Conditional Cash Transfer and Food Insecurity: Evidence from Low-Income Households With Children in Indonesia

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Abstract

This study examines the link between conditional cash transfers (CCTs) and food insecurity among low-income households with children in Indonesia, using data from the 2022 National Socioeconomic Survey (SUSENAS). The insecurity is assessed using calorie intake and the Food Insecurity Experience Scale (FIES), while the link is examined using binary and ordinal logistic regression models. The results indicate that insecurity is substantially higher than estimates: 82.37% based on calorie intake and 32.61% based on the FIES. These percentages highlight the disproportionate burden of food insecurity faced by vulnerable groups, with the prevalence being the highest in eastern Indonesia, particularly in Maluku, Papua, and Nusa Tenggara. The results also show that CCT is associated with a lower likelihood of both calorie- and FIES-based food insecurity.

Keywords

Calorie-intake food insecurity; conditional cash transfer; food security; Food Insecurity Experience Scale; Indonesia

Introduction

Food insecurity has increasingly affected more people annually since 2014 (Food and Agriculture Organization [FAO] et al., 2022), reaching 828 million or 9.8% of the world's population in 2021, which is an increase of approximately 46 million from 2020 and 150 million from the onset of the COVID-19 pandemic (FAO et al., 2022). These alarming numbers urge the need to strengthen the efforts to achieve Sustainable Development Goal (SDG) 2, aiming to end hunger and ensure universal access to food.

In Indonesia, food insecurity remains a persistent issue despite the economic growth and declining poverty rates (Sleet, 2020). The Economist Intelligence Unit's (EIU) Global Food Security Index (GFSI) reported that Indonesia has a moderate level of food security, scoring 60.2 in 2022 (The Economist Group, 2022). Likewise, the Food and Agriculture Organization (FAO) et al. (2022) reported that the prevalence of moderate or severe food insecurity in Indonesia was 6% in 2020, with the unaffordability of diverse, nutritious food as the primary driver.

Food insecurity refers to the lack of physical, social, or economic access to sufficient, safe, and nutritious food that meets dietary needs and preferences for an active and healthy life (FAO, 2008). This insecurity affects both present and future generations, particularly among vulnerable groups like children (Cook et al., 2004), whose health outcomes remain affected until middle childhood (Schmeer & Piperata, 2017). Poverty is the leading cause of such insecurity in Indonesia (Maitra, 2018; Sen, 1982), as it often leads to poor child-rearing practices, such as early weaning and inadequate diets (Fram et al., 2015; Saha et al., 2008). The rate of food insecurity among poor households with children is at around 50.55% of the general population (Yunita, 2021), driven by low-income levels, education, access to food sources, land ownership, sanitation, access to clean water, and availability of health services (Ballard et al., 2013).

Government assistance programs can reduce food insecurity by improving household purchasing power (Alvarez et al., 2015; Barrett, 2002; Davy et al., 2015). In this case, poor households can avoid negative coping strategies, such as reducing meal size or quality, selling productive assets, or diverting education expenses to food purchases, which will exacerbate vulnerability (FAO, 2015). Social protection can also mitigate these adverse coping mechanisms by increasing access to nutritious food (Brugh et al., 2018). In the long term, cash assistance can also improve human capital (Devereux, 2016; Hanlon et al., 2012).

The government of Indonesia has implemented both unconditional transfer programs, such as direct cash assistance (*Bantuan Langsung Tunai* [BLT]), and conditional cash transfer (CCT) programs, such as the Family Hope Program (*Program Keluarga Harapan* [PKH]). The PKH is Indonesia's first and largest CCT program, targeting low-income families to improve nutrition, education, and health outcomes. Unlike unconditional programs such as BLT, which primarily aim to cushion short-term income shocks, PKH is designed to reduce intergenerational poverty by investing in human capital through education, health, and maternal care (Indonesian Ministry of Social Affairs, 2022). In addition to school attendance and healthcare utilization, PKH is expected to improve household food consumption, which, in turn, influences cognitive development, physical health, and academic performance (Schmeer & Piperata, 2017). Considering the importance of PKH, assessing its impact on food security is urgent to ensure the program achieves its long-term developmental goals.

Since cash assistance can improve access to food (Bhalla et al., 2018), income support programs such as cash transfers or food credit can be effective in tackling food insecurity (Barrett, 2002; Ellis, 1998; Gladwin et al., 2001; Hidrobo et al., 2014). However, the evidence remains mixed and context-specific (Banerjee et al., 2015; Basu & Wong, 2015; Haushofer & Shapiro, 2016), with some studies reporting limited or null effects, possibly due to the modest amount or misuse of funds for other purposes, such as debt repayment or asset purchases. Therefore, further empirical investigation is needed, especially in more diverse settings (Haushofer & Shapiro, 2016; Tiwari et al., 2016).

This study aims to fill the gaps and contribute to the literature by addressing several critical aspects. First, although evidence suggests that cash transfers can reduce food insecurity, outcomes remain inconsistent and context-dependent, reinforcing the need for country-specific evaluations, especially in complex socioeconomic settings such as Indonesia. Second, this study focuses on low-income households with children—a vulnerable group whose nutritional deprivation can lead to long-term, intergenerational consequences. Past studies have not disaggregated effects by household type or vulnerability. Third, this study uses 2022 SUSENAS data, which reflect post-COVID-19 socioeconomic conditions, including new shocks, inflationary pressures, and behavioral changes that may influence the CCT's effectiveness. Finally, this study employs a dual-measure approach: calorie intake, which objectively assesses dietary adequacy, and FIES, which captures subjective experiences and behavioral responses to food access constraints. Together, these indicators offer a more comprehensive understanding of household food insecurity than studies relying on a single metric, while also allowing comparability with national nutrition monitoring systems and international standards.

Literature review

Conditional cash transfer Program Keluarga Harapan (PKH)

The PKH was launched in 2007 by the Indonesian Ministry of Social Affairs as the country's first large-scale CCT program. Initially piloted in selected provinces, the program has since expanded to cover millions of poor households across the country, reaching 10 million beneficiaries (equivalent to 15% of the population) during the COVID-19 pandemic (Gentilini et al., 2020). The PKH targets low-income families with vulnerable members, such as pregnant and lactating women, school-aged children, older adults, and individuals with disabilities. Recipients must comply with specific behavioral requirements, including regular school attendance for children, completion of routine immunizations, and participation in scheduled health check-ups. These conditions are intended to promote long-term human capital development, distinguishing PKH from unconditional transfers that offer support without requiring behavioral compliance (Indonesian Ministry of Social Affairs, 2022).

As of 2024, PKH beneficiaries receive cash amounts ranging from IDR 900,000–3 million (USD 54–180) per year, depending on household composition: those with pregnant and lactating women receive IDR 3 million, those with schoolchildren receive between IDR 900,000–2 million, and those with older individuals or people with disabilities receive IDR 2.4 million annually. Payments are disbursed quarterly. Despite its developmental objectives, the program does not monitor how the cash is actually spent (Indonesian Ministry of Social Affairs, 2022).

Concept of household food security and food insecurity

Food security is multidimensional, with its definition and conceptualization changing significantly over recent decades (Burchi & De Muro, 2016). According to FAO (2001), food security means having physical, social, and economic access to sufficient, safe, and nutritious food that meets dietary needs and food preferences for an active and healthy life. Four dimensions of food security are food availability, accessibility, utilization, and stability (FAO, 2008). This definition was last revised at the 2008 World Summit on Food Security, with a fifth dimension, namely stability, added as a short-term indicator of withstanding natural and artificial shocks (FAO, 2008).

Accordingly, food insecurity is the lack of access to sufficient, safe, and nutritious food for normal growth and development and an active and healthy life (FAO et al., 2018). It can also be defined as a lack of consistent access to adequate food (Balistreri, 2016) or the inability to obtain or eat quality food in a socially acceptable way (Dowler & O'Connor, 2012). Food insecurity can be measured through nutrition intake, such as household or individual food consumption over seven days, and the Food Insecurity Experience Scale (FIES), which captures households' perceptions and behaviors under food constraints. The former assesses the amount of food consumed, including purchases and donations, to determine whether each household member meets the minimum energy requirements. The latter, a relatively new and cost-effective tool developed by the FAO (2012), has gained traction as a reliable measure of food insecurity. Research shows that food insecurity often begins with concerns about adequacy, then progresses to altered eating patterns, reduced food quantity and quality, and even meal skipping (Kumar et al., 2022). Adapted into a global version, FIES assesses the severity of food insecurity based on access to sufficient food and ensures cross-cultural validity, enabling comparable indicators across countries and levels of severity.

The impact of CCT on food insecurity among poor households

The resilience theory

The resilience theory explains how poor households respond to food insecurity through stages of adversity, mediating processes, and outcomes (Van Breda, 2018). This perspective is especially relevant for examining how CCT can strengthen household capacity to withstand and recover from food-related shocks. For low-income households with children, poverty is multidimensional, so food insecurity is rarely the result of low income alone. It often reflects multiple, overlapping deprivations (Wang, 2022), including limited access to education, healthcare, sanitation, decent work, and social protection (Taniu et al., 2022). These deprivations often overlap, reinforce one another, and deepen vulnerability. When livelihoods are unstable, these deprivations compound, further constraining poor households' ability to secure adequate and nutritious food.

Meanwhile, mediating processes are mechanisms for coping with vulnerabilities and working toward better outcomes (Van Breda, 2018). Since CCT provides predictable income support, households can use it for food consumption, child nutrition, health, and education. Under such conditions, households will be better able to allocate resources and adapt to mitigate multidimensional deprivation. From a resilience-as-process perspective, CCT thus represents institutional support that buffers poor households against chronic poverty and enhances their resilience.

Lastly, outcomes capture the extent of household food security and nutritional well-being. From a resilience-as-outcome perspective, households are considered "resilient" when they achieve stronger food security than expected given their poverty and vulnerability. In this context, CCT-recipient households may exhibit higher dietary diversity or lower food insecurity scores than non-recipients with similar socioeconomic conditions.

Previous empirical research

Research on the effect of CCT on food insecurity, using various approaches, has yielded mixed results. Using household expenditure and anthropometry, Mascie-Taylor et al. (2010) examined the impact of a cash-for-work program on food insecurity in rural Bangladesh, focusing on the nutritional status of poor women and children. The results showed that households receiving cash transfers spent more on food and consumed more protein-rich foods, hence improving women's and children's nutritional status.

Another study in Bangladesh examined the effect of cash transfers on household food security using two measures: the food consumption score (FCS) and the household hunger score (HHS) (Regmi & Paudel, 2016). The results show that remittances, non-agricultural income, male leadership, and literacy are associated with food security. Higher non-agricultural income significantly raises household food security. Meanwhile, a study in Ethiopia by Dejene and Cochrane (2022) showed different results. Assessing food security status using the household access scale and coping strategy index, they show that the assistance program was suboptimal due to unpredictable and delayed payments. Households remained vulnerable to unconventional debt arrangements that exacerbate their vulnerability.

Variations in estimation methods and contexts across experience-based food insecurity studies have led to inconsistent results. Correia et al. (2018) examined the relationship between cash transfers and food insecurity based on the US Department of Agriculture Food Insecurity module. The results show that cash transfer programs were independently associated with food security, as were education levels, living arrangements, and child nutritional status. De Araújo Palmeira et al. (2021) applied logistic regression and population-attributable risk fraction models using the Brazilian Household Food Insecurity Measurement Scale (EBIA) to assess how family income and CCT affected household food insecurity in a highly vulnerable municipality in Northeastern Brazil. The results showed a 17.5% decrease in food insecurity over time, with 24.5% of families who were food-insecure in 2011 becoming food-secure in 2014.

After the adjustment, families whose total income did not increase or who received smaller cash transfers faced a higher risk of persistent food insecurity. The research also shows that food insecurity decreases in areas with extreme climates and social vulnerability, with these improvements more strongly linked to cash transfers than to rising family income over time. Makkar et al. (2022) employed a FIES-based approach, logistic regression, and propensity score adjustment to assess the impact of government cash assistance on food insecurity in Bihar. The study found that household food insecurity rose sharply during the lockdown from 20% to 47%, but households receiving cash transfers faced lower odds of food insecurity once restrictions were lifted.

Using a FIES-based approach, Kumar et al. (2022) used an instrumental variable (IV) approach to examine factors influencing rural households' participation in cash transfer programs and their impact on food insecurity in India. The findings indicate that government cash transfers

significantly reduced moderate and severe food insecurity among rural households by 0.5% and 0.92%, respectively.

As for Indonesia, research on the effect of cash transfers on food insecurity is limited. Nasrudin et al. (2020) conducted a field experiment on cash transfers involving 534 fishing households in the Kei Islands, Eastern Indonesia. Household food insecurity was measured using the US Household Food Security Survey Module, which captures experiences of hunger among both adults and children. The results show that a cash transfer of IDR 17,000 (USD 1.4) or 5% of weekly household expenditure reduced the score on the 15-item food insecurity scale by 2 points. An additional weekly household income of IDR 234,000 (USD 19) is needed to eliminate household food insecurity in the study area.

Control variables of food insecurity

Per capita income has a significant impact on food security, as greater employment among household heads raises income and improves household food production and access to adequate, nutritious food (Babatunde et al., 2006). Education is also a determinant of household food insecurity (Yustika Devi et al., 2020). Higher educational attainment influences food insecurity through better employment opportunities and higher income (Mutisya et al., 2016), as well as through more informed decision-making, greater access to social assistance programs, and improved capacity to utilize such assistance (Magaña-Lemus et al., 2016).

Age is also a determinant. Younger household heads are more likely to work multiple jobs and obtain employment, thereby increasing their likelihood of meeting household food needs (d'Errico et al., 2018; Smith & Frankenberger, 2018). Meanwhile, having toddlers increases food insecurity as parents become less available for work (Felker-Kantor & Wood, 2012). Household size also affects food security as it means more food to be put on the table (d'Errico et al., 2018; Smith & Frankenberger, 2018).

Households with more laborers are less likely to experience food insecurity (Mango et al., 2014), while those with more school-age children are more likely to experience food insecurity (Khan et al., 2012; Ralston et al., 2017). School-related costs such as tuition, uniforms, and transportation can strain household budgets and reduce spending on food. However, households with school-age children are also more likely to receive CCT, which can offset these pressures, so the impact on food security remains context-dependent. Lastly, regional differences are also relevant (Yustika Devi et al., 2020), with food being more available and accessible in urban than rural areas (d'Errico et al., 2018); and so are other socio variables, such as marital status, house ownership status, and access to electricity (Yustika Devi et al., 2020).

Methodology

Data

This research uses data from the March 2022 National Socioeconomic Survey (SUSENAS), a large-scale household survey conducted annually by BPS-Statistics Indonesia. The SUSENAS is the primary nationally representative survey for monitoring the welfare of Indonesian households. It is designed using a two-stage stratified sampling method: (i) census blocks are

selected in the first stage, and (ii) households within those blocks are selected in the second stage. The March 2022 round covered approximately 350,000 households across all provinces, ensuring representativeness at the national and provincial levels.

Two core instruments were employed simultaneously. The SUSENAS Kor (Core Questionnaire) collects demographic and socioeconomic information on each household member, including age, sex, marital status, education, employment, housing conditions, and access to health facilities. In 2022, SUSENAS Kor included food insecurity questions adapted from the FIES, which was developed in FAO's Voices of the Hungry project. Meanwhile, the SUSENAS Consumption/Expenditure Module records detailed household food and non-food consumption, covering more than 200 food items and over 100 non-food expenditure categories. From these data, BPS-Statistics Indonesia produces measures of household calorie intake and per capita expenditure (used as a proxy for per capita income). The March 2022 SUSENAS was chosen as it provided the most recent and comprehensive dataset available at the time of the 2023 analysis. It also captures post-COVID-19 socioeconomic conditions, including inflationary pressures and shifts in household behavior.

The unit of analysis in this study is households with children, defined as households with a household head of a working age (≥15 years old) and at least one member under 18 years, unmarried, and identified as a biological, step, or adopted child of the household head. Households without children were excluded. After data cleaning and sample screening, the final dataset consisted of 65,736 households. These households were categorized by poverty levels (poor, almost poor, vulnerably poor) according to BPS thresholds.

Table 1: Descriptive Statistics

Variable	Distribution (%)	Average	Min	Max
(1)	(2)	(3)	(4)	(5)
Conditional Cash Transfer				
Do not receive	70.48			
Receive	29.52			
Per capita income (rupiah)		598,209	138,983	1,757,515
Household education				
Low education	68.84			
Moderate education	26.71			
High education	4.45			
Household age (year)		42.40	16	91
The number of household members		4.81	2	20
Toddlers under five years old				
With toddler(s)	54.44			
Without toddler(s)	45.56			
School-age children				
Less than two school-age children	45.37			
Two or more school-age children	54.63			
Working family members				
Less than two working family members	60.03			
Two or more working family members	39.97			
Area of residence				
Urban	35.16			

Variable	Distribution (%)	Average	Min	Max
(1)	(2)	(3)	(4)	(5)
Rural	64.84			

Table 1 summarizes the descriptive statistics of the sample. Nearly one-third of households (29.5%) received CCT, while the majority did not. Household heads were predominantly low educated (68.8%), with only 4.5% having higher education. The average household size was 4.8 members, with more than half having toddlers or at least two school-age children. Most households resided in rural areas (64.8%), reflecting the rural dimension of poverty and food insecurity in Indonesia.

Model analysis and variable measurement

Based on theoretical insights and previous studies, this research hypothesizes that CCT in the form of PKH is associated with lower food insecurity among households with children. Two empirical models are estimated, corresponding to two dependent variables: nutrition intake and FIES. Let $dnutrition\_fi_i$ denote nutrition-based food insecurity and $dfies\_fi_i$ indicate FIES-based food insecurity.

The binary logit model for nutrition-based food insecurity is specified as:

$$P_i^N \equiv \Pr(dnutrition\_fi_i = 1|X_i) = \Lambda(\beta_0 + \beta_1 d\_ccs_i + \beta_2 income_i + \beta_3 d\_secondary_i + \beta_4 d\_higher_i + \beta_5 age_i + \beta_6 hhsize_i + \beta_7 d\_toddler_i + \beta_8 d\_schoolingchild_i + \beta_9 d\_workmember_i + \beta_{10} d\_location_i), \Lambda(z) = \frac{e^z}{1+e^z} \tag{1}$$

For FIES-based food insecurity, the ordered logit model is given as:

$$P_i^F \equiv \Pr(dfies\_fi_i < j|X_i) = \Lambda(\kappa_j - X_i\beta), j = 1,2 \tag{2}$$

$$\Lambda(z) = \frac{e^z}{1+e^z}$$

$$X_i\beta = \beta_1 d\_ccs_i + \beta_2 income_i + \beta_3 d\_secondary_i$$
$$+ \beta_4 d\_higher_i + \beta_5 age_i + \beta_6 hhsize_i$$
$$+ \beta_7 d\_toddler_i$$
$$+ \beta_8 d\_schoolingchild_i$$
$$+ \beta_9 d\_workmember_i$$
$$+ \beta_{10} d\_location_i$$

κ_j = threshold parameters distinguishing the ordered categories of food insecurity.

The measurement of the dependent variable is as follows:

(1) Nutrition-based measure ($dnutrition\_fi$)

Calorie intake is obtained from household food consumption data in SUSENAS, which records the quantity of more than 200 food items consumed over the past week. Reported food quantities are first converted into kilograms/ounces, then matched with the Indonesian Food Composition Table (*Tabel Komposisi Pangan Indonesia*) to derive calorie values for each item. The total household calorie consumption is summed, divided by 7 to obtain daily intake, and then adjusted by adult-equivalent units to account for household demographic composition.

Following the national standard set by the Second National Conference on Food and Nutrition (*Widyakarya Nasional Pangan dan Gizi* or WNPG) in 2018, households with an average daily intake below 2,100 kilocalories per adult equivalent are classified as food insecure, while those meeting or exceeding this threshold are classified as food secure (BPS-Statistics Indonesia, 2021).

(2) FIES-based measure ($dfies\_fi$)

FIES is adopted in SUSENAS through the food access module, consisting of these eight yes/no questions:

1. In the past year, have you or other household members worried you may not have enough food due to a lack of money or other resources?
2. In the past year, was there a time when you or other household members could not eat healthy and nutritious food due to a lack of money or other resources?
3. In the past year, have you or other household members eaten only limited types of food due to a lack of money or other resources?
4. In the past year, have you or other household members ever missed a meal on a particular day because you did not have enough money or other resources to obtain food?
5. In the past year, have you or other household members eaten less than you should have due to a lack of money or other resources?
6. In the past year, did the household run out of food due to a lack of money or other resources?
7. In the past year, have you or any other household members felt hungry but not eaten because of a lack of money or other resources?
8. In the past year, have you or any household members gone without eating for an entire day due to a lack of money or other resources?

The responses are coded as binary indicators (1 = "yes", 0 = "no"). Following the FAO methodology, household food insecurity is then assessed based on the number of affirmative responses. A higher score indicates more severe food insecurity, ranging from mild (1–3 affirmative responses) to moderate (4–6) to severe (7–8). Missing responses were addressed using *ImputeRasch* to ensure complete data. This allows capturing the experiential dimension of food insecurity, complementing the calorie adequacy approach with subjective evidence of food access difficulties. Table 2 describes the variables used in the analysis.

Table 2: Variable Definitions

Variable	Definition	Measurement
$dnutrition\_fi$	Dummy nutrition-based household food insecurity	0: Food-secure household 1: Food-insecure household
$dfies\_fi$	Dummy FIES-based household food insecurity	1: Mild food insecurity 2: Moderate food insecurity 3: Severe food insecurity The dummy variable base is mild food insecurity.
d_ccs	Dummy receiving conditional cash transfer status	0: If the household does not receive CCT (PKH) 1: If the household receives CCT (PKH)

Variable	Definition	Measurement
income	Natural logarithm of monthly household per capita income	Total household expenses in one month divided by the number of household members
d_secondary	Dummy education of the household head	Household head completing high school and equivalent (secondary education) 0: Other than secondary education 1: Secondary education
d_higher	Dummy education of the household head	Household head completing higher education 0: Other than higher education 1: Higher education
age	Age of household head	Years, calculated by rounding down
hhsize	Number of household members	The number of people in the household
d_toddler	Dummy the presence of children under five years old	0: If the household does not have toddlers 1: If the household has toddlers
d_schoolingchild	Dummy the presence of children attending school	0: If the household has fewer than two children attending school 1: If the household has two or more children attending school
d_workingmember	Dummy the presence of working household members	0: If the household has fewer than two working household members 1: If the household has two or more working household members
d_location	Classification of the residential areas	0: If the household lives in an urban area 1: If the household lives in a rural area

Data analysis

This research uses a quantitative approach to analyze the influence of CCT and household characteristics on food insecurity. Binary and ordinal logistic regression are used for estimation because of the nature of the dependent variable. The former is used in the nutrition-based food insecurity model, while the latter is used in the FIES-based food insecurity model. Food-secure households were excluded from the FIES-based model to examine whether the CCT program influenced changes in household food insecurity (e.g., from severe to mild). Logistic regression analyzes the influence of explanatory variables on binary qualitative responses.

Meanwhile, ordinal logistic regression is used when the response variable has more than two categories and is measured on an ordinal scale (Hosmer et al., 1989). Parameter estimation for both models is performed using the maximum likelihood method. In both models, statistical significance testing can be carried out partially and simultaneously. Partial statistical significance testing employs the Wald Test, while simultaneous significance testing uses the Likelihood Ratio (LR) Test. Finally, the model's goodness-of-fit was assessed using pseudo-R-squared. The interpretation of binary and ordinal logistic models uses odds ratios and marginal effects.

Results and discussion

Descriptive analysis

This study analyzes food insecurity using two complementary approaches: the nutrition-based and the FIES-based measures. Figure 1 illustrates the food insecurity status of households with children in Indonesia in 2022, using a nutrition-based approach. In this framework, households are classified into two categories: (1) food-secure, with average daily per capita calorie intake exceeding 2,100 kcal, and (2) food-insecure, with intake below the 2,100-kcal threshold. The results indicate that 82.37% of low-income households with children are food-insecure, leaving only 17.63% classified as food-secure.

Figure 1: Percentage of Food Insecurity Based on Nutrition in Indonesia
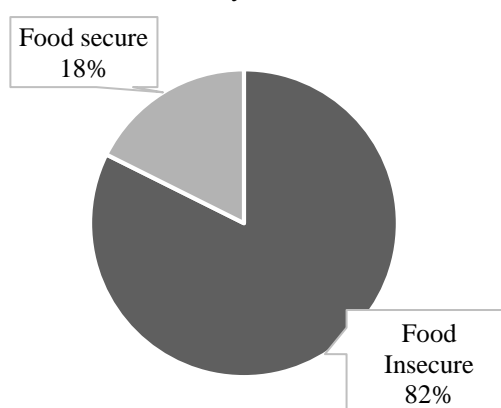
Using the FIES approach, food insecurity variables were explored to capture the general trend, summarized in Table 3.

Table 3: Summary of responses to questions in the FIES for Households with Children

FIES question item	Response Answer (%)	
	No	Yes
1	71.31	28.69
2	82.80	17.20
3	84.85	15.15
4	94.50	5.50
5	89.99	10.01
6	94.25	5.75
7	95.68	4.32
8	97.28	2.72
Average Raw Score		0.89

Table 3 shows that the first item, capturing the mildest form of food insecurity, namely concern about not having enough food, received the highest proportion of affirmative responses (28.69%). The share of "yes" responses declines as the severity of food insecurity increases, with only 2.72% of households reporting the most extreme condition (Item 8). Food insecurity levels are calculated by summing all "yes" responses across the eight items, where higher totals indicate greater severity. Using the 2022 SUSENAS sample of low-income

households with children, the average raw FIES score was 0.89, suggesting that households experienced fewer than one of the eight food insecurity conditions on average. While the severity appears low, the results still reveal underlying vulnerability given the disadvantaged status of the surveyed households. The seriousness of FIES-based food insecurity in Indonesia is summarized in Table 4.

Table 4: FIES-based Percentage of Food Insecurity in Households with Children

	Food Security	Mild Food Insecurity	Moderate Food Insecurity	Severe Food Insecurity
Indonesia	67.39	18.53	11.39	2.69

Note: Moderate and severe food insecurity are presented as separate categories but are also summed in the main text to indicate that 14.08% of households experience either moderate or severe food insecurity.

Tables 5 and 6 present a regional breakdown of food insecurity measured by calorie intake and FIES. Table 5 shows that nutrition-based food insecurity is widespread across all islands, with the highest prevalence in Maluku-Papua (86.8%).

Table 5: Percentage of Nutrition-based Food Insecurity by Island

Island	Food Secure	Food Insecure
(1)	(2)	(3)
Sumatera	18.65	81.35
Java-Bali	17.54	82.46
Nusa Tenggara	29.69	70.31
Kalimantan-Sulawesi	14.40	85.60
Maluku-Papua	13.24	86.76

Table 6, based on the FIES framework, also highlights regional disparities. Nusa Tenggara is the most food-insecure region, with only 44.9% of households classified as food-secure and 20.9% experiencing moderate food insecurity. Maluku–Papua also shows high vulnerability, with 33.1% of households food insecure, including the highest proportion of severe cases (5.7%). In contrast, Java-Bali and Sumatra show relatively better conditions, with over two-thirds of households classified as food secure. Overall, the results confirm that food insecurity is most severe in eastern Indonesia, particularly in Nusa Tenggara and Maluku-Papua.

Table 6: FIES-based Percentage of Food Insecurity in Households with Children

Island	Food Secure	Mild Food Insecurity	Moderate Food Insecurity	Severe Food Insecurity
(1)	(2)	(3)	(4)	(5)
Sumatera	66.76	20.06	11.01	2.17
Java-Bali	73.65	16.09	8.04	2.22
Nusa Tenggara	44.91	31.69	20.95	2.45
Kalimantan-Sulawesi	69.67	17.22	11.07	2.04
Maluku-Papua	66.90	14.10	13.28	5.72

Food insecurity model estimation results

Binary logistic regression analyzed the association between CCT and nutrition-based food insecurity, while ordinal logistic regression examined its effect on FIES-based food insecurity. The regression odds ratios and marginal effects are shown in Tables 7 and 8, respectively. Table 7 shows that the impact of CCT (*d_ccs*) on nutrition-based food insecurity in Indonesia is statistically significant at the 1% level. The odds ratio indicates that households with CCT had 0.631 times the odds of becoming food insecure than households without CCT. Judging from the marginal effect, changing status from not receiving CCT to receiving CCT is associated with a 5.8% lower probability of experiencing food insecurity.

Other independent variables are statistically significant at the 1% level, except for the variable *d_schoolingchild*, which is statistically insignificant. It means that, aside from the dummy variable for school-age children, the independent variables (income, household head education, age, household size, having toddlers, having working family members, and area of residence) are significantly associated with nutrition-based food insecurity. Higher household income was associated with a lower likelihood of food insecurity. By contrast, household heads with secondary education face a higher risk of insecurity, while those with higher education face a lower risk. In terms of age, older household heads were less likely to experience food insecurity.

As for family sizes, households with more members and toddlers face a higher risk, whereas those with more working family members face a lower risk. Lastly, residents of rural areas also face a lower risk of insecurity. In addition, the Likelihood Ratio (LR) test yields a *p* value of .000, indicating that the full model with explanatory variables provides a significantly better fit than the intercept-only model. This suggests that, collectively, the independent variables improve the model's explanatory power. The model's pseudo-R^2 (McFadden) statistic is 0.1578, indicating that the inclusion of explanatory variables improves the model fit relative to the intercept-only model. Although pseudo-R^2 does not have the same interpretation as in linear regression, the value indicates that the predictors meaningfully explain variations in household food insecurity.

Table 7: Odds Ratio and Marginal Effect of CCT on Nutrition-Based Food Insecurity

Variable	Odd Ratio Value	Marginal Effect
d_ccs	0.631*** (0.0159)	-0.058***
income	0.181*** (0.0074)	-0.214***
d_secondary	1.315*** (0.0369)	0.029***
d_higher	0.028*** (0.0015)	-0.713***
age	0.992*** (0.0013)	-0.001***
hhsize	1.257*** (0.0139)	0.029***
d_toddler	1.127*** (0.0311)	0.015***
d_schoolingchild	0.963 (0.0264)	-0.005
d_workmember	0.827*** (0.0200)	-0.024***
d_location	0.663*** (0.0169)	-0.051***
constant	3.419e+10*** (1.94e+10)	
Observation	65,736	
Prob > chi²	0.0000	
Pseudo R²	0.1578	

*Note: Standard errors in parentheses *** p < .01, ** p < .05, * p < .1*

Regarding FIES-based food insecurity, the ordinal logistic model estimates that 21,434 households with children experience it (see Table 8). Statistically, CCT is linked to FIES-based food insecurity. In the moderate food insecurity category, households receiving CCT saw a 2.5% lower probability of food insecurity, while in the severe category, the reduction was 1.1%.

A 1% increase in per capita income is associated with a 7.84% lower probability of food insecurity and a 3.40% reduction in severe cases. Similar interpretations apply to other significant variables, namely education level, family size, age, having toddlers, having working household members, and area of residence. Simultaneous LR test results yield a *p* value of .000, indicating that the full model, which includes explanatory variables, fits the data significantly better than the intercept-only model. Furthermore, the pseudo-R-squared is 0.83%, which indicates that the inclusion of explanatory variables improves the model fit relative to the intercept-only model.

Table 8: Odds Ratio of Receiving CCT on FIES-based Food Insecurity

Variable	Odd Ratio Value	Marginal Effect	
		$\pi1/(1-\pi1)$ (Moderate Category)	$\pi2/(1-\pi2)$ (Severe category)
d_ccs	0.865*** (0.0260)	-0.025*** (0.0052)	-0.011*** (0.0022)
income	0.632*** (0.0289)	-0.078*** (0.0079)	-0.034*** (0.0034)
d_secondary	0.886*** (0.0297)	-0.021*** (0.0058)	-0.009*** (0.0024)
d_higher	0.924 (0.0756)	-0.014 (0.0141)	-0.006 (0.0059)
age	1.004** (0.0016)	0.001** (0.0003)	0.000** (0.0001)
hhsize	1.055*** (0.0117)	0.009*** (0.0019)	0.004*** (0.0008)
d_toddler	0.941* (0.0304)	-0.010* (0.0056)	-0.005* (0.0024)
d_schoolingchild	0.771*** (0.0355)	0.017*** (0.0055)	0.007*** (0.0024)
d_workmember	1.105*** (0.0224)	-0.044*** (0.0050)	-0.019*** (0.0022)
d_location	0.799*** (0.0239)	-0.038*** (0.0051)	-0.017*** (0.0022)
/cut1	0.003***		
/cut2	0.029***		
Observation	21,434		
Prob > chi2	0.0000		
Pseudo R2	0.0083		

*Note: Standard errors in parentheses; *** p < .01, ** p < .05, * p < .1*

Tables 7 and 8 show CCT's consistent role in reducing food insecurity, while Table 9 supports these findings, showing that the most significant spending is on food.

Table 9: CCT Spending Distribution

Spending	Percentage
Foods	42.11
Housing and household necessities	12.04
Treatments	6.86
Pregnancy care	1.15
School fees	34.09
Credit payment	2.58
Others	0.58
Total	100

CCT for food purchases plays a crucial role in shaping the consumption patterns of poor households with children. By improving food intake, it directly supports better health outcomes and contributes to human capital development. More substantial human capital, in turn, enhances opportunities for socioeconomic mobility and offers a pathway out of poverty.

Discussion

The two approaches yield markedly different estimates: the nutrition-based approach indicates a prevalence of 82%, while the FIES-based approach indicates a prevalence of 32.61%. However, both highlight that the regional disparities are evident: Maluku-Papua records the highest nutrition-based food insecurity, while Nusa Tenggara shows the most prevalent FIES-based insecurity. These patterns reflect the concentration of poverty in eastern Indonesia, where March 2023 poverty rates far exceeded the national average of 9.36%, reaching 19.96% in East Nusa Tenggara, 16.42% in Maluku, 20.49% in West Papua, and 26.03% in Papua (BPS-Statistics Indonesia, 2025b). This is because poverty restricts households' access to food and resources (Pereira & Oliveira, 2020).

These findings support previous studies stating that food insecurity correlates significantly with deprivation of well-being (Adeyeye et al., 2023; Maitra & Rao, 2015). Addressing food insecurity requires more substantial poverty alleviation efforts, particularly as Indonesia grapples with slowing poverty reduction and widening income inequality (Purwono et al., 2021; Solihin et al., 2021). The average poverty reduction fell from 1.9% in the 1990s to 0.5% between the 2000s and 2017 (Purwono et al., 2021). Meanwhile, the Gini coefficient rose from 32.8 in 2002 to 38.3 in 2023 (World Bank, 2024).

This study shows that calorie-based food insecurity remains high, which aligns with Hasanah et al. (2024), who used pre-pandemic SUSENAS data and estimated that around 50% of Indonesian households were food insecure before COVID-19. The higher prevalence found in this study likely reflects the disproportional burden of food insecurity among low-income households. Furthermore, the FIES-based estimates differ substantially from those reported by BPS-Statistics Indonesia (2025a), which found that only 4.85% of the general population experienced moderate or severe food insecurity in 2022. This discrepancy highlights the greater vulnerability of low-income households with children, who experience substantially higher levels of food insecurity than the general population.

The stark differences between food insecurity estimates from nutritional and FIES-based approaches highlight that each captures a distinct dimension of the issue. The nutrition-based method measures caloric deficiencies against a standard threshold, whereas the FIES reflects psychological and behavioral constraints on food access. Given its subjective nature, FIES-based measurement is prone to response bias, including stigma-related underreporting and cultural variation in perceptions of food insecurity. In some contexts, respondents may be reluctant to disclose food access difficulties due to the stigma attached to food deprivation. Moreover, the notion of "lack of food scarcity" can vary across cultures, complicating comparisons between regions or groups (Tadesse et al., 2020). Nonetheless, the differences in estimates between the two approaches do not necessarily imply conflicting policy directions. Instead, it underscores the importance of adopting a multidimensional approach to measuring food insecurity to develop more effective, targeted policy interventions.

The estimation results from binary and ordinal logistic models indicate that CCT is consistently associated with lower food insecurity, as hypothesized in this research. This is

indicated by the CCT coefficient being negative and significant at the 1% level in both approaches. From logistic regression estimates of nutrition-based food insecurity, households with CCT are less likely to experience it than households without. The result aligns with research by Saldivar-Frausto et al. (2022), which found that CCT in Mexico (PROSPERA) reduced household food insecurity by increasing access to food and nutrition, especially for vulnerable groups such as households with children. Likewise, Ruiz-Arranz et al. (2002) also found that households with CCT increased their consumption and, therefore, their food security (Miller et al., 2011; Piperata et al., 2016; Tiwari et al., 2016).

Similarly, the ordinal logistic regression estimates indicate that CCT is associated with lower FIES-based food insecurity, which aligns with a study in Brazil that found that households that did not experience income growth following reduced CCT were at greater risk of remaining food insecure (Palmeira et al., 2020). Another study in Mexico also found that CCT can influence health and nutrition outcomes through monetary incentives that increase beneficiary households' purchasing power (Saldivar-Frausto et al., 2022). This is also consistent with the study by Susantyo et al. (2023), which found that cash assistance was primarily used for basic needs (food) during the COVID-19 pandemic in Indonesia.

In addition to these short-term improvements, CCT can also have long-term effects on reducing intergenerational poverty. Evidence from a long-term evaluation in Nicaragua shows that families with younger children receiving CCT had higher labor force participation and earnings than those with older children in the same program, primarily due to enhanced human capital accumulation and delayed childbearing among women (Barham et al., 2013). Similarly, Araujo et al. (2017) provided modest evidence of CCT reducing intergenerational poverty in Ecuador. Nevertheless, the full realization of these benefits depends on program design and implementation. Challenges such as inaccuracies and regional disparities remain significant, underscoring the need for stronger monitoring systems and context-specific adaptations to maximize the long-term impact of CCT.

Regarding other household characteristics, both approaches find that higher per capita income is associated with a lower likelihood of food insecurity. Per capita income, reflected in expenditure, significantly affects food security (Coleman-Jensen et al., 2022). As income increases, households are better able to meet their food needs, thereby reducing the risk of food insecurity, which aligns with previous research by Mei et al. (2020) and Olabiyi and McIntyre (2014).

Other household characteristics also influence food insecurity. Households with a more educated household head face a lower risk of food insecurity, which aligns with Issahaku and Abdulai (2020). The age of the household head also has a negative and significant effect on food insecurity. The older the household head, the lower the household's risk of food insecurity, which aligns with the findings of Abor et al. (2018) and d'Errico et al. (2018). However, the FIES results show the opposite: the age of the household head is positively and significantly associated with food insecurity. Older age may lead to a decline in food and nutritional security (Babatunde et al., 2006) because households with an older household head may have lower-quality food intake than those with a younger household head, especially in rural areas (Li & Yu, 2010).

Family size has a positive and significant effect on nutrition-based food insecurity, with a significance level of 1%, as indicated by the regression results. The same results were also obtained from FIES. The more members a household has, the greater the likelihood of food insecurity, as found in research by Murendo et al. (2021), d'Errico et al. (2018), and Alinovi et

al. (2010). Likewise, based on nutrition intake, having toddlers in the household has a positive and significant effect on household food insecurity, which aligns with Balistreri (2016). The more toddlers in the household, the greater the income allocated to their needs (Felker-Kantor & Wood, 2012; Ratcliffe et al., 2011).

Meanwhile, having children attending school in the household has a negative and significant effect on food insecurity, according to the calorie intake measure. However, this contrasts with FIES-based food insecurity, which has a considerable positive impact. The proportion of school-attending children in a household can influence rural household budgets and, in turn, affect access to food. A positive association between schooling and food security may arise when households view children's education and health as complementary investments. Conversely, if households perceive schooling and health expenditures as competing priorities, a negative relationship between schooling and food security may emerge (Khan et al., 2012).

The presence of working household members has a negative and significant effect on food insecurity in both approaches. This may be due to the household's higher welfare from the income they receive. When income is high, households have greater purchasing power for food and other essentials, which strengthens food security; lower income, conversely, heightens the risk of food insecurity (Abdullah et al., 2019; Coleman-Jensen, 2011; Olabiyi & McIntyre, 2014).

Lastly, the area of residence has a negative and significant effect on food insecurity, according to both approaches. Households in rural areas face a lower risk of food insecurity than those in urban areas, consistent with Onianwa and Wheelock (2006). Poor households in urban areas depend on income to meet food and non-food needs, and their access to agricultural land is more limited than that of those in rural areas (Ruel et al., 2010). According to Zimmerman et al. (2023), the cost of living in rural areas tends to be lower than in urban areas. In addition, social networks in villages are stronger than in urban areas (Bowen et al., 2022; Martin et al., 2004).

Despite the robust findings outlined above, this study is subject to several limitations. First, the analysis is based on cross-sectional data, which constrains the ability to capture long-term dynamics of food insecurity and the sustained impacts of CCT. Second, the methodological approach adopted identifies associations between CCT and food insecurity but does not provide a causal impact evaluation framework; thus, the findings should be interpreted as correlations rather than causal effects. Third, the analysis focuses primarily on the accessibility dimension of food security, leaving availability, utilization, and stability outside the scope. These limitations underscore the need for future research that employs longitudinal data, a mixed-methods approach, and causal inference designs to assess the intergenerational impacts of CCT and the multidimensional nature of food insecurity. Future studies may also extend the analysis by examining how CCT influences other dimensions of food security, thereby offering a more comprehensive understanding of program effectiveness.

Conclusion

This study examines the effect of CCT on nutrition- and FIES-based food insecurity. In general, the percentage of nutrition-based food insecurity in Indonesia is higher (82.37%) than that reported in the FIES (32.61%). Furthermore, household food insecurity varies across regions in Indonesia, with a higher prevalence in the eastern part of Indonesia, including

Maluku and Papua. The regression results show that CCT is associated with lower food insecurity. These findings underscore the importance of sustaining the CCT program, particularly through stable funding and effective targeting mechanisms. This study offers new insights into the relationship between CCT and food insecurity among low-income households with children in Indonesia, although several limitations remain. The cross-sectional design and association-based methods limit causal inference and long-term assessment. In addition, the analysis centers on food access, overlooking other dimensions of food security. Future research using longitudinal and multidimensional approaches is needed to better capture the intergenerational impacts of CCT.

Ethical statement

The dataset used in this research is a secondary dataset from the National Socioeconomic Survey (SUSENAS), conducted twice a year (March and September) by BPS–Statistics Indonesia. Access to the dataset was obtained through official approval from BPS–Statistics Indonesia via its data service procedure. The data are fully anonymized and contain no personally identifiable information. As the study relies exclusively on secondary data and involves no direct interaction with human participants, informed consent was not required.

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References

Abdullah, N., Zhou, D., Shah, T., Ali, S., Ahmad, W., Din, I. U., & Ilyas, A. (2019). Factors affecting household food security in rural northern hinterland of Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, *18*(2), 201–210. https://doi.org/10.1016/j.jssas.2017.05.003

Abor, J. Y., Amidu, M., & Issahaku, H. (2018). Mobile telephony, financial inclusion and inclusive growth. *Journal of African Business*, *19*(3), 430–453. https://doi.org/10.1080/15228916.2017.1419332

Adeyeye, S. A. O., Ashaolu, T. J., Bolaji, O. T., Abegunde, T. A., & Omoyajowo, A. O. (2023). Africa and the nexus of poverty, malnutrition and diseases. *Critical Reviews in Food Science and Nutrition*, *63*(5), 641–656. https://doi.org/10.1080/10408398.2021.1952160

Alinovi, L., Mane, E., & Romano, D. (2010). Measuring household resilience to food insecurity: Application to Palestinian households. In R. Benedetti, M. Bee, G. Espa, & F. Piersimoni (Eds.), *Agricultural Survey Methods* (1st ed., pp. 341–368). Wiley. https://doi.org/10.1002/9780470665480.ch21

Alvarez, C., Lantz, P., Sharac, J., & Shin, P. (2015). Food insecurity, food assistance and health status in the U.S. community health center population. *Journal of Health Care for the Poor and Underserved*, *26*(1), 82–91. https://doi.org/10.1353/hpu.2015.0006

Araujo, M. C., Bosch, M., & Schady, N. (2017). Can cash transfers help households escape an intergenerational poverty trap? In C. B. Barrett, M. R. Carter, & J.-P. Chavas (Eds.), *The economics of poverty traps* (pp. 357–382). University of Chicago Press.

Babatunde, R. O., Omotesho, O. A., & Sholotan, O. S. (2006). Socio-economic characteristics and food security status of farming households in Kwara State, North-Central Nigeria. *Pakistan Journal of Nutrition*, 6(1), 49–58. https://doi.org/10.3923/pjn.2007.49.58

Balistreri, K. S. (2016). A decade of change: Measuring the extent, depth and severity of food insecurity. *Journal of Family and Economic Issues*, 37(3), 373–382. https://doi.org/10.1007/s10834-016-9500-9

Ballard, T. J., Kepple, A. W., & Cafiero, C. (2013). *The Food Insecurity Experience Scale: Developing a global standard for monitoring hunger worldwide*. Food and Agriculture Organization of the United Nations. https://www.fao.org/economic/ess/ess-fs/voices/en/

Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Parienté, W., Shapiro, J., Thuysbaert, B., & Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science*, 348(6236), Article 1260799. https://doi.org/10.1126/science.1260799

Barham, T., Macours, K., & Maluccio, J. A. (2013). *More schooling and more learning?: Effects of a three-year conditional cash transfer program in Nicaragua after 10 years*. Inter-American Development Bank. https://doi.org/10.18235/0011482

Barrett, C. B. (2002). Food security and food assistance programs. In B. L. Gardner & G. C. Rausser (Eds.), *Handbook of agricultural economics* (Vol. 2, pp. 2103–2190). Elsevier. https://doi.org/10.1016/S1574-0072(02)10027-2

Basu, K., & Wong, M. (2015). Evaluating seasonal food storage and credit programs in East Indonesia. *Journal of Development Economics*, 115, 200–216. https://doi.org/10.1016/j.jdeveco.2015.02.001

Bhalla, G., Handa, S., Angeles, G., & Seidenfeld, D. (2018). The effect of cash transfers and household vulnerability on food security in Zimbabwe. *Food Policy*, 74, 82–99. https://doi.org/10.1016/j.foodpol.2017.11.007

Bowen, S., Elliott, S., & Hardison-Moody, A. (2022). Rural food insecurity: A longitudinal analysis of low-income rural households with children in the south. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 8(3), 50–77. https://doi.org/10.7758/RSF.2022.8.3.02

BPS-Statistics Indonesia. (2021, October 29). *Konsumsi kalori dan protein penduduk Indonesia dan provinsi, Maret 2021* [Calorie and protein consumption of the Indonesian population and provinces, March 2021]. Badan Pusat Statistik. https://www.bps.go.id/id/publication/2021/10/29/37f947f55d3303c512466781/konsumsi-kalori-dan-protein-penduduk-indonesia-dan-provinsi--maret-2021.html

BPS-Statistics Indonesia. (2025a, January 24). *Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES) (percent), 2022* [Dataset]. https://www.bps.go.id/en/statistics-table/2/MTQ3NCMy/prevalence-of-moderate-or-severe-food-insecurity-in-the-population--based-on-the-food-insecurity-experience-scale--fies-.html

BPS-Statistics Indonesia. (2025b, July 25). *Persentase penduduk miskin (P0) menurut provinsi dan daerah (persen), 2023* [Percentage of the poor population (P0) by province and area (percent), 2023]. https://www.bps.go.id/id/statistics-table/2/MTkyIzI=/persentase-penduduk-miskin--maret-2023.html

Brugh, K., Angeles, G., Mvula, P., Tsoka, M., & Handa, S. (2018). Impacts of the Malawi social cash transfer program on household food and nutrition security. *Food Policy*, 76, 19–32. https://doi.org/10.1016/j.foodpol.2017.11.002

Burchi, F., & De Muro, P. (2016). From food availability to nutritional capabilities: Advancing food security analysis. *Food Policy*, 60, 10–19. https://doi.org/10.1016/j.foodpol.2015.03.008

Coleman-Jensen, A. J. (2011). Working for peanuts: Nonstandard work and food insecurity across household structure. *Journal of Family and Economic Issues*, 32(1), 84–97. https://doi.org/10.1007/s10834-010-9190-7

Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2022, September 7). *Household food security in the United States in 2021*. U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=104655

Cook, J. T., Frank, D. A., Meyers, A. F., Berkowitz, C., Black, M. M., Casey, P. H., Cutts, D. B., Zaldivar, N., Skalicky, A., Levenson, S., Heeren, T., & Nord, M. (2004). Food insecurity is associated with adverse health outcomes among human infants and toddlers. *The Journal of Nutrition*, *134*(6), 1432–1438. https://doi.org/10.1093/jn/134.6.1432

Correia, L. L., Rocha, H. A. L., Leite, Á. J. M., Cavalcante E Silva, A., Campos, J. S., Machado, M. M. T., Lindsay, A. C., & Cunha, A. J. L. A. D. (2018). The relation of cash transfer programs and food insecurity among families with preschool children living in semiarid climates in Brazil. *Cadernos Saúde Coletiva*, *26*(1), 53–62. https://doi.org/10.1590/1414-462x201800010341

Davy, B. M., Zoellner, J. M., Waters, C. N., Bailey, A. N., & Hill, J. L. (2015). Associations among chronic disease status, participation in federal nutrition programs, food insecurity, and sugar-sweetened beverage and water intake among residents of a health-disparate region. *Journal of Nutrition Education and Behavior*, *47*(3), 196–205. https://doi.org/10.1016/j.jneb.2015.01.001

de Araújo Palmeira, P., de Araújo Mattos, R., Pérez-Escamilla, R., & Salles-Costa, R. (2021). Multisectoral government programs and household food insecurity: Evidence from a longitudinal study in the semiarid area of northeast Brazil. *Food Security*, *13*(3), 525–538. https://doi.org/10.1007/s12571-020-01100-4

Dejene, M., & Cochrane, L. (2022). Safety nets as a means of tackling chronic food insecurity in rural southern Ethiopia: What is constraining programme contributions? *Canadian Journal of Development Studies*, *43*(2), 157–175. https://doi.org/10.1080/02255189.2021.1914559

d'Errico, M., Romano, D., & Pietrelli, R. (2018). Household resilience to food insecurity: Evidence from Tanzania and Uganda. *Food Security*, *10*(4), 1033–1054. https://doi.org/10.1007/s12571-018-0820-5

Devereux, S. (2016). Social protection for enhanced food security in sub-Saharan Africa. *Food Policy*, *60*, 52–62. https://doi.org/10.1016/j.foodpol.2015.03.009

Dowler, E. A., & O'Connor, D. (2012). Rights-based approaches to addressing food poverty and food insecurity in Ireland and UK. *Social Science & Medicine*, *74*(1), 44–51. https://doi.org/10.1016/j.socscimed.2011.08.036

The Economist Group. (2022, September 20). *Global Food Security Index 2022*. Economist Impact. https://impact.economist.com/sustainability/project/food-security-index?utm_source=chatgpt.com

Ellis, F. (1998). Household strategies and rural livelihood diversification. *Journal of Development Studies*, *35*(1), 1–38. https://doi.org/10.1080/00220389808422553

FAO, IFAD, UNICEF, WFP, & WHO. (2018). *The state of food security and nutrition in the world 2018: Building climate resilience for food security and nutrition*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/i9553en/i9553en.pdf

FAO, IFAD, UNICEF, WFP, & WHO. (2022). *The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/cc0639en/cc0639en.pdf

Felker-Kantor, E., & Wood, C. H. (2012). Female-headed households and food insecurity in Brazil. *Food Security*, *4*(4), 607–617. https://doi.org/10.1007/s12571-012-0215-y

Food and Agriculture Organization (FAO). (2001). *The state of food insecurity in the world 2001: Food insecurity—When people live with hunger and fear starvation*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/y1500e/y1500e.pdf

Food and Agriculture Organization (FAO). (2008). *An introduction to the basic concepts of food security*. Food and Agriculture Organization of the United Nations. https://www.fao.org/4/al936e/al936e00.pdf

Food and Agriculture Organization (FAO). (2012). *The state of food insecurity in the world 2012: Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/i3027e/i3027e.pdf

Food and Agriculture Organization (FAO). (2015). *The state of food and agriculture 2015: Social protection and agriculture—Breaking the cycle of rural poverty*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/i4910e/i4910e.pdf

Fram, M. S., Ritchie, L. D., Rosen, N., & Frongillo, E. A. (2015). Child experience of food insecurity is associated with child diet and physical activity. *The Journal of Nutrition*, *145*(3), 499–504. https://doi.org/10.3945/jn.114.194365

Gentilini, U., Almenfi, M. B. A., Orton, I., & Dale, P. (2020, April 17). *Social protection and jobs responses to COVID-19: A real-time review of country measures*. World Bank. https://doi.org/10.1596/33635

Gladwin, C. H., Thomson, A. M., Peterson, J. S., & Anderson, A. S. (2001). Addressing food security in Africa via multiple livelihood strategies of women farmers. *Food Policy*, *26*(2), 177–207. https://doi.org/10.1016/S0306-9192(00)00045-2

Hanlon, J., Barrientos, A., & Hulme, D. (2012). *Just give money to the poor: The development revolution from the global South*. Kumarian Press.

Hasanah, H., Nachrowi, N. D., Wisana, I. D. G. K., & Siregar, H. (2024). Could the minimum wage policy reduce food insecurity among households of formal workers in Indonesia? *Agriculture & Food Security*, *13*(1), Article 7. https://doi.org/10.1186/s40066-023-00451-3

Haushofer, J., & Shapiro, J. (2016). The short-term impact of unconditional cash transfers to the poor: Experimental evidence from Kenya. *The Quarterly Journal of Economics*, *131*(4), 1973–2042. https://doi.org/10.1093/qje/qjw025

Hidrobo, M., Hoddinott, J., Peterman, A., Margolies, A., & Moreira, V. (2014). Cash, food, or vouchers? Evidence from a randomized experiment in northern Ecuador. *Journal of Development Economics*, *107*, 144–156. https://doi.org/10.1016/j.jdeveco.2013.11.009

Hosmer, D. W., Jovanovic, B., & Lemeshow, S. (1989). Best subsets logistic regression. *Biometrics*, *45*(4), 1265–1270. https://doi.org/10.2307/2531779

Indonesian Ministry of Social Affairs. (2022). *Bantuan Program Keluarga Harapan (PKH)* [Family Hope Program (PKH) assistance]. https://kemensos.go.id/infografis/ditjen-perlindungan-dan-jaminan-sosial/bantuan-program-keluarga-harapan-pkh

Issahaku, G., & Abdulai, A. (2020). Can farm households improve food and nutrition security through adoption of climate-smart practices? Empirical evidence from northern Ghana. *Applied Economic Perspectives and Policy*, *42*(3), 559–579. https://doi.org/10.1093/aepp/ppz002

Khan, R. E. A., Azid, T., & Toseef, M. U. (2012). Determinants of food security in rural areas of Pakistan. *International Journal of Social Economics*, *39*(12), 951–964. https://doi.org/10.1108/03068291211269082

Kumar, A., Mishra, A. K., Saroj, S., & Rashid, S. (2022). Government transfers, COVID-19 shock, and food insecurity: Evidence from rural households in India. *Agribusiness*, *38*(3), 636–659. https://doi.org/10.1002/agr.21746

Li, Y., & Yu, W. (2010). Households' food security in poverty-stricken regions: Evidence from Western rural China. *Agriculture and Agricultural Science Procedia*, *1*, 386–395. https://doi.org/10.1016/j.aaspro.2010.09.048

Magaña-Lemus, D., Ishdorj, A., Rosson, C. P., & Lara-Álvarez, J. (2016). Determinants of household food insecurity in Mexico. *Agricultural and Food Economics*, *4*(1), Article 10. https://doi.org/10.1186/s40100-016-0054-9

Maitra, C. (2018). *A review of studies examining the link between food insecurity and malnutrition* (Technical paper). Food and Agriculture Organization of the United Nations. http://www.fao.org/3/CA1447EN/ca1447en.pdf

Maitra, C., & Rao, D. S. P. (2015). Poverty–food security nexus: Evidence from a survey of urban slum dwellers in Kolkata. *World Development*, *72*, 308–325. https://doi.org/10.1016/j.worlddev.2015.03.006

Makkar, S., Manivannan, J. R., Swaminathan, S., Travasso, S. M., John, A. T., Webb, P., Kurpad, A. V., & Thomas, T. (2022). Role of cash transfers in mitigating food insecurity in India during the COVID-19 pandemic: A longitudinal study in the Bihar state. *BMJ Open*, *12*(6), Article e060624. https://doi.org/10.1136/bmjopen-2021-060624

Mango, N., Zamasiya, B., Makate, C., Nyikahadzoi, K., & Siziba, S. (2014). Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Development Southern Africa*, *31*(4), 625–640. https://doi.org/10.1080/0376835X.2014.911694

Martin, K. S., Rogers, B. L., Cook, J. T., & Joseph, H. M. (2004). Social capital is associated with decreased risk of hunger. *Social Science & Medicine*, *58*(12), 2645–2654. https://doi.org/10.1016/j.socscimed.2003.09.026

Mascie-Taylor, C., Marks, M., Goto, R., & Islam, R. (2010). Impact of a cash-for-work programme on food consumption and nutrition among women and children facing food insecurity in rural

Bangladesh. *Bulletin of the World Health Organization*, *88*(11), 854–860. https://doi.org/10.2471/BLT.10.080994

Mei, C. F., Faller, E. M., Chuan, L. X., & Gabriel, J. S. (2020). Household income, food insecurity and nutritional status of migrant workers in Klang Valley, Malaysia. *Annals of Global Health*, *86*(1), Article 90. https://doi.org/10.5334/aogh.2859

Miller, C. M., Tsoka, M., & Reichert, K. (2011). The impact of the social cash transfer scheme on food security in Malawi. *Food Policy*, *36*(2), 230–238. https://doi.org/10.1016/j.foodpol.2010.11.020

Murendo, C., Murenje, G., Chivenge, P. P., & Mtetwa, R. (2021). Financial inclusion, nutrition and socio-economic status among rural households in Guruve and Mount Darwin Districts, Zimbabwe. *Journal of International Development*, *33*(1), 86–108. https://doi.org/10.1002/jid.3513

Mutisya, M., Ngware, M. W., Kabiru, C. W., & Kandala, N. (2016). The effect of education on household food security in two informal urban settlements in Kenya: A longitudinal analysis. *Food Security*, *8*(4), 743–756. https://doi.org/10.1007/s12571-016-0589-3

Nasrudin, R., Resosudarmo, B. P., Yamazaki, S., & Girsang, W. (2020). Contribution of cash transfers in moderating household food insecurity in small-island communities: Experimental evidence from Indonesia. *Marine Policy*, *118*, Article 104025. https://doi.org/10.1016/j.marpol.2020.104025

Olabiyi, O. M., & McIntyre, L. (2014). Determinants of food insecurity in higher-income households in Canada. *Journal of Hunger & Environmental Nutrition*, *9*(4), 433–448. https://doi.org/10.1080/19320248.2014.908450

Onianwa, O. O., & Wheelock, G. D. (2006). An analysis of the determinants of food insecurity with severe hunger in selected southern states. *Journal of Rural Social Sciences*, *21*(1), Article 5. https://egrove.olemiss.edu/jrss/vol21/iss1/5

Palmeira, P. A., Salles-Costa, R., & Pérez-Escamilla, R. (2020). Effects of family income and conditional cash transfers on household food insecurity: Evidence from a longitudinal study in Northeast Brazil. *Public Health Nutrition*, *23*(4), 756–767. https://doi.org/10.1017/S1368980019003136

Pereira, M., & Oliveira, A. M. (2020). Poverty and food insecurity may increase as the threat of COVID-19 spreads. *Public Health Nutrition*, *23*(17), 3236–3240. https://doi.org/10.1017/S1368980020003493

Piperata, B. A., McSweeney, K., & Murrieta, R. S. (2016). Conditional cash transfers, food security, and health: Biocultural insights for poverty-alleviation policy from the Brazilian Amazon. *Current Anthropology*, *57*(6), 806–826. https://doi.org/10.1086/688912

Purwono, R., Wardana, W. W., Haryanto, T., & Khoerul Mubin, M. (2021). Poverty dynamics in Indonesia: Empirical evidence from three main approaches. *World Development Perspectives*, *23*, Article 100346. https://doi.org/10.1016/j.wdp.2021.100346

Ralston, K., Treen, K., Coleman-Jensen, A., & Guthrie, J. (2017). *Children's Food Security and USDA Child Nutrition Programs*. https://doi.org/10.22004/AG.ECON.259730

Ratcliffe, C., McKernan, S.-M., & Zhang, S. (2011). How much does the Supplemental Nutrition Assistance Program reduce food insecurity? *American Journal of Agricultural Economics*, *93*(4), 1082–1098. https://doi.org/10.1093/ajae/aar026

Regmi, M., & Paudel, K. P. (2016). Impact of remittance on food security in Bangladesh. In A. Schmitz, P. L. Kennedy, & T. G. Schmitz (Eds.), *Frontiers of Economics and Globalization* (Vol. 16, pp. 145–158). Emerald Group Publishing Limited. https://doi.org/10.1108/S1574-871520150000016006

Ruel, M. T., Garrett, J. L., Hawkes, C., & Cohen, M. J. (2010). The food, fuel, and financial crises affect the urban and rural poor disproportionately: A review of the evidence. *The Journal of Nutrition*, *140*(1), 170S-176S. https://doi.org/10.3945/jn.109.110791

Ruiz-Arranz, M., Davis, B., Stampini, M., Winters, P., & Handa, S. (2002). *More calories or more diversity? An econometric evaluation of the impact of the PROGRESA and PROCAMPO transfer programs on food security in rural Mexico* (ESA Working Paper No. 02-09). Food and Agriculture Organization of the United Nations. https://doi.org/10.22004/AG.ECON.289105

Saha, K. K., Frongillo, E. A., Alam, D. S., Arifeen, S. E., Persson, L. Å., & Rasmussen, K. M. (2008). Household food security is associated with infant feeding practices in rural Bangladesh. *The Journal of Nutrition*, *138*(7), 1383–1390. https://doi.org/10.1093/jn/138.7.1383

Saldivar-Frausto, M., Unar-Munguía, M., Méndez-Gómez-Humarán, I., Rodríguez-Ramírez, S., & Shamah-Levy, T. (2022). Effect of a conditional cash transference program on food insecurity

in Mexican households: 2012–2016. *Public Health Nutrition*, *25*(4), 1084–1093. https://doi.org/10.1017/S1368980021003918

Schmeer, K. K., & Piperata, B. A. (2017). Household food insecurity and child health. *Maternal & Child Nutrition*, *13*(2), Article e12301. https://doi.org/10.1111/mcn.12301

Sen, A. (1982). *Poverty and famines: An essay on entitlement and deprivation*. Oxford University Press.

Sleet, P. (2020, February 20). *The state of Indonesian food security and nutrition*. Future Directions International, Global Food and Water Crises Research Programme. https://apo.org.au/node/27546

Smith, L. C., & Frankenberger, T. R. (2018). Does resilience capacity reduce the negative impact of shocks on household food security? Evidence from the 2014 floods in northern Bangladesh. *World Development*, *102*, 358–376. https://doi.org/10.1016/j.worlddev.2017.07.003

Solihin, A., Wardana, W. W., Fiddin, E., & Sukartini, N. M. (2021). Do government policies drive economic growth convergence? Evidence from East Java, Indonesia. *Cogent Economics & Finance*, *9*(1), Article 1992875. https://doi.org/10.1080/23322039.2021.1992875

Susantyo, B., Habibullah, H., Irmayani, N., Erwinsyah, R., Nainggolan, T., Sugiyanto, S., Rahman, A., Arifin, J., As'adhanayadi, B., & Nurhayu, N. (2023). Social cash assistance for food security during a disaster: Lessons learned from Indonesia. *IOP Conference Series: Earth and Environmental Science*, *1180*(1), Article 012047. https://doi.org/10.1088/1755-1315/1180/1/012047

Tadesse, G., Abate, G. T., & Zewdie, T. (2020). Biases in self-reported food insecurity measurement: A list experiment approach. *Food Policy*, *92*, Article 101862. https://doi.org/10.1016/j.foodpol.2020.101862

Taniu, S., Sari, D. W., & Satria, D. (2022). Institutional access and poverty of capture fisheries households in Indonesia. In G. A. Sahadewo, E. N. Afifah, E. Sulistyaningrum, D. S. Pratomo, A. Halimatussadiah, & B. P. Resosudarmo (Eds.), *Institutional human capital and development in Indonesia* (IRSA Book Series on Regional Development No. 20, Chap. 10, pp. 191–214). IRSA Press.

Tiwari, S., Daidone, S., Ruvalcaba, M. A., Prifti, E., Handa, S., Davis, B., Niang, O., Pellerano, L., Quarles Van Ufford, P., & Seidenfeld, D. (2016). Impact of cash transfer programs on food security and nutrition in sub-Saharan Africa: A cross-country analysis. *Global Food Security*, *11*, 72–83. https://doi.org/10.1016/j.gfs.2016.07.009

Van Breda, A. D. (2018). A critical review of resilience theory and its relevance for social work. *Social Work/Maatskaplike Werk, 54*(1), 1–18. https://doi.org/10.15270/54-1-611

Wang, X. (2022). *Multidimensional poverty measurement: Theory and methodology*. Springer.

World Bank. (2024). [Dataset]. https://data.worldbank.org/indicator/SI.POV.GINI?locations=ID

Yunita, H. (2021). Status bekerja, struktur keluarga dan kerawanan pangan rumah tangga dengan anak [Employment status, family structure, and household food insecurity with children]. *Jurnal Ekonomi dan Kebijakan Publik Indonesia, 8*(1), 1–18. https://jurnal.usk.ac.id/EKaPI/article/view/21166

Yustika Devi, L., Andari, Y., Wihastuti, L., & Haribowo, K. (2020). Model sosial-ekonomi dan ketahanan pangan rumah tangga di Indonesia [Socio-economic model and household food security in Indonesia]. *Jurnal Ekonomi dan Pembangunan, 28*(2), 103–115. https://doi.org/10.14203/JEP.28.2.2020.103-115

Zimmerman, J. N., Rignall, K., & McAlister, C. (2023). The enduring price of place: Revisiting the rural cost of living. *Rural Sociology*, *88*(1), 252–280. https://doi.org/10.1111/ruso.12475