *error term*

There are three methods to estimate the regression model by panel data, i.e. the Pooled Least Square which usually uses the method of the Ordinary Least Square (OLS), the Fixed Effect (FE), and the Random Effect (RE). The best model determination between the Ordinary Least Square, the Fixed Effect, and the Random Effect uses two model estimation techniques. Both techniques are used in the data panel regression for obtaining the right model to estimate the data panel regression. Both techniques are as follows. Firstly, the Chow test is used for determining the best model between the Ordinary Least Square and the Fixed Effect model. Secondly, the Hausman test is used for determining the best model to estimate the data panel regression between the Fixed Effect and the random effect model (Gujarati, 2012). The uses of both tests in determining the best model of data panel regression are shown in Figure 4:

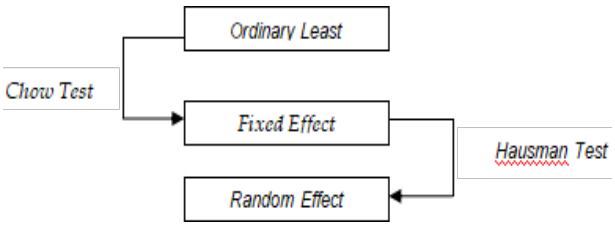

Figure 4. The best model determination of data panel regression

2.1 Chow Test

This chow test aims to determine how the model is used, whether uses the Ordinary Least Square or the Fixed Effects, by the hypotheses as follows:

H_0 : The model of OLS

H_1 : The model of FE

2.2 Hausman Test

The Hausman test is a further test to determine the data panel's regression model. This test is conducted when the Chow Test shows that the Model Fixed Effects is better. Then, the Hausman test will determine the best model to use between the Fixed Effects and the Random Effects. The Hausman test uses the hypotheses as follows:

H_0 : The model of Random Effects

H_1 : The model of Fixed Effects

Because there are few collinearities among variables in the data panel, the classical assumptions used in this research, I.e. multicollinearity, autocorrelation and heteroskedasticity tests. After analyzing the food consumption expenditure determinants, the policy formulation analysis of food consumption fulfillment in Central Java was conducted according to the previous analysis and was enriched by literature reviews.

3. Results and Discussion

3.1 Result

The rural and urban society consumption expenditures are classified into two parts, i.e. food and non-food consumption expenditure. Figure 5 shows the expenditures for food and non-food consumption in Central Java tend to increase along the period 2012 to 2019 by the proportion of food and non-food consumption expenditure amount which tend to be similar each year. Yet, in certain years, i.e. 2015, 2018, dan 2019, the non-food consumption expenditures were higher than the food consumption expenditure. Meanwhile, in 2014 and 2017, the food consumption expenditures tended to be higher than the non-food consumption expenditures.

For analyzing the determinants which affect the food consumption expenditure by using a data panel, the classical assumption test was conducted to estimate the data panel's regression model. The research used three methods, i.e. the Ordinary Least Square (OLS), the Fixed Effect (FE), and the Random Effect (RE). The first test conducted was a chow test for determining the best model between OLS and FE. Before conducting a data panel regression test, the classical assumption test was conducted. The classical assumption test consists of a multicollinearity test, heteroskedasticity test, and autocorrelation test. The research result shows the data used have been verified of those three classical assumption tests. Table 1 shows the VIF value of each variable is not more than 10, which indicates there is no multicollinearity. As the value of the heteroskedasticity test and autocorrelation test, i.e. Prob>chi^2 and Prob>F is 0.0000, respectively, the data used have been verified of three classical assumption tests.

The first analysis is the chow test to estimate the best model between OLS dan FE. The chow test result shows the FE value of the model is less than t-α, which indicates the FE model is better than the OLS model. Therefore, it needs a further test, i.e. the Hausman test for determining the best model between FE and RE test. The determination of the best model between FE and RE is conducted based on p-Value (prob>chi^2). Because the Hausman test shows the p-value (prob>chi^2) is 0.0000, it indicates the FE model is better than the RE model. Therefore, the FE model is used to analyze this research.

Table 2 shows the regression analysis using the FE method assumes the intercept of each individual is different, while the intercept among individuals is fixed. Data panel regression result shows the independent variables which consist of non-food consumption expenditure, the Gross Domestic Regional Products of constant price, the inflation rate, and the poverty rate which significantly affect the food consumption expenditure in Central Java by 52.48%. Meanwhile, the rest, i.e. 47.52%, are explained by other variables which are not reflected in the model. This analysis result shows $NonFood_i$, $GRDP_i$, and Pov_i significantly affect the food expenditure, while the I_i variable does not affect the food consumption expenditure. The $NonFood_i$ and $GRDP_i$ variable positively affect the food consumption expenditure, while P_i negatively affect the food consumption expenditure.

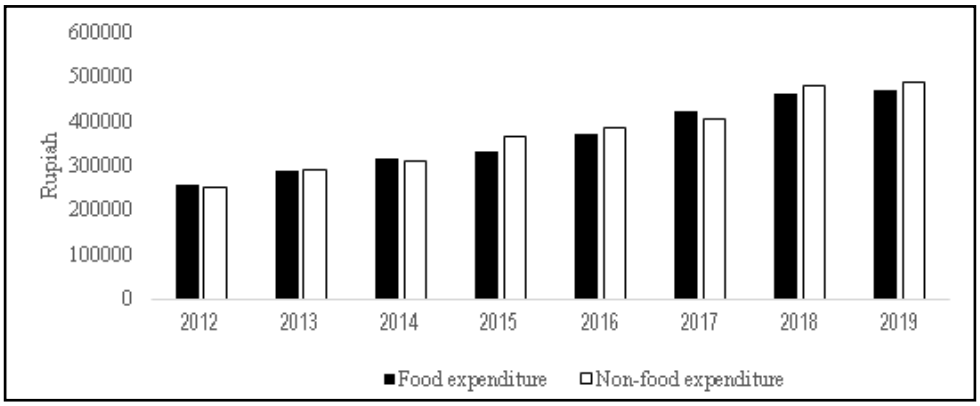

Figure 5. The consumption expenditures of food and non-food in the period 2012 to 2019 (Source: BPS, 2021b, processed data)

Table 1. The VIF value of the independent variables

Independent Variables	VIF value
Non-food consumption expenditure	4.95
Gross Domestic Regional Products (GRDP) of constant price	2.35
Inflation rate	4.11
Poverty rate	2.53

Table 2. The regression test result analysis by FE method

Variables	Coefficient	Standard error	t-test value	P > |t|
Non-food consumption expenditure	0.476295	0.030539	15.60	0.000*
GDRP of constant price	0.002465	0.0006282	3.92	0.000*
Inflation rate	-1180.31	848.7298	-1.39	0.166
Poverty rate	-18689.01	1831.66	-10.20	0.000*
Constant	366034.9	33373.07	10.97	0.000*
F-test value	0.0000			
R-square	0.5248			

Notes: * significant on α 1%, ** significant on α 5%, *** significant on α 10%

The analysis result shows the non-food consumption expenditure affects the food consumption expenditure rate in Central Java positively and significantly. A similar research result is also shown by Zainuddin et al. (2020) who investigated the food consumption expenditure determinants in East Java. The research result shows if the non-food consumption expenditure increases by 10%, the food consumption expenditure will increase by 4.76% at the 99%-confidence level. This condition states that the society's income is allocated together for food and non-food necessities. The society necessity expenditures are related to the amount of income. It means if the society earns a higher income, then the food and non-food expenditure will be higher too. The household economic conditions which are getting better will affect the household expenditure rate directly, both for main necessities for food and other needs, i.e. clothes, house, etc. Moreover, Muslim (2011) stated the consumption increase will repair the national economic condition by local product consumption as daily necessity fulfillment.

A similar result is also shown by the Gross Domestic Regional Products (GRDP) of the constant price which affects the food consumption expenditure rate in Central Java positively and significantly. This result is similar to the research by Alitasari & Yasa (2018) who analyzed the impact of the Gross Domestic Regional Products on the Indonesian society household. This research shows if the GDRP of constant price increases by 10.000 Rupiah, then the food consumption expenditure will increase by 0.02 Rupiah at the 99%-confidence level. BPS (2021c) stated the GDRP of constant price is an amount of value-added produced by all business units in a certain area, or the numbers of high-end goods and services produced by all economic units in a certain area, calculated by the prices. The value-added created by a business unit relates to the society consumption expenditure rate which includes in a variable which forms the GDRP of constant price. Because food consumption is a society's main expenditure, so the GDRP of constant price becomes the one of main determinants to enhance the food consumption expenditure. Dama et al. (2016) stated the GDRP is the main indicator to recognize the economic condition in certain areas and periods, based on constant price and constant price.

Although the inflation rate affects the food consumption expenditure rate negatively, it does

not significantly affect the test levels 1%, 5%, and 10%. The research result is similar to the research by Eriawati (2019) who analyzed the factors which affect the food consumption expenditure rate in Indonesia. This research indicates if the inflation rate is higher, then the food consumption expenditure rate in Central Java will be lower, but it is not significant. Miranti (2016) stated the food consumption is society's basic necessity. Therefore, the food price dynamics do not significantly affect the food consumption expenditures. Yet, the price of food necessities generally should not change significantly for maintaining the society's purchasing power ability.

Food price inflation affects household security because it relates to the food supply availability (Erokhin & Gao, 2020; Headey, 2013)this stability has been undergoing one of the most vigorous pressure tests ever due to the COVID-19 outbreak. From a mere health issue, the pandemic has turned into an economic threat to food security globally in the forms of lockdowns, economic decline, food trade restrictions, and rising food inflation. It is safe to assume that the novel health crisis has badly struck the least developed and developing economies, where people are particularly vulnerable to hunger and malnutrition. However, due to the recency of the COVID-19 problem, the impacts of macroeconomic fluctuations on food insecurity have remained scantily explored. In this study, the authors attempted to bridge this gap by revealing interactions between the food security status of people and the dynamics of COVID-19 cases, food trade, food inflation, and currency volatilities. The study was performed in the cases of 45 developing economies distributed to three groups by the level of income. The consecutive application of the autoregressive distributed lag method, Yamamoto's causality test, and variance decomposition analysis allowed the authors to find the food insecurity effects of COVID-19 to be more perceptible in upper-middle-income economies than in the least developed countries. In the latter, food security risks attributed to the emergence of the health crisis were mainly related to economic access to adequate food supply (food inflation. The food price fluctuation is a major factor that determines the society's food consumption expenditure rate (Heriyanto, 2016). The efforts to stabilize the food price should not give benefits to the consumers as the benefit receivers, but also as the producers, the farmers should be considered by stabilizing the price of farm product input-output, i.e. seeds, fertilizers, pesticides, etc. Andriati & Sudana (2011) stated that the policy of the Highest Retail Price (HRP) of the urea fertilizer is not effective because the fertilizer price paid by the farmers tends above the HRP.

Food consumption expenditure is a basic need of society. It causes the dynamics of food prices to tend not to have a significant effect on food consumption patterns. Price stabilization should not be the one strategy in meeting food consumption but also it is influenced by various factors, i.e. food availability, food accessibility, and food quality. Therefore, the strategy for fulfilling the food consumption should be adjusted to the pillars of food security, so the strategy to fulfill food consumption can be addressed comprehensively.

The poverty rate significantly affects the food consumption expenditure in Central Java. If poverty increases by 0.01%, then the food consumption rate will decrease by 186.89 Rupiah at the 99%-confidence level. Adiana & Karmini (2012) stated if the household income level is higher, then the food consumption expenditure rate will be higher too. Haryatingsih & Haviz (2019) revealed the behavior of pre-prosperous inhabitants tend to expense their income for food consumption compared to non-food consumption.

The poverty rate is measured based on the society's ability to fulfill their basic necessity both food and non-food. BPS (2021d) stated the poverty rate is measured by the basic necessity fulfillment ability concept. Therefore, poverty is viewed as an inability from the economic side to fulfill the necessity of both food and non-food measured by the expenditure side. Ananda (2015) stated the consumption expenditure is a tool to determine the poverty line. The inhabitant who has the average expenditure per capita per month

below the poverty line is categorized as a poor inhabitant.

The research result shows that the poverty rate significantly affects the food consumption rate. It means the main strategy to fulfill the food consumption is decreasing the poverty rate. BPS (2021d) stated the poverty rate in Central Java during the period 2012 to 2019 did not change significantly. This condition indicates that efforts for fulfilling the basic necessity of both food and non-food in Central Java have not been achieved.

Mostly the poverty rate is affected by the consideration level of health and nutrition for supporting the life-expectancy value (Tisniwati, 2012). The purchasing power and food supply are the main factors that affect the household nutrition intake (Lipoeto et al., 2013). Many factors affect the society's basic consumption fulfillment failure caused by socio-cultural, psychological, demographical, personal character, past time experience, and certain motivation factors, such as diet pattern (Mak et al., 2012; Nemecek et al., 2016). Besides those factors, behavior, faith, religion, and moral obligation become the determinant variables in consuming halal food in Indonesia (Vanany et al., 2019).

3.2 Discussion

The household prosperity rate is the main factor to determine the consumption expenditure rate. It is generally reflected by the household income. Kostakis (2014) stated that the household food consumption expenditures are affected by the demographic and sociodemographic condition, i.e. income, gender, age, marital status, area, and employment sort. Yudaningrum (2011) explained the income is the main factor to determine household expenditures, including the food consumption pattern. If the income increases, then the consumption pattern will be various.

At a certain time, the household income will affect consumption. If the income is higher, then the expenditure will be higher too, and vice versa (Pujoharso, 2012). In their research, Lindawati & Saptanto (2014) found that the sort of food in the food consumption expenditure allocation should be considered as the nutrition intake effort, i.e. energy, carbohydrate, protein, vitamin, fat, etc. The research result shows the fish cultivators' household food security condition in Subang Regency is classified in troubled status because of the incorrect allocation of food consumption expenditure, i.e. use more for tobacco (cigarette) consumption.

The food expenditure segment reflects the household food security condition, i.e. if the household food expenditure is higher than the non-food expenditure, then the food security will be lower. It indicates if the household income is higher, then the non-food consumption expenditure proportion will be higher than the food consumption expenditure (Arida et al., 2015; Fatimah & Syamsiyah, 2018; Purwaningsih et al., 2015; Sinaga et al., 2014). Because the society whose income is classified as middle-up has enough income for fulfilling the food consumption, their income will be used for the non-food consumption, i.e education, health, investment, lifestyle, self-quality enhancement necessities, etc. The society whose income is middle-low tends to act, on the contrary, i.e. most income allocation is used for the non-food necessity fulfillment.

As a basic necessity, food consumption has still been the main problem for most societies. The efforts to fulfill the society's food consumption relate to the food security status which does not just consider the food intake, but also the food quality or nutrition. FAO (2013) explained the food security has four main pillars, i.e. food availability, food accessibility, food utilization, and food nutrition. Berry et al. (2015) stated the strategy to fulfill the household food consumption should not just focus on the household ability in accessing food, but also the balanced-nutrition food intake necessity fulfillment. Hadi et al. (2020) revealed Indonesia has not succeeded yet to solve the nutrition problem of children recognized by the indicator of stunting or the toddlers' weight. By this reason, it is crucial to be included the strengthen food security being the one of strategies of fulfilling the food consumption necessity.

Specifically, Figure 5 summarizes the strategy to fulfill the food consumption necessity

based on analysis results and literature reviews. There are three strategies fulfilling the food consumption need, i.e. strengthen the food security dimensions, optimalization of agriculture value chain, and enhance the social prosperity.

The household food consumption fulfillment is affected by income amount which is an indicator of prosperity rate. If the society's prosperity rate is higher, then the household expenditure rate will be higher too (Nurhemi et al., 2014). Yet, the food consumption fulfillment does not completely affect the household food security status positively. This condition is not just caused by income level, but also the external factors, i.e. socio-cultural, geographical, economic, political condition, etc.

The effort to fulfill society's food consumption is an altogether obligation between government and society morally, socially, and legally (Kementerian Perdagangan, 2013). The individual food feasibility fulfillment is an essential of food security reflected by the food supply, i.e. both amount and quality, safety, variety, nutrition, balance, feasible price, and it does not against the religion, the faith, and the culture of the society (Cafiero et al., 2014; Farcas et al., 2021; Gerlach & Loring, 2013).

This research shows the food consumption expenditure negatively correlates to the poverty rate, which means if the food consumption expenditure rate is higher, then the poverty rate will be lower. The efforts for eliminating poverty should be directed to the basic food necessity fulfillment considering the food intake "the filling of my plate." (Alifiana, 2018; Karwati, 2017) revealed that the society prosperity enhancement by income enhancement needs to conduct by microeconomic strategies such as the entrepreneurship ecosystem establishment based on conducive local resources. According to this scheme, the number of tourists does not just increase, but also the entrepreneur capability quality. In addition, it needs an effort to establish labor-intensive job fields. As it maintains the society's purchasing power of the food material, food consumption fulfillment will be achieved.

According to this research result, it shows the inflation rate affects negatively to the food consumption expenditure, but it is not significant. By this result, the strategy to fulfill the food consumption is not only the affordability food, but also all of the food security pillars, i.e. the food availability, accessibility, and quality.

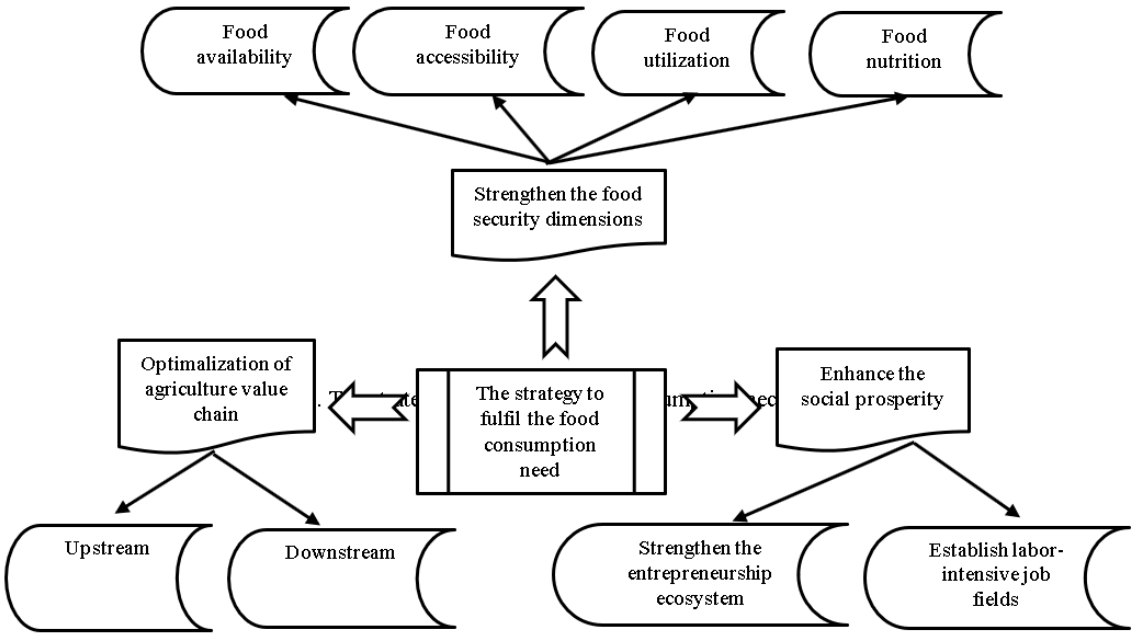

Figure 5. The strategy to fulfill the food consumption necessities of society

The food price feasibility is a food security pillar as the food product purchasing power strengthening form. Yet, it needs to consider the price stabilization of agricultural input-output to achieve agribusiness sustainability. Rivai & Anugrah (2016) stated the food security is one of the main intension in sustainable agriculture. Food consumption fulfillment intends to eliminate poverty and the society's nutrition status enhancement.

Because there is an income imbalance between rural and urban inhabitants in Central Java Province, the households which status are "the food impermanence" tend to be more in rural areas. About 52.2% of households in rural areas are classified as "the food impermanence", and so are the rest, i.e. about 47.8% of households in urban areas (Vinahari, 2019). Although the household numbers in Central Java which had "food security status" tended to increase from 2014 to 2016, yet the households having Recommended Dietary Allowances (RDA) which was less than 70% also increased. It indicates it needs some strategies to strengthen the food security in Central Java.

The food security pillars should be prioritized in the strategies to eliminate poverty by food consumption fulfillment. Jamal et al. (2018) said the agricultural innovation system is a strategy to support the agricultural establishment sustainability which guarantees the food supply and the farmers' prosperity repairment. As some efforts to maintain the food availability and accessibility, there are some factors needed to consider, i.e. the adoption of knowledge and technology to enhance productivity, logistic innovation, infrastructure repairment, and supply chain management, etc. The food consumption fulfillment is prioritized to the local food resources as the national food reserves. The government acts essentially in the policies formulation to enhance the society's food security status. As the food reserves are prioritized from the national food resources, it needs society's role and element, mainly they work in agricultural unites.

The national food fulfillment sustainability should be formulated by considering the aspects from various dimensions, i.e. economic, environmental, sociocultural, etc. That statement is similar to Lang & Barling (2012) who said there is a food security concept difference between the past theory and the latest theory. According to the past theory, food security just focuses on food production enhancement. Meanwhile, according to the latest theory, it focuses on the sustainability aspects covering the aspects, i.e. social, economic, and environmental. Berry et al. (2015) explained the relationship between food security and sustainability. The security pillars and sustainability dimensions, i.e. social, economic, and environmental, such as the natural resources and climate change have reciprocal relationships as an ecosystem. According to the economic dimension, as the food utilization is directed to the agribusiness actors, mainly the farmers as the food producers, there is an enhancement of the Farmers Exchange Rate.

The farmers' prosperity should be prioritized in maintaining the food product price stability, both by the stabilization of supply and agricultural inputs' price. That strategy is used to maintain agricultural sustainability and national food. Retno et al. (2018) stated the global food security is a big challenge, then it needs collaboration, both by the multidiscipline and holistic approach, for contributing more effectively to decrease poverty and malnutrition. Raj & Bhattacharjee (2017) stated the keys for enhancing agricultural competitiveness are the enhancement of commodities' innovation, creativity, and value-added.

The research by Mahadevan & Hoang (2016) in Vietnam shows there is a negative correlation between the poverty rate, both in urban areas and rural areas, with the calorie intake level. It means, if the poverty rate of a household is higher, then the calorie intake level is lower. According to that research, the national food necessity fulfillment is wished to cover all sides, mainly the side with middle-low income who are in the rural and urban areas.

The efforts to fulfill the food consumption should be observed from the environmental dimension by the utilization of food resources, i.e. it should consider the biodiversity environmental sustainability. Misra (2014) explained the food security status is also affected by the factor of

climate and weather because it relates to the food supply availability. A sociocultural dimension approach is needed as an effort to enhance the food security status enhancement by emphasizing the human resources as the main actor. Jamal et al. (2018) stated the food security policies should consider things comprehensively and integratively based on the technical, economic, social, and environmental aspects, to make it simple for policymakers to determine the options of policy and program wanted to be achieved.

As Indonesia is popular with its high biodiversity, it has abundant local food resources (Rijanta et al., 2013). That main capital should balance with the regulation providing benefits to the society. As an effort to fulfill the food consumption, it needs a new food product invention and a food product value-added enhancement. The new food product innovation should be prioritized for local food resource utilization (Berti & Mulligan, 2016; Dwivedi et al., 2017). Traditional local food which is often consumed by rural communities has more complex and healthy nutrition (Kumar et al., 2021).

Jamal et al. (2018) stated the food utilization based on local food resources is an obligation to fulfill food consumption fulfillment. Food quality is also an essential factor to maintain food security because it relates directly to society's health and nutrition status.

In addition, considering the supply, food accessibility is also an essential factor to establish national food security. The product distribution relates to the area infrastructure condition which affects the food product logistics. The value chain optimization is an effective approach to strengthen food security because it relates directly to the global food system (Capone et al., 2014; Farmery et al., 2021). The agricultural supply chain management is the main determinant as an effort to fulfill the food consumption by accessibility aspect (Ahmed et al., 2014).

Food distribution affects food's safety, quality, and supply. The research conducted in three big cities, i.e. Samarinda, Balikpapan, and Tarakan shows a long distribution chain-link causes a difficulty to monitor the pollution, then it dangers human health. In addition, the food quality will decrease along with the distribution (Sukartiningsih et al., 2014). As the agricultural actors, i.e. farmers and consumers accept higher economic profit, value chain optimization is needed. For achieving the national agricultural competitiveness by agricultural products which have the competitive and comparative advantage, it needs the innovation, the latest knowledge, and technology (Boehlje et al., 2011; Sokolova & Litvinenko, 2020). Innovation is the crucial process for entrepreneurial competitiveness. It is distinguished by four area: product, process, organizational, and marketing (Geldes & Felzensztein, 2013). The innovative activity will ensure the effective of agricultural production, I.e. labor productivity growth, resource savings and cost reduction, increasing the volume and efficiency (Collier & Dercon, 2014).

The agricultural supply chain management establishment which is competitive and sustainable needs cooperation with various sides, i.e. academicians, researchers, central government, local government, and agribusiness actors such as farmers, experts, and entrepreneurs. It should ensure that the society obtains food that is of good quality and nutritious to implement a better Indonesian Health Index. In addition, to consider the upstream aspect such as food innovation, it also needs a healthy lifestyle training by food intake which has balanced nutrition.

According to the result analysis, the strategies for fulfilling the food consumption in Central Java are as follow: 1) the society prosperity enhancement by strengthen the entrepreneurship ecosystem and establish the labor-intensive job fields, 2) the agricultural value chain optimization, 3) the price stabilization of food and agricultural inputs, 4) the acceleration of physical and digital infrastructures for food product accessibility easiness, 5) strengthen the food security dimensions, 6) the adoption of technology and knowledge for local food resources utilization, and 7) the training of healthy lifestyle importance by food nutrition intake feasibility. For achieving the food consumption fulfillments which are sustainable, competitive, and inclusive,

the food consumption fulfillment strategy formulation should be conducted comprehensively by stakeholders.

4. Conclusions

This research shows the food and non-food consumption expenditure allocations in Central Java tend to increase along the year by nearly similar expenditure amount proportion tendency. The regression test shows some factors that affect the food consumption expenditure positively and significantly, i.e. the non-food consumption expenditure, the GDRP of constant price, and the poverty rate. Meanwhile, the inflation rate does not affect significantly.

The food consumption fulfillment strategy formulations in Central Java are as follow: 1) the society prosperity enhancement by strengthen the entrepreneurship ecosystem and establish the labor-intensive job fields, 2) the agricultural value chain optimization, 3) the price stabilization of food and agricultural inputs, 4) the acceleration of physical and digital infrastructures for food product accessibility easiness, 5) strengthen the food security dimensions, 6) the adoption of technology and knowledge for local food resources utilization, and 7) the training of healthy lifestyle importance by food nutrition intake feasibility. For achieving the food consumption fulfillments which are sustainable, competitive, and inclusive, the food consumption fulfillment strategy formulation should be conducted comprehensively by stakeholders.

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