



The impact of food aid digitization on prevalence of food insecurity in Indonesia

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Abstract

This study aims to assess the effect of food aid on the prevalence of household food insufficiency in Indonesia. The distribution of food aid in-kind (Rastra, Beras Sejahtera) and cash/digital (BPNT, Non-Cash Food Assistance) is compared to prove whether the digitalization of food aid can reduce the prevalence of food insecurity. A quantitative approach using the difference-in-differences (DiD) method is applied to 8 (eight) years of data from the National Socio-Economic Survey (SUSENAS) 2015-2022. Then, a qualitative approach using the in-depth interview method with food aid recipients was conducted to support and complement the quantitative study. The results of the quantitative study prove that the digitalization of food aid has actually resulted in an increase in the prevalence of food insecurity in beneficiary households. In addition, there are inclusion and exclusion errors in aid distribution that affect the effectiveness of the program. The distribution of food assistance through BPNT led to an increase in food insufficiency among beneficiary households. Calorie consumption per capita shows a significant relationship in increasing food insufficiency. On the other hand, household expenditure, per capita expenditure and food expenditure show a positive direction of significance which will decrease the likelihood of households experiencing food insufficiency. Food aid plays an important role in reducing food insufficiency, but non-targeted distribution can reduce its effectiveness. Therefore, it is concluded that food assistance and digitalization of food assistance have a significant effect on increasing food insufficiency. In addition, the BPNT distribution mechanism needs to be thoroughly evaluated considering that this program has proven ineffective in reducing food insecurity. The evaluation should include the distribution process, the amount of assistance, and the accuracy of target recipients. Efforts to improve food access through food price stabilization also need to be a priority to overcome food insufficiency in a sustainable manner.

Keywords: Food aid, food insufficiency, BPNT, rastra, difference-in-differences, Indonesia

Introduction

The National Priority "Improving Quality and Competitive Human Resources" has been on the main agenda for the past ten years. This priority is realized through various activities that are measured using various indicators. The success of the development program is reflected in a number of indicators that show significant progress, including an increase in the proportion of the population covered by the Social Security Program which reflects the expansion of people's access to health insurance and social protection. In addition, the decrease in the Maternal Mortality Rate and Infant Mortality Rate showed an improvement in the quality of maternal and child health services. Other indicators, such as the Child Protection Index, also show a positive increase in efforts to protect children's rights. This achievement is the result of various programs and policies that are implemented in an integrated and sustainable manner. However, there are still indicators that need attention because the achievement has not been on target, including the prevalence of stunting and wasting in toddlers and the proportion of poor and vulnerable households who receive social assistance from the government.

The implementation of this National Priority uses development funding, with the central government focusing on spending allocation on quality improvement in three

main sectors, namely health, education, and social protection. Concrete efforts are made to reform the national health system to expand access and improve the quality of health services, improve the quality of education at all levels, and strengthen social protection programs for vulnerable communities. The government also targets the acceleration of the reduction in maternal mortality and stunting prevalence as indicators of human development success (Presidential Regulation Number 52 of 2023)^[26].

Development funding for this third National Priority requires a budget of IDR 233 trillion, an increase from IDR 227 trillion in 2023. Of this amount, the Priority Program "Strengthening the implementation of social protection" received a fund allocation of Rp153 trillion, of which 67.3% or around Rp103 trillion was budgeted for Social Assistance and Targeted Subsidies. One of the activities in this program is the distribution of food assistance through the Cheap Basic Food Card with a target of 18.8 million families by 2024. The distribution of food aid aims to free Indonesia from the phenomenon of hunger and malnutrition.

In the period from 2018 to 2022, it was recorded that the prevalence of stunting decreased from year to year, but the prevalence of food insecurity (PoU) actually increased, which could be caused by an increase in food prices. Food insecurity in households affects the growth and development

of children and toddlers, which ultimately determines the quality of Indonesia's human resources. Although the non-cash food assistance program aims to improve food access for poor families, it has not been able to fully address the problem of food accessibility, one of which is due to high food commodity prices. This price surge limits the purchasing power of people, especially the poor, so that it is difficult for them to meet their food needs adequately. Therefore, more comprehensive efforts are needed, such as stabilizing food prices, increasing food production, and strengthening the food distribution system (Ilman and Wibisono, 2019)^[19].

Rice prices, as the main food commodity, showed an upward trend from 2017 to 2020, had decreased in 2021 due to rice import policies to maintain price stability and supply availability, and increased again in 2022 (Pamungkas *et al.*, 2023)^[24]. The achievement of the 2nd Sustainable Development Goals (SDG's), namely No Hunger, is measured by the prevalence of insufficient food consumption. Some of the factors that affect this indicator include rice production per capita, expenditure per capita, and local government social assistance expenditure per capita. Increasing rice production, people's purchasing power, and social assistance from local governments can improve people's access to food. On the other hand, high monthly food inflation actually increases the number of people who experience insufficient food consumption (Solana, 2022)^[31].

In Indonesia, the transformation of food aid into a digital form began since the issuance of Presidential Regulation Number 63 of 2017, which changed the distribution of aid from the form of Raskin/Rastra to food ingredients such as rice, eggs, and sugar that can be exchanged for basic food cards. This transformation aims to make the assistance more targeted and in accordance with the unique needs of each household. Studies in various countries show that, compared to cash assistance, in-kind assistance is able to increase the calorie consumption of the beneficiaries the most. However, several studies show that Non-Cash Food Assistance (BPNT) in Indonesia still has challenges in increasing diverse and nutritious consumption.

Materials and Methods

This study examines the effect of food assistance on the prevalence of food insecurity in households, by comparing two periods of aid distribution: Rastra (2015–2017) and BPNT through e-vouchers (2018–2022). The variables analyzed included the prevalence of food insecurity as a dependent variable, and food assistance and digitization of food assistance as independent variables, while control variables included household calorie levels, household expenditure, and expenditure for food categories. Secondary

data from the National Socio-Economic Survey (SUSENAS) in 2018–2022 was used as the main data source. The analysis was conducted using the Difference-in-Differences (DiD) model to evaluate the impact of changes in aid distribution methods on the prevalence of food insecurity. The data sources in this study are entirely derived from secondary data, namely household level SUSENAS and data from the provincial Central Statistics Agency (BPS). Details of the operationalization of variables and data sources are presented in table 1.

This research also involves a qualitative approach with interviews with food aid recipients to understand their perception of the aid received and the impact of changes in distribution methods. The main hypothesis tested is whether there is a significant influence between food aid and changes in distribution methods on the prevalence of food insecurity. The empirical model used for the data analysis includes several control variables such as per capita calorie consumption, household expenditure, and household food expenditure.

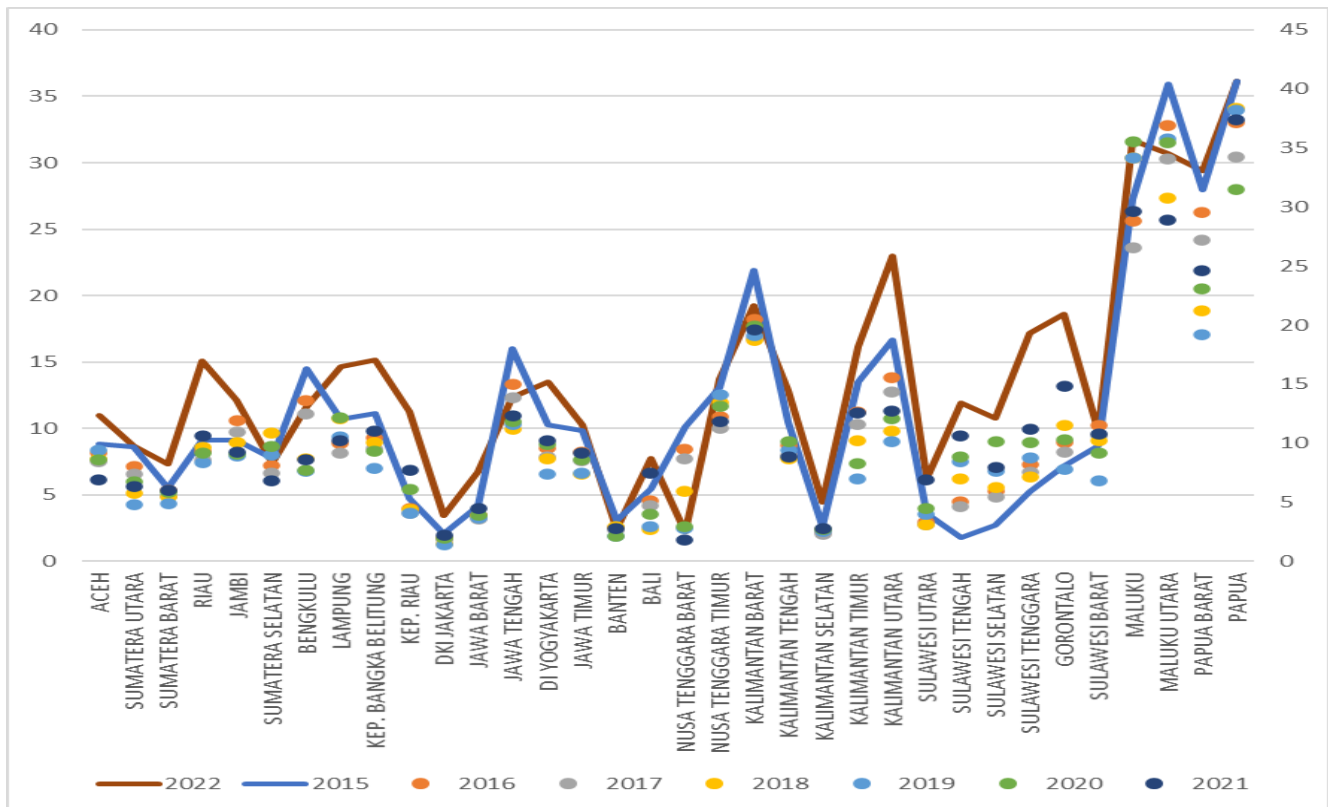
Results and Discussion

Result

Descriptive Statistical Analysis

Descriptive statistical results for the period 2015 to 2022 with the number of observations as many as 2,499,270. The mean value of food aid is smaller than the standard deviation and is close to the minimum value, which is 0. This shows that the distribution of data is more homogeneous. In contrast, in the variable of food aid digitization, the average value was higher compared to the standard deviation, which indicates a more varied distribution of data. Both variables have the same minimum and maximum values, namely 0 and 1, because they are both dummy variables. From the table, it can be seen that the average recipient of food assistance is only 26% of the total observations of 2,499,270 (Susenas, 2015-2022).

In the variable prevalence of food insecurity, the lowest prevalence rate was recorded at 0.218 points in North Sumatra province in 2016, where at that time food assistance was still in the form of Rastra. The lower the prevalence ratio, the higher the level of food insecurity that occurs in households. This is related to food aid receipts, where households with a prevalence of 0.218 points do not receive food assistance, which is indicated by a value of 0 on the food assistance dummy variable. In contrast, the highest prevalence was recorded in West Papua province in 2015, with a score of 1365.35 points. Figure 1 shows that the lowest level of food insecurity occurred in the province of DKI Jakarta in 2019, while the highest occurred in the province of Papua in 2015.



Source: BPS, 2023^[11]. Reworked by the Author

Fig 1: Prevalence of Food Insufficiency by Province Year 2015 to 2022

For the variables of calories per capita, household food expenditure, household expenditure, and per capita expenditure, the mean values across all control variables were higher compared to standard deviation, indicating that the distribution of data was heterogeneous or highly variable. The prevalence variable in table 1 uses the food insecurity ratio, where the smaller the ratio produced, the higher the food insufficiency that occurs in the household. With an average value of 6.43, in the next table, an analysis was carried out related to the prevalence of food insecurity, which was categorized as low (0-6), medium (6.1-13), and high (>13).

The distribution of samples by category of food aid recipients can be explained that the number of households that do not receive food assistance is more than those that receive assistance. In households that receive food assistance, the majority have a prevalence of food insecurity that is in the low category, which means that they experience food insecurity that is quite severe compared to other categories. This reflects the suitability of the purpose of receiving food assistance, which is indeed aimed at food-

insecure households. In the control variables, households that did not receive assistance had higher averages in terms of calories per capita, food expenditure, household expenditure, and per capita expenditure compared to households receiving assistance.

However, the average difference between the recipient and non-recipient groups on the control variable tended to be insignificant. In the distribution of food aid, both through the Rastra and BPNT programs, there are errors of inclusion and exclusion. Inclusion error occurs when food aid recipients have greater food expenditure than the food poverty line, while exclusion error occurs when households that have food expenditure below the food poverty line do not receive food assistance. Table 1 shows the largest inclusion error occurred in 2016, with 39.23% of aid recipients having food expenditures greater than the food poverty line. Overall, the level of inclusion errors decreased after the distribution of food aid switched to BPNT. On the other hand, exclusion errors actually increased after the change from Rastra to BPNT, with the largest exclusion error occurring in 2020, at 84.33%.

Table 1: Inclusion Errors for the Period 2015 to 2022 Based on food production compared to the food poverty line

Year	Receiving Food Aid		Not Receiving Food Assistance		Total Obs
	Obs	%	Obs	%	
2015	104.668	36,88	179.169	63,12	283.837
2016	113.226	39,23	175.408	60,77	288.634
2017	101.954	34,48	193.742	65,52	295.696
2018	104.139	35,45	189.611	64,55	293.750
2019	56.342	17,95	257.604	82,05	313.946
2020	50.378	15,15	282.045	84,85	332.423
2021	62.858	18,58	275.493	81,42	338.351
2022	64.926	19,20	273.198	80,80	338.124
Total	658.491	26,50	1.826.270	73,50	2.484.761

Source: Susenas 2015-2022 data, processed using Stata 18

Table 2 shows the exclusion error, where more and more households do not receive food assistance even though their food expenditure is below the food poverty line. These

results show that food aid distribution is often not on target, both in terms of inclusion and exclusion, which can affect the effectiveness of the program

Table 2: Exclusion Errors for the Period 2015 to 2022 Based on food production compared to the food poverty line

Year	Receiving Food Aid		Not Receiving Food Assistance		Total Obs
	Obs	%	Obs	%	
2015	1.294	62,48	777	37,52	2.071
2016	1.787	64,28	993	35,72	2.780
2017	869	55,00	711	45,00	1.580
2018	852	60,64	553	39,36	1.405
2019	426	24,68	1.300	75,32	1.726
2020	283	15,67	1.523	84,33	1.806
2021	457	27,19	1.224	72,81	1.681
2022	399	27,33	1.061	72,67	1.460
Total	6.367	43,88	8.142	56,12	14.509

Source: Susenas 2015-2022 data, processed using Stata 18

Estimating Results Using Difference in Differences (DiD)

In the application of the Difference-in-Differences (DiD) method, there are a number of prerequisites that must be met. These include the existence of clearly defined treatment and control groups, the availability of time periods before and after policy interventions, and the fulfillment of parallel trend assumptions (Card & Krueger, 1994) [14]. In this study, policy interventions were introduced in 2017 and officially enacted in 2018, accompanied by the publication of guidelines for their implementation. Given that the policy is implemented nationally in all Indonesian provinces, the researchers used an intensity approach to classify treatment and control groups. This approach refers to the method developed by Lucas & Mbiti (2012) [23].

The intensity determination was carried out by considering the proportion of households whose food expenditure is

below the food poverty line and receive food assistance. The average percentage of households receiving food assistance, which was recorded at 36%, was used as a threshold in determining the treatment and control categories. After group identification, a parallel trend assumption test was carried out through p-value analysis and graphs. If the p-value exceeds 0.05, then the parallel trend assumption is considered to be met, indicating that there is no significant difference between policy periods. Based on Figure 2, the prevalence of food insecurity increased from 2015 to 2016 and decreased in 2017, a period when food assistance was still in the form of Rastra. After 2018, the prevalence decreased again with a gap pattern between treatment and control groups that was smaller than during the Rastra period

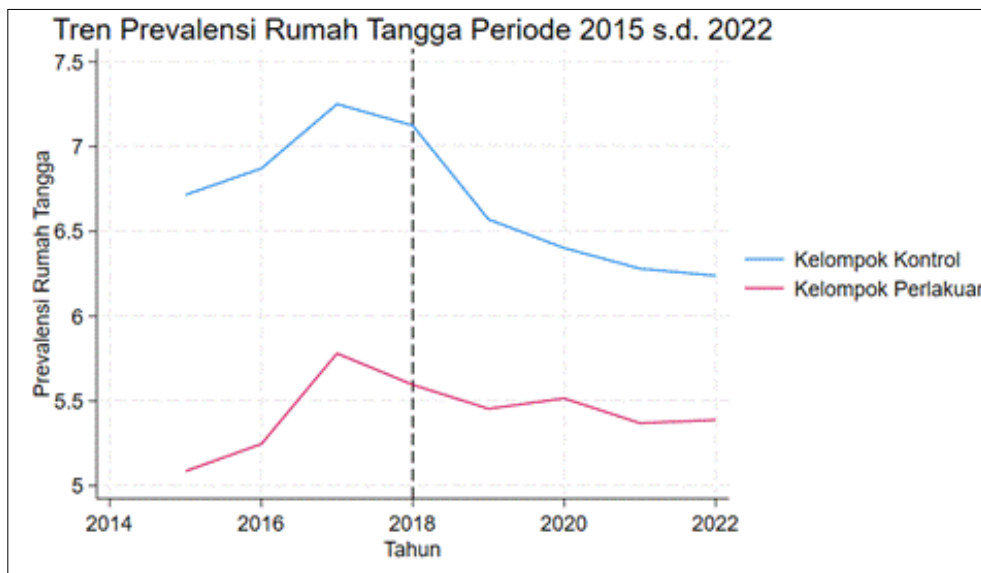


Fig 2: Parallel testing of trends in the prevalence of malnutrition

After the parallel trend assumption is met, the analysis is continued by examining the impact of food aid digitization on the prevalence of food insecurity using the DiD method. The regression results for the period 2015–2022, shown in Table 3, show that all study variables had a significant effect at a significance level of 1%. The main variable indicates the direction of the negative coefficient, while the control

variable indicates the direction of the positive or negative direction. The positive coefficient in the food expenditure variable indicates that an increase in food expenditure by 1% has the potential to increase food sufficiency by 5.316%, in line with the findings of Sehusman *et al.* (2022) that food expenditure is an indicator of household welfare.

Table 3: Regression Results with DiD method for observation for the 2015-2022 Period

Variable	Prevalence of food insecurity (Ratio)
Food Aid	-0.387 (-103.72)
Treatment*Time	-0.105 (-17.42)
Calories per capita	-0.121 (-15.05)
Household food production	5.316 (239.91)
Household expenditure	0.225 (10.58)
Per capita expenditure of households	0.335 (24.34)

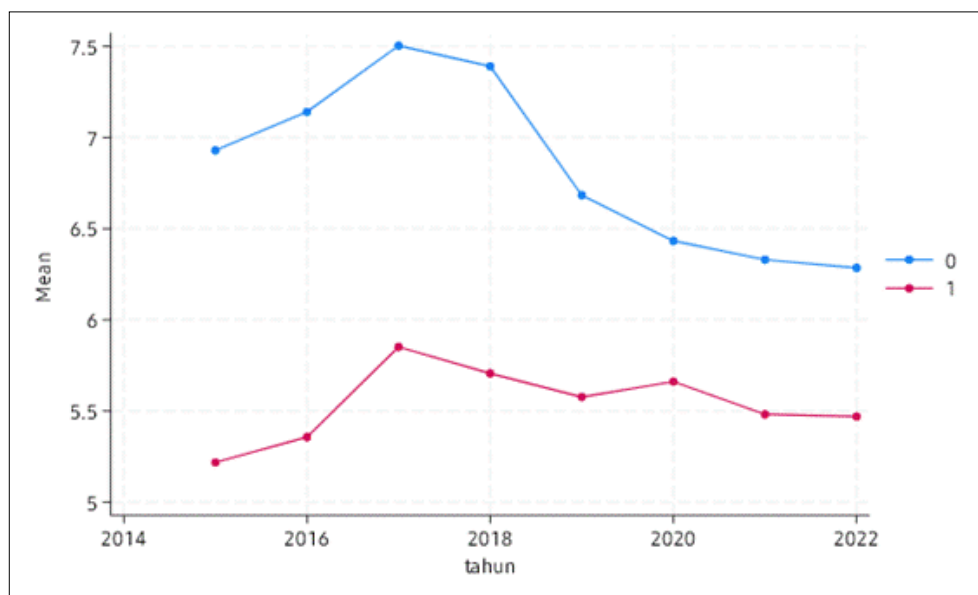
The level of p-value significance is 1% with the symbol ***
Food production ratio and food poverty line

For the food assistance variable, the resulting coefficient was negative, consistent with the interaction between treatment and the BPNT distribution period, which showed that food assistance reduced the prevalence ratio of food inadequate by 0.387% and 0.105%, respectively. This means that the greater the food assistance in the BPNT period, the possibility of households experiencing food insecurity increases. This is in line with Temple *et al.* (2019) [34] who stated that the type of social assistance has an effect on food security risks, as well as a World Bank report (2017) [36] which revealed that there is an inaccuracy of the target in the distribution of food assistance. In addition, in practice, the BPNT program is often not carried out according to the mechanism due to the dominance of agents in food packaging (Kiswanto, 2021) [22].

The variables of household expenditure and per capita expenditure both showed positive and significant coefficients, of 0.225% and 0.335%, respectively. This indicates that the increase in these two variables reduces the probability of households experiencing food insecurity. Both are also indicators of the poverty line, which can be used to determine food aid recipients (Adji & Maulana, 2020) [1]. In other words, households with higher expenditures are less likely to receive food assistance because they are considered economically capable.

In contrast, the per capita calorie variable showed a negative coefficient, which means that increased calorie consumption is actually correlated with food insecurity. Each increase in per capita calorie consumption of 1% decreases the prevalence ratio of malnutrition by 0.121%. This finding is interesting because theoretically, households with food insecurity are expected to have low calorie consumption. This increase in calorie consumption in food-insecure households is likely due to a diet dominated by carbohydrate sources without paying attention to the balance of micronutrients (Angeles *et al.*, 2021) [6].

If we compare the prevalence trend of food insecurity between recipient and non-recipient households during 2015–2022, it can be seen that the prevalence among aid recipients tends to be higher than non-recipients. Figure 3 shows that food aid recipients generally come from households with food insecurity. However, the prevalence of food insecurity in non-recipient households is also decreasing, indicating that some households that do not receive assistance continue to experience food insecurity. In 2017, there was a sharp spike in the prevalence ratio of food insecurity, indicating that fewer and fewer households experienced food insecurity that year.



Description: Receiving Food Aid (1), Not Receiving (0)

Fig 3: Trends in the Prevalence of Food Insufficiency and Food Assistance for the Period 2015 to 2022

Based on the results of the table, the use of dummy variables on dependent variables shows a similar pattern of results to the use of ratios in previous tests, although the coefficient values are different. In Table 4, food assistance and BPNT distribution period have a significant negative relationship, indicating that the increase in food assistance and BPNT distribution actually increases the number of households experiencing food insecurity. However, the

value of the resulting coefficient is very small, which is 0.001. This coefficient shows that grouping variables into dummy shapes (1 and 0) leads to the loss of the ratio variation previously seen in Table 3. Thus, the use of variable dummy reduces the regression sensitivity to small changes in the amount of household expenditure as a proxy for the prevalence of food insecurity.

Table 4: Regression Results with DiD method for observation for the 2015-2022 Period

Variable	Prevalence of malnutrition (Dummy)
Food Aid	-0.001* (-4.18)
Treatment*Time	-0.002* (-4.98)
Calories per capita	0.001* (14.40)
Household food production	-0.031* (-96.13)
Household expenditure	-0.003* (-11.29)
Per capita expenditure of households	0.007* (124.06)

The level of p-value significance is 1% with the symbol *

Dummy variable: 1 if the household has household food expenditure below the food poverty line

In addition, the variable coefficients of calories per capita, food expenditure, and household expenditure show differences compared to Table 3. The use of dummy variables shows that an increase in calories per capita is related to a decrease in the likelihood of households experiencing food insecurity, in line with the use of calories as an indicator of food sufficiency (BPS, 2023; Adji & Maulana, 2020) [1, 11]. On the other hand, increased food and household spending actually increases the likelihood of food insecurity. This phenomenon can be caused by factors such as inflation, rising food prices, and the growth in the number of family members which is not balanced by an increase in income (Ilman & Wibisono, 2019; Dahiri, 2023) [19]. In general, both using prevalence ratios and dummy variables, the findings show that households receiving food assistance and BPNT actually tend to experience an increase in food insecurity.

Interview Results related to the Benefits of Digitizing Food Aid

In addition to the data analysis that has been presented previously, this section describes the results of interviews with several informants in Bintara Jaya Village, consisting of Rastra food aid recipients, BPNT, and communities that are not included food aid recipients. Suhaeti's mother, 60 years old, sells nasi uduk with a fixed income and lives with her child who has mental limitations. He is not a regular recipient of assistance, only occasionally receives rice from the village and wonders why he does not receive regular assistance. Mrs. Ikhmawati, 47 years old, an honorary kindergarten teacher, receives 10 kg of rice from Bulog every month and feels very helped, despite seeing the uneven distribution of aid in her environment. Mrs. Husnawati, 59 years old, a housewife with five children, receives BPNT worth Rp200,000 per month in cash, which she says is more flexible than the basic food assistance she previously received. Similarly, Mrs. Fitria, 51 years old, an irregular worker, who is more hoping for cash BPNT

assistance to meet various family needs. Mrs. Asmiati, 66, who runs the canteen, also prefers assistance in the form of cash rather than basic necessities that cannot be selected in content.

Meanwhile, Mrs. Eni, 43 years old, who helps her family business sell nasi uduk, is a BPNT recipient who now receives cash assistance of Rp200,000, although the disbursement is not always routine. According to him, cash assistance is more useful because it can be used for his children's urgent needs, such as school supplies. From all these interviews, it can be concluded that the informants felt that food assistance, both in the form of rice and BPNT, was very helpful for their basic needs. However, most prefer the cash assistance system because it provides greater flexibility in meeting their daily needs, compared to basic food assistance which sometimes does not suit their needs. The informants also hope that this assistance program will continue, with a fairer and more equitable distribution in the community.

Discussion

In the application of the Difference-in-Differences (DiD) method, there are several prerequisites that must be met, including the existence of clearly defined treatment and control groups, the availability of data before and after the policy, and the fulfillment of parallel trend assumptions (Card & Krueger, 1994) [14]. In the context of this study, the policy intervention began in 2017 and was officially implemented in 2018, accompanied by the publication of its implementation guidelines. Given that this policy is enforced nationally in all provinces of Indonesia, the researchers used an intensity approach to classify the treatment and control groups, referring to a method developed by Lucas & Mbiti (2012) [23]. The intensity determination was carried out by considering the proportion of households whose food expenditure was below the food poverty line and who received food assistance. The threshold used in this study is the average percentage of

households receiving food assistance, which was recorded at 36%. After group identification, a parallel trend assumption test was carried out with p-value analysis and graphs. If the p-value exceeds 0.05, then the parallel assumption of the trend is considered to be met, which indicates the absence of significant differences between policy periods. Based on the results of the analysis, the prevalence of food insecurity showed a pattern that increased from 2015 to 2016, but decreased in 2017 when food assistance was still in the form of Rastra. After 2018, the prevalence declined again with a smaller gap pattern between the treatment and control groups compared to the Rastra period.

After the parallel trend assumption is fulfilled, the analysis is continued by examining the impact of food aid digitization on the prevalence of food insecurity using the DiD method. The regression results for the period 2015–2022 showed that all research variables had a significant effect at a significance level of 1%. The main variable indicates the direction of the negative coefficient, while the control variable indicates the direction of variation, both positive and negative. The positive coefficient on the food expenditure variable shows that an increase in food expenditure by 1% has the potential to increase food sufficiency by 5.316%, in line with the findings of Sehusman *et al.* (2022) who stated that food expenditure is an indicator of household welfare. Meanwhile, the negative coefficient in the food aid variable showed that the interaction between the treatment and the BPNT distribution period actually increased the prevalence ratio of food insecurity by 0.387% and 0.105%, respectively. This indicates that the greater the food assistance received during the BPNT period, the higher the likelihood of households experiencing food insecurity. This phenomenon is consistent with the findings of Temple *et al.* (2019)^[34] who stated that the type of social assistance has an effect on food security risks, as well as a World Bank report (2017)^[36] which noted that there is an inaccuracy of targets in the distribution of food aid. In practice, the BPNT program is often not carried out according to the expected mechanism due to the dominance of agents in food packaging (Kiswanto, 2021)^[22].

The variables of household expenditure and per capita expenditure showed positive and significant coefficients, of 0.225% and 0.335%, respectively, indicating that the increase in both variables was related to a decrease in the probability of food insecurity. These two variables are also poverty line indicators used to determine food aid recipients (Adji & Maulana, 2020)^[1]. In other words, households with higher expenditures are less likely to receive food assistance because they are considered economically capable. In contrast, the per capita calorie variable showed a negative coefficient, which means that increased calorie consumption was associated with a decrease in the prevalence of food insecurity. Each increase in per capita calorie consumption of 1% decreases the prevalence of food insecurity by 0.121%. This finding is quite interesting, because in theory households that experience food insecurity should have low calorie consumption. The increase in calorie consumption in food-insecure households is likely due to a diet that relies more on carbohydrate sources without paying attention to the balance of micronutrients (Angeles *et al.*, 2021)^[6].

A comparison of the trend in the prevalence of food insecurity between recipient and non-recipient households during the 2015–2022 period shows that the prevalence of

food insecurity in aid recipients tends to be higher than non-recipients. However, the prevalence in non-recipient groups is also declining, indicating that some households that do not receive assistance still face food insecurity. In 2017, there was a sharp spike in the prevalence ratio of food insecurity, indicating that fewer households experienced food insecurity that year.

The use of dummy variables in the analysis showed similar results to the use of ratios in previous tests, although the resulting coefficients were smaller. The use of dummy variables in these tests led to the loss of ratio variations previously seen in the analysis, which could reduce the sensitivity of regression to small changes in the amount of household expenditure. In addition, the use of dummy variables changed the relationship between the variable coefficient of calories per capita, food expenditure, and household expenditure, reflecting changes in the influence of variables on food insufficiency. An increase in per capita calorie consumption, for example, indicates a decrease in the likelihood of food insecurity, while an increase in food expenditure and household expenditure actually increases food insecurity. This phenomenon may be influenced by external factors such as inflation, rising food prices, and the growth in the number of family members which is not balanced by an increase in income (Ilman & Wibisono, 2019; Dahiri, 2023)^[19]. Overall, both using prevalence ratios and dummy variables, the findings show that households receiving food assistance and BPNT tend to experience increased food insecurity.

In addition to quantitative analysis, interviews with several informants in Bintara Jaya Village provided deeper insight into the experiences of food aid recipients. The informants, consisting of Rastra and BPNT recipients, revealed that although food assistance is very helpful for their basic needs, most prefer cash assistance because of the higher flexibility in meeting various daily needs. They also expressed a desire for a fairer and more equitable distribution, as well as complaints about the uneven distribution of aid in their neighborhoods. These findings highlight the importance of improving the distribution mechanism of social assistance to better suit the needs of the community.

Conclusions and Suggestions

Conclusion

Household income plays an important role in determining food consumption patterns. Low-income households tend to allocate a large proportion of their spending to food, where the smaller the proportion, the higher the level of welfare. Although increased income can improve food consumption, rising food prices actually erode purchasing power, exacerbating malnutrition, especially in the poor. This study shows that food assistance, including digitalization from Rastra to BPNT, has a significant effect on increasing food insecurity. The shift triggered an increase in food prices in several regions and caused problems with the quality of assistance, so poor households continued to experience difficulties in accessing food. In addition, food expenditure is the main indicator of household welfare.

Other findings reveal that increased per capita calorie consumption does not necessarily reduce food insecurity, in line with a study in the Philippines that showed high carbohydrate consumption in food-insecure households. Meanwhile, the increase in per capita expenditure and

expenditure on food actually reduces food insecurity. Thus, food aid and the digitalization of food aid have a significant effect on the prevalence of food insecurity

Suggestion

Improvements are needed in the mechanism for determining aid recipients by taking into account indicators of food poverty, such as calorie consumption and food expenditure. Injustice practices, such as nepotism in aid distribution, still occur and increase the potential for fraud that has not been optimally addressed. In addition, the BPNT distribution mechanism needs to be thoroughly evaluated considering that this program is not effective in reducing food insecurity. The evaluation must include the distribution process, the amount of assistance, and the accuracy of the recipient's targets. Efforts to improve food access through food price stabilization also need to be a priority to overcome food insecurity in a sustainable manner.

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