



ORIGINAL ARTICLE

# Revisiting the determinants of food security: Does regular remittance inflow play a role in Ghanaian households? A disaggregated analysis

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## Abstract

The study investigates the factors that influence food security in Ghana, focusing on the role of remittances. Employing data from the Ghana Living Standards Survey (GLSS) 7, the study found that receiving remittances reduces the probability of facing food insecurity by 0.4% to 1.2% while receiving them regularly decreases the chances of experiencing food insecurity by 1.8% to 3.9%. In addition, an analysis of the disaggregated components of remittances shows that cash and other goods (non-food) remittances are negative and significantly associated with food insecurity. The results emphasize the importance of not only cash remittances but also remittances in the form of other non-food goods in improving food security. Policies that will encourage the easy and regular inflow of remittances will be key to enhancing food security.

## KEYWORDS

food remittances, food security, Ghana, other goods remittances, cash remittances

## JEL CLASSIFICATION

F24, F22, I31, Q18



## 1 | INTRODUCTION

Food security is defined by the Food and Agriculture Organization (FAO) as the condition “when all people, at all times, have physical and economic access to sufficient, safe, nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2009). Food security implies having access to adequate quantities of appropriate foods, where people have the ability to purchase the food they need. It becomes clear that inherent in the concept of food security are a number of determining factors that may be interrelated. Sustainable development goal (SDG) 2 seeks to end hunger and achieve food security by the year 2030. The goal is to ensure that countries do not lose sight of the need to tackle the inequalities prevalent in addressing the need for food security globally (Masa et al., 2020). This indicator tells us about poverty levels, the availability of food and people's concerns about being able to have food in the needed quantity and of the right quality all year round. The current data reveals that Africa, particularly sub-Saharan Africa (SSA), is not on target to meet this goal by the year 2030. Africa remains challenged in terms of achieving control over food security due to a number of factors such as extreme weather conditions which are the result of climate change, continuous reliance on rain-fed agriculture, the absence of alternative livelihoods and poverty (Kuuire et al., 2013; Obi et al., 2020). Khan et al. (2014) opine that this situation will worsen due to the presence of factors such as high population growth (Africa being the continent with the youngest population), climate change, inadequate food production and an excessively high dependence on foreign imports. This assertion is supported by the world bank's migration and development brief No. 36, which shows that the COVID-19 pandemic and the war in Ukraine have worsened the woes of sub-Saharan Africa. Most countries in this region are net importers of wheat, maize, oil, etc. (Ratha et al., 2022). FAO et al. (2019) report that 2 billion of the world's population live with moderate or severe food insecurity and that hunger is a growing phenomenon in Africa. Of the 260 million people living with hunger on the continent as of 2018, 90% were within the sub-Saharan African (SSA) region (Ebadi et al., 2020; Karamba et al., 2011; Masa et al., 2020).

The foregoing underscores the fact that food security is an important subject of discourse on the continent and in particular within SSA. More research is required to help address the challenge of food insecurity. This is especially important given food security's implications for crucial sectors such as health, education and national security.

While Ghana is reported to be making good progress on some SDGs such as 12 and 13, the same cannot be said for SDG 2, where the nation's performance is reported as “stagnating” (Sachs et al., 2022). The trends point to prevailing inequalities with respect to poverty and food security. The Ghana Statistical Service (GSS) points out that 3% of the labour force is engaged in agriculture as a main source of income (GSS, 2016). However, given that agriculture remains largely small scale, rain-fed and unattractive for credit advances from financial institutions, rural communities, which are often the ones engaged in agriculture, tend to experience poverty and uncertainty about their next meal. Thus, a significant proportion of the farming and rural population, particularly in the northern parts of Ghana, continues to experience extreme forms of poverty and food insecurity (Zereyesus et al., 2014). For such households, non-farm income sources such as remittances are of utmost importance in the face of challenges to the practice of agriculture to shore up household food security. (Tsiboe et al., 2016). Remittances have been identified as an important source of income for households, especially in developing countries, as well as foreign exchange (Ebadi et al., 2020; Ratha et al., 2022; Sam et al., 2013). Remittances also contribute to the development of national economies since they come second to foreign direct investments in the sub-Saharan African region, in terms of financial inflows (World Bank, 2018). The World Bank (2019) ranked Ghana the second highest recipient of international remittances, estimated at US\$ 3.5 billion in sub-Saharan Africa.

Remittances, which can be monetary or non-monetary (Ebadi et al., 2020), are usually private and affect the lives of families (Sulemana et al., 2019). They are classified under two types: namely, domestic remittances and international or foreign remittances. They are also categorized as cash transfers and food remittances (Crush & Caesar, 2018). There are also remittances that households receive in the form of other goods besides food.

Ebadi et al. (2020) report that families that received domestic remittances were relatively poorer than families that received monies from abroad. In Ghana, remittances are a key source of household income. In the 12 months



under its review, the Ghana Living Standards Survey (GLSS) 7 report (2017) indicates that the total amount of cash received as remittance amounted to Gh¢ 687.1 million. Out of this, over Gh¢ 384 million, representing 55.9%, were domestic remittances (i.e., were received from migrants living within Ghana). This points to the crucial role domestic remittances play, given that more than half of remittances received over the period were domestic.

It has been argued that remittances support the ability of households to meet their daily needs and provide a strategy for coping with or mitigating against the effects of the shocks of economic down turns, climate change and, presently, pandemics which impose restrictions on movement (Bhalla et al., 2018; Ogunniyi et al., 2020; Tarasuk et al., 2016). There have, however, not been enough studies to show the impact of remittances on food security directly. Ebadi et al. (2020) suggest that the study area of remittances and how they influence food security has not been fully explored, especially within the sub-Saharan African region. This study seeks to make advances towards remedying this gap in literature by delving into an analysis of the relationship between regular remittances and food security in Ghana using the most recent national survey, the GLSS 7. The study also seeks to expand the literature by contributing to findings on the role of domestic remittances as a determinant for food security.

The existing literature generally confirms that scholarly interest in the area of remittances and food security has arisen in recent times, with most literature drawing a nexus between migration, remittances and food security or by extension development. This is consistent with the growing impetus that the concept has taken on worldwide, since cash transfers have witnessed sustained growth in the last twenty years (Crush & Caesar, 2018; Ratha et al., 2022). In 2021, global remittances to low- and middle-income countries (LMICs) are reported as US\$ 605 billion (Ratha et al., 2022). This reflects an increase in flows despite the global economic challenges which face the world as a result of the COVID-19 pandemic.

Ebadi et al. (2018) considered the impact of remittances on the food security status in the Global South. The researchers sought to confirm whether the positive association between remittances and food security was present in all the sampled countries on the basis of data from the 2017 World Gallup poll. Their study concluded that Africa, and more specifically sub-Saharan Africa, has the highest number of food-insecure people in the world. According to them, the determinants of food security in Africa include climate change, agricultural output, family income, conflicts and insecurity. Remittances showed a positive association with food security and were confirmed to be a critical source of stable incomes for households.

Ebadi et al. (2020) again used data from the 2014–2017 Gallup World Poll to investigate the relationship between food security status and the receipt of remittances. They found that households that received domestic remittances are relatively more food insecure when compared with households that received remittances from international sources. They confirm that remittances are critical for families that face financial difficulties, and they are used to meet routine expenses, which include spending on education, training, health and buying consumer goods. Thus, they found that receiving remittances was a determinant of food security. The GLSS 7 (2017) report, which reveals that remittances from domestic sources are crucial in Ghana, may be a useful indicator for food security among Ghanaian households, as Ebadi et al. (2020) have found that remittances from domestic sources may have a role to play in household food security analysis.

Sulemana et al. (2019) expanded the existing literature by focusing their investigations into the relationship between remittances and food security in 32 countries in the sub-Saharan African region. Apart from widening the scope in terms of study participation and generalization of application, they also explored the frequency of remittances and whether this affects the food security status of households. The study enriches the discourse on the subject by leveraging previous studies which concluded that sub-Saharan Africa was experiencing an increase in food insecurity levels. The key takeaway from their study is that, beyond the positive effect that remittances have on household food security, it is more crucial that attention is paid to the frequency or regularity of these cash transfers.

Kuuire et al. (2013) sought to study the ways in which food remittances impacted recipient households in Ghana as a developing nation. They used households in the Upper West Region of Ghana as a representative sample.



According to them poverty is linked to growing food insecurity, hence their choice of the vulnerability framework as a theoretical grounding for their study. Theirs was a qualitative study which allowed them to explore the importance of food remittances in the face of environmental change and poverty. They found that households are unable to provide adequate food to meet the dietary needs of their families all year round and that rural poor families in Ghana rely on food remittances as a means of managing the insecurity they experience when it comes to food and nutrition. Remittance inflows are found to be essential for navigating the constraints imposed by the effects of climate change and delayed advances with respect to modern agriculture. They arrive at the conclusion that food remittances are critical for coping with the uncertainties around food availability and the shocks of high food prices during the lean season. The prevailing knowledge posits that remittances are used primarily for household expenditure related to food, clothing and shelter (Sumata & Cohen, 2018).

Atuoye et al. (2017) investigated the relationship between residential remittances and food security in the Upper West Region of Ghana. Their findings show that food security is influenced by migration and remittances. According to that study, remittances are not leading to food security among poorer households, thus emphasizing the deep effects that persistent socio-economic inequalities present. Thus, such poor families depend on remittances to meet their basic daily needs. This finding agrees with the findings of Karamba et al. (2011), which reveal that remittances are not necessarily a shock absorber where poverty and the effects of economic instability are concerned. Atuoye et al. (2017) concluded that there is the need for a national food security policy which incorporates dynamic approaches to farming and the creation of alternative livelihoods which support the development of local economies. Kuuire et al. (2013) studied the impact of remittances as a shock absorber against poverty and environmental change, and Atuoye et al. (2017) studied the relationship between residential or domestic remittances and food security. With a focus on migration as a result of increasing urbanization and an awareness of the food insecurity problem faced by not only rural dwellers but urban settlers, as well, Atuoye et al. (2017) broadened their scope to take into account the experiences of both rural and urban populations within the Upper West Region of Ghana. To achieve this, they made use of the New Economic and Labour Migration discourse. This allowed the authors to analyse migration from a more holistic view where existing structural and agency factors are considered to see how they inform migration and, by extension, food remittances to improve food security. They found that both rural and urban dwellers who were poor and food insecure benefitted from food remittances, especially in the seasons of food shortages.

In summary, the limited studies done suggest that, generally, remittances have a positive effect on household food security (Atuoye et al., 2017; Ebadi et al., 2020; Sam et al., 2013; Sulemana et al., 2019). However, the scope of the existing literature suggests that a country-level study is necessary. Ebadi et al. (2018), for instance, posit that, though their multi-country study found that remittances might influence food security positively, the association may not hold for each of the countries in the sample. Thus, our study focusing on Ghana, with its ability to capture the effects of the country's unique economic and social features, will complement the literature and enhance insights into the relationship between remittances and food security in Ghana. This is especially important in our case because a previous related study on Ghana (Karamba et al., 2011) found no significant effect between migration and food consumption of migrant-sending households. In addition, our study adds to the literature on the subject matter, which is relatively scant compared with the literature available on other social and economic issues and is still a developing area of research.

To this end, this study seeks to examine the relationship between remittance inflows and food security in Ghana. Our objective is to investigate the association between domestic remittances and food security among Ghanaian households, focusing more on the regularity of remittance inflows. Furthermore, we aim to conduct a disaggregated analysis by disaggregating remittances into different forms to examine their individual effects on food security. We contribute to the literature in at least three ways. First, this study not only focuses on the value of remittances that households receive but also investigates how the regularity of receiving these remittances may affect their food security situation. This feature of 'regularity of receiving remittances' is not common with previous studies. Therefore, examining it in this study fills that gap in the literature. Secondly, we conduct a disaggregated



analysis of remittances received in the same study. Previous studies focus either on cash remittances or food remittances. Our study goes further to observe the separate associations of cash remittances, food remittances and remittances in the form of other goods with the food security situation of households. By doing this, we contribute to the literature in understanding which remittance form tends to have a greater and more significant association with household food (in)security. Furthermore, the scant studies done on Ghana have focused on particular regions or communities mostly in northern Ghana, without the use of national-level data that allows for a holistic analysis (see Atuoye et al., 2017; Kuuire et al., 2013). By employing data that covers a nationally representative sample, we provide an analysis that could reflect the Ghanaian situation more comprehensively.

## 2 | DATA AND METHODOLOGY

### 2.1 | Data

This study uses data from the seventh and latest round of an official statistical survey, the Ghana Living Standards Survey (GLSS 7). The living standards surveys are nationwide household-level surveys that collect data on demographics and economic and social variables. They remain the most comprehensive source of household-level data in Ghana relative to scope and coverage. The surveys are conducted by the Ghana Statistical Service (GSS), Ghana's official statistics bureau. The sampling frame consists of persons living in private households but excludes the population in institutions such as hospitals and schools. The enumeration areas (EAs) for the survey are stratified into the administrative regions.<sup>1</sup> The survey for GLSS 7 began in September 2016 and ended in October 2017, covering 14,000 households. The GSS adopted a two-stage stratified random sampling design. In the first stage, 1,000 EAs were selected to cover the 10 regions. The second stage involved the sampling of households in these EAs. A nationally representative sample of 15,000 households was selected, out of which 14,009 responded to the survey. Summary statistics of the variables included in this study are shown in Table 1.

### 2.2 | Theoretical framework and empirical methodology

We estimate the association between regular remittance inflows and household food security status. Our analyses are conducted on the basis of the permanent income theory of consumption by Friedman (1957). According to the theory, individuals consume based on expected average long-term income (permanent income), demonstrated mathematically as follows:

$$C = aY^P, \quad (1)$$

where  $C$  is consumption,  $Y^P$  is permanent income and  $a$  is the fraction of permanent income spent on consumption. Furthermore, Friedman (1957) argued that transitory income is not likely to have a significant influence on consumption. According to Friedman (1957), permanent income comprised both labour income and non-labour income, which in the context of this study would include remittances received. From the theoretical perspective, remittances can influence consumption in several ways. For instance, remittances can reduce budget constraints and smoothen individuals' consumption patterns (Taylor et al., 2003). Remittances could also translate into food security by serving as a hedge against likely emergencies and economic shocks (Gubert, 2002; Poirine, 1997; Stark & Levhari, 1982) as well as enhancing savings and investments that allow recipient households to be more self-sufficient

<sup>1</sup>Since 2019, new regions have been created in Ghana by re-demarcating previous regional boundaries. Consequently, the total number of regions in Ghana now stands at 16. The regional effects included in this study are done on the basis of the 10 regions that existed at the time of the survey, in 2016/2017.

**TABLE 1** Variables and definitions

Variables	Definition
Food insecurity (any indicator)	Dummy (1 = food insecurity by an experience of at least one indicator; otherwise, 0)
Food insecurity (moderate to severe)	Dummy (1 = food insecurity by an experience of at least four indicators; otherwise, 0)
Food insecurity (severe)	Dummy (1 = food insecurity by an experience of at least six indicators; otherwise, 0)
Total remittances	Continuous (value of total domestic remittances received in all forms in Gh¢ '000)
Regularity	Dummy (1 = remittance received regularly; otherwise, 0)
Ln of household expenditure	Continuous (log of household expenditure)
Education of household head	Categorical (4 = tertiary; 3 = secondary; 2 = junior high/middle school; 1 = primary; 0 = no formal education)
Household size	Continuous (household size)
Location	Dummy (1 = urban; otherwise, 0)
Gender of head of household	Dummy (1 = male; otherwise, 0)
Food remittance	Continuous (value of domestic food remittances received in Gh¢ '000)
Cash remittance	Continuous (value of domestic cash remittances received in Gh¢ '000)
Other goods remittance	Continuous (value of domestic remittances received in the form of other goods in Gh¢ '000)

(Cox & Jimenez, 1992; Lucas & Stark, 1985; Yang, 2008). Finally, it has been postulated that the migration experience could sensitize individuals as to the need to improve the general wellbeing of their relatives who were left behind, for which reason they might send remittances (Cox-Edwards & Ureta, 2003; Stark, 1991; Stark & Lucas, 1988; Djajić, 1986). Adapting this theory to our analyses, receiving regular remittances forms part of the permanent income of households, and thus we test empirically how that might influence their consumption of food and, consequently, their food security status. Based on the foregoing, we specify a model for the probability of experiencing food insecurity as follows:

$$\text{Food insecurity experience}_i = \beta_0 + \beta_1 R_i + \beta_2 RR_i + \beta_3 X_i + \varepsilon_i, \quad (2)$$

where  $R$  is the value of remittances received in Ghana cedis (Gh¢),  $RR$  represents whether remittances are received regularly or otherwise and  $X$  is a vector of relevant control variables. Regular receipt means that households received remittances on a regular basis at specified intervals of time as opposed to one time or isolated cases of receiving a remittance. On the basis that there are different forms of remittances as identified in the literature (Crush & Caesar, 2018), this study disaggregates remittances to examine their individual effects. To observe the effect of specific remittances on food security, we disaggregate  $R$  in Equation (2) into three components: the food remittance, cash remittance and other goods remittance. The values (in Ghana cedis) of food remittance, cash remittance and other goods remittance are used to replace  $R$  in Equation (2) as follows:

$$\text{Food insecurity experience}_i = \beta_0 + \beta_1 FR_i + \beta_2 CR_i + \beta_3 OR_i + \beta_4 RR_i + \beta_5 X_i + \varepsilon_i, \quad (3)$$

where  $FR$ ,  $CR$  and  $OR$  represent the values in cedis of food remittance, cash remittance and other goods remittance, respectively.

Food security is measured by calculating three binary variables as indicators of food insecurity, following the FAO's Food Insecurity Experience Scale (FIES). In the GLSS 7 survey, respondents were asked eight dichotomous choice questions following the FAO on feeding experiences in the 12 months preceding the survey to indicate their



level of food (in)security.<sup>2</sup> These questions require either a yes (1) or no (0) response. First, the FIES raw score is calculated as the sum of a respondent's responses to each question, after which three food insecurity experiences are computed as defined by FAO (2015) as follows: any indicator of food insecurity is equal to 1 if the raw score is at least 1, otherwise 0; moderate-to-severe food insecurity is equal to 1 if the raw score is at least 4, otherwise 0; and severe food insecurity is equal to 1 if the raw score is at least 7, otherwise 0 (FAO, 2015). Thus, we end up with three different food insecurity experience categories: any food insecurity indicator, moderate-to-severe food insecurity, and severe food insecurity. The left-hand side of Equations (2) and (3) are therefore represented by each of these food insecurity variables. Thus, Equations (2) and (3) are each estimated thrice, with the dependent variables in the three estimations being the three food insecurity variables.

Equations (2) and (3) are estimated by linear probability modelling with region fixed effects to account for regional heterogeneities. Even though the logit or probit has been widely used to estimate binary dependent variables, there is bias associated with using them in the presence of fixed effects (Greene, 2002). Thus, following Bellemare et al. (2015), we adopt the linear probability model (LPM) to estimate Equations (2) and (3). The coefficients from the LPM represent changes in probability without further transformation as in the case of the logit or probit. There is the possibility of confounding but unobservable factors in households' receiving remittances. That is, there could be factors that influence the receipt of remittances that might also influence food insecurity but are unobservable from the data, and hence we are unable to account for them. However, given the practical difficulty in obtaining a valid and relevant instrument to account for this, our results best explain the association between regular remittance inflows and food insecurity. Table 1 describes the variables used in the study and their definitions.

## 3 | ANALYSIS AND DISCUSSION OF RESULTS

### 3.1 | Summary statistics

Table 2 presents the summary statistics for the variables used in the study. The average value of total remittances received was Gh¢ 827.<sup>3</sup> Food remittances averaged Gh¢ 85, and cash remittances averaged Gh¢ 685, while other goods remittances averaged Gh¢ 57. With regard to the regularity of remittances, 58% of the respondents received remittances regularly. Of the households, 71% had experienced at least one indicator of food insecurity (i.e., any food insecurity), while 52.5% and 27% experienced moderate-to-severe food insecurity and severe food insecurity, respectively. Regarding the socio-demographic characteristics, on average, 31.8%, 28.9%, 13.7% and 6.2% of heads of households had primary, junior high/middle school, secondary and tertiary levels of education, respectively. This shows that, on average, a majority of the respondents had attained relatively lower levels of education. About 58% of the respondents reside in rural areas while the average household size is approximately 4. Further analysis of the data showed that a large proportion of remittances came from urban areas, as expected. Remittances received from urban areas to urban areas accounted for 40% of remittances received, while remittances from urban areas to rural areas accounted for 44.5%. Remittances from rural areas to rural areas accounted for 13.3%, while remittances from rural areas to urban areas accounted for only 2.2% of remittances received.

### 3.2 | Remittances, regularity of inflows and food security

Table 3 reports results from the linear probability model regression of remittances, regularity of remittance inflows and other covariates on food insecurity. Models 1, 2 and 3 represent the three different food insecurity experience

<sup>2</sup>The eight questions related to food security have been provided in the [appendix](#) (Table A1)

<sup>3</sup>The exchange rate averaged US\$ 1.00:Gh¢ 4.4 in 2017

**TABLE 2** Summary statistics

Variable	Observations	Mean	Standard deviation	Min	Max
Food insecurity (any indicator)	6,961	0.714	0.452	0	1
Food insecurity (moderate to severe)	6,961	0.525	0.499	0	1
Food insecurity (severe)	6,961	0.270	0.444	0	1
Food remittances (Gh¢ '000)	6,961	0.085	0.302	0	8.4
Cash remittances (Gh¢ '000)	6,961	0.685	2.467	0	100
Other goods remittances (Gh¢ '000)	6,961	0.057	0.349	0	15
Total remittances (Gh¢ '000)	6,961	0.827	2.582	0	100
Regularity (1 = regular)	6,961	0.580	0.494	0	1
Ln of household expenditure	6,961	8.897	0.800	4.592	11.876
Education					
Primary	6,961	0.318	0.466	0	1
Junior high/middle school	6,961	0.289	0.453	0	1
Secondary	6,961	0.137	0.344	0	1
Tertiary	6,961	0.062	0.242	0	1
Household size	6,961	4.002	2.807	1	25
Location (1 = urban)	6,961	0.426	0.495	0	1
Gender of household head (1 = male)	6,961	0.528	0.499	0	1

**TABLE 3** Linear probability results: Probability of food insecurity

VARIABLES	(1)	(2)	(3)
	Food insecurity (any indicator)	Food insecurity (moderate to severe)	Food insecurity (severe)
Total remittances received (Gh¢ '000)	-0.012*** (0.002)	-0.008*** (0.002)	-0.004*** (0.001)
Regularity (1 = regular)	-0.039*** (0.010)	-0.035*** (0.011)	-0.018* (0.010)
Ln of household expenditure	-0.114*** (0.008)	-0.130*** (0.008)	-0.093*** (0.008)
Primary	-0.021 (0.013)	-0.052*** (0.015)	-0.080*** (0.015)
Junior high/middle school	-0.065*** (0.014)	-0.073*** (0.016)	-0.097*** (0.016)
Secondary	-0.133*** (0.018)	-0.134*** (0.020)	-0.123*** (0.018)
Tertiary	-0.195*** (0.026)	-0.204*** (0.025)	-0.154*** (0.021)
Household size	0.021*** (0.002)	0.028*** (0.002)	0.020*** (0.002)
Location (1 = urban)	-0.035*** (0.012)	-0.036*** (0.013)	0.003 (0.011)
Gender of household head (1 = male)	-0.061*** (0.011)	-0.081*** (0.011)	-0.041*** (0.010)
Constant	1.651*** (0.073)	1.555*** (0.076)	1.006*** (0.072)
Region fixed effects	Yes	Yes	Yes
Observations	6,961	6,961	6,961
R-squared	0.189	0.209	0.205

Notes: Robust standard errors in parentheses.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .



categories: any food insecurity indicator, moderate-to-severe food insecurity and severe food insecurity, respectively.

The results from Table 3 indicate that total remittances have a significant negative relationship with food insecurity. This means that receiving a higher value of remittance reduces the probability of being food insecure. Specifically, a Gh¢ 1,000 increase in remittances is associated with a reduction in any food insecurity, moderate-to-severe food insecurity and severe food insecurity by 1.2%, 0.8% and 0.4% respectively. Furthermore, the study found a significant negative relationship between the regularity of remittances and food insecurity. Compared with those who do not receive regular remittances, those who do are about 3.9%, 3.5% and 1.8% less likely to have any indicator of food insecurity, moderate-to-severe food insecurity and severe food insecurity, respectively. This finding supports that of Sulemana et al. (2019). It could be attributed to the fact that households that receive regular remittances are likely to augment their household income, which helps them improve their food security situation (De & Ratha, 2012; Regmi & Paudel, 2016). According to Regmi and Paudel (2016), food security is related to poverty. Therefore, as long as the receipt of remittances improves the household poverty situation, overall food security for households can be improved. In addition, remittances could lessen the effect of economic shocks on the wellbeing of households (Regmi & Paudel, 2017) and thus could explain why remittances reduce the likelihood of experiencing food insecurity. The finding could also be linked to the permanent income theory by Friedman (1957). That is, those who receive regular remittances regard them as part of their permanent income, and those who do not receive remittances regularly could consider it as transitory income. Therefore, as explained earlier, those who receive the remittances regularly are likely to have an improved food security situation, while one-time or isolated cases of remittances are less likely to improve households' food security situation significantly since they are transitory.

Advancement in educational attainments decreases the chances of food insecurity, which was significant in all the models. Furthermore, the absolute value of the coefficient of education increases with each level of education. Heads of households with secondary education are less likely to experience food insecurity by between 12.3% and 13.4% compared with those with no formal education, while those with tertiary education are between 15.4% to 20.4% less likely to experience food insecurity compared with those with no formal education. Those with higher education are more likely to have higher incomes than those with lower educational attainments, as poverty is more prevalent among those with no level or low levels of education (Regmi & Paudel, 2016; 2017). The higher incomes could be used in food consumption, thus reducing the likelihood of experiencing food insecurity. The finding confirms the works of Mora-Rivera and van Gameren (2021), Sulemana et al. (2019), Abdullah et al. (2019), and Ebadi et al. (2018). It is also in line with Mango et al. (2014), who found that food security increased among households with literate heads.

A 1% increase in the spending of a household, used as a proxy for household income, decreases the likelihood of that household having any indicator of food insecurity, moderate-to-severe food insecurity and severe food insecurity by 0.11, 0.13 and 0.09, respectively. This confirms the study by Habtewold (2018), who found that households that owned more assets had higher tendencies of being food secure than those who owned no or fewer assets. Smith et al. (2017) also found lower food security in countries with low levels of GDP per capita. This is also attributable to the fact that higher levels of income are associated with a greater ability to buy more food as well as other goods that improve health and general wellbeing, which has the potential of improving food security (Barrett, 2002). Without adequate income, people cannot obtain the food they need. At one point or another, not having enough funds implies that one may have to consume cheaper meals or fewer meals in a day. This has implications for dietary needs, rendering them partially met or unmet.

The location of a household has a significant relationship with having any indicator of food insecurity and moderate-to-severe food insecurity but not severe food insecurity. Compared with rural areas, people in the urban areas had lower chances of being food insecure. This confirms the existence of overall urban-rural inequalities in Ghana, as observed in other countries, and hence food insecurity should not be addressed or treated homogeneously for households in different locations (eg., Sahn & Stifel, 2003; Thu Le & Booth, 2014). Our finding is in line with



Ebadi et al. (2018) but contradicts the work of Smith et al. (2017), who suggested that being in a rural or urban area does not matter for food security.

Household size represents the household's consumption level needs and the associated burden involved in feeding its members. The study revealed that an increase in household size has a positive and significant effect on food insecurity. Larger households face a higher "burden to feed" and, hence, are more probable to be food insecure (Gebre, 2012; Mango et al., 2014; Mitiku et al., 2012).

The findings show that male-headed households were less likely to be food insecure. This means that females have a higher probability of experiencing any form of food insecurity than males. This be due to the fact that most females in the relationship have little power over household resource and food allocation (Quisumbing & Pandolfelli, 2010). Females also have lower income levels due to the lower positions they occupy in the labour market as well as the inability to invest in their own skills and education due to caretaking responsibilities in the home (Selepe et al., 2015). This is consistent with the works of Adjei-Mantey et al. (2022), Negesse et al. (2020) and Selepe et al. (2015). Nonetheless, it contradicts studies by Silvestri et al. (2015) and Mallick and Rafi (2010), in which no significant relationship was found which could be the case when both males and females have the freedom to participate in the labour market without any social and cultural restrictions.

### 3.3 | Disaggregated analysis of different remittance forms

Next, we perform a disaggregated analysis to ascertain how different forms of remittances relate to food insecurity.

Table 4 reports the results of the disaggregated components of remittances on food insecurity. It shows that cash and other goods remittances are negative and significantly associated with food insecurity, but food remittances, though negative, were not significant. While the insignificance of the association between food remittances and food insecurity may be a curious finding, it is plausible. This is because receiving food remittances does not necessarily imply receiving the preferred kinds of foods or foods that carry the nutritional value required by the recipient, thereby not contributing significantly to the household's food insecurity experience since the questions used to measure the FIES include questions on eating different kinds of foods and foods with the nutrients required by the household. Specifically, the results reveal that a Gh¢ 1000 increase in the value of cash and other goods remittances is associated with a 1.1% and 3.2% decrease in the chances of having any indicator of food insecurity, respectively. A Gh¢ 1000 increase in the value of cash and other goods remittances decreases the probability of being moderately to severely food insecure by 0.7% and 2.1%, respectively. Severe food insecurity is significantly associated with cash remittances only. A Gh¢ 1000 increase in cash remittances reduces the likelihood of severe food insecurity by 0.4%. Other remittance forms have no significant association with severe food insecurity. What this implies is that severe food insecurity, which occurs when the household is deprived in almost all or all of the indicators, can only be significantly mitigated by cash remittances per the findings of this study. Studies by Mora-Rivera and van Gameren (2021), Moniruzzaman (2022) and Rahman and Mishra (2020) have shown that remittances in the form of income improve food security, as demonstrated in this study. The magnitudes of the coefficient for the different forms of remittances were highest for other goods remittance. Thus, while remittances are often discussed in the context of cash receipts, our results show that non-cash remittances in the form of other goods received by households appear to be an important factor that can influence household food insecurity. Households could allocate their own funds to meeting dietary or food needs since other needs might have been met with the receipt of non-cash (other goods) remittances. Hence, the importance of remittances in non-cash forms such as other goods remittances cannot be underestimated. Other covariates such as household expenditure, location (urban), gender (male heads) and education maintain their negative and significant relationship with all forms of food insecurity, while household size maintains its significant positive association with food insecurity in the disaggregated analysis.

In summary, our results show that remittances could play an important role in households' food insecurity statuses, particularly when the remittances are received regularly. Furthermore, we show that, in addition to cash

**TABLE 4** Linear probability results: Probability of food insecurity, disaggregated analysis

VARIABLES	(1)	(2)	(3)
	Food insecurity (any indicator)	Food insecurity (moderate to severe)	Food insecurity (severe)
Food remittances (Gh¢ '000)	-0.008 (0.018)	-0.018 (0.018)	-0.005 (0.011)
Cash remittances (Gh¢ '000)	-0.011*** (0.002)	-0.007*** (0.002)	-0.004*** (0.001)
Other goods remittances (Gh¢ '000)	-0.032* (0.017)	-0.021** (0.010)	-0.012 (0.007)
Regularity (1 = regular)	-0.039*** (0.010)	-0.034*** (0.011)	-0.017* (0.010)
Ln of household expenditure	-0.113*** (0.008)	-0.129*** (0.008)	-0.092*** (0.008)
Primary	-0.021 (0.013)	-0.052*** (0.015)	-0.080*** (0.015)
Junior high/middle school	-0.065*** (0.014)	-0.074*** (0.016)	-0.097*** (0.016)
Secondary	-0.133*** (0.018)	-0.134*** (0.020)	-0.123*** (0.018)
Tertiary	-0.195*** (0.026)	-0.205*** (0.025)	-0.154*** (0.021)
Household size	0.020*** (0.002)	0.028*** (0.002)	0.020*** (0.002)
Location (1 = urban)	-0.035*** (0.012)	-0.036*** (0.013)	0.003 (0.011)
Gender of household head (1 = male)	-0.060*** (0.011)	-0.081*** (0.011)	-0.040*** (0.010)
Constant	1.646*** (0.073)	1.551*** (0.076)	1.004*** (0.072)
Region fixed effects	Yes	Yes	Yes
Observations	6,961	6,961	6,961
R-squared	0.189	0.209	0.205

Notes: Robust standard errors in parentheses.

\*\*\* $p < 0.01$ . \*\* $p < 0.05$ . \* $p < 0.1$ .

remittances, other goods remittances are also important in promoting food security among Ghanaian households and, by extension, households in developing countries.

## 4 | CONCLUSION AND POLICY IMPLICATIONS

This study assessed the factors that influence food security in Ghana, employing data from the GLSS 7. The study showed that an increase in remittances of cash and other goods is associated with being more food secure. In disaggregating remittances, the study found that the magnitudes of the coefficient differed, with other goods remittance having the higher. This emphasizes the significance of non-cash remittances in improving food security. In addition, improvement in food security is associated with the frequency of remittances. Regular remittances have a more significant association with food security than one-time or isolated receipts of remittances. Thus, the study demonstrates that remittances could play an important role in attaining Sustainable Development Goals 2 and 3 on ending hunger and in achieving food security and improved nutrition, as well as ensuring healthy living and promoting wellbeing for all ages. The implications of the findings are varied. Policies to ease not only remittance inflows but also regular inflows of these remittances will ultimately lead to improved food security among Ghanaian households and thus ought to be encouraged. We recommend that policymakers encourage the regular inflow of remittances by reducing transaction and operational costs. Promoting competition in remittance services, enhancing regulation to ease the processes involved and having a responsive financial sector could be starting points for easing the inflow of remittances. This will complement the government's own efforts at ensuring adequate food security, which it is



currently undertaking through its food security policy known as Planting for Food and Jobs. Furthermore, we recommend that policies to promote higher education attainment and those that increase household incomes should be pursued, given their positive correlation with food security. The findings also have implications for the theory of permanent income, as it provides the empirical basis to support the theory. Households receiving regular remittances count on these to improve their consumption. The study might be limited by the inability to account for a variable such as land ownership which could potentially influence the food insecurity experience of households due to data constraints. We recommend that future studies attempt to empirically test the impact pathways from remittances received to food security to increase the knowledge on this subject.

## DATA AVAILABILITY STATEMENT

Data for this study can be accessed at [www.statsghana.gov.gh](http://www.statsghana.gov.gh).

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## REFERENCES

- Abdullah, Z. 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>
- Adjei-Mantey, K., Kwakwa, P. A., & Adusah-Poku, F. (2022). Unraveling the effect of gender dimensions and wood fuel usage on household food security: Evidence from Ghana. *Heliyon*, 8(11), e11268. <https://doi.org/10.1016/j.heliyon.2022.e11268>
- Atuoye, K. N., Kuuire, V. Z., Kangmenaa, J., Antabe, R., & Luginaah, I. (2017). Residential remittances and food security in the upper west region of Ghana. *International Migration*, 55(4), 18–34. <https://doi.org/10.1111/imig.12310>
- Barrett, C. B. (2002). Food security and food assistance programs. *Handbook of Agricultural Economics*, 2, 2103–2190.
- Bellemare, M. F., Novak, L., & Steinmetz, T. L. (2015). All in the family: Explaining the persistence of female genital cutting in West Africa. *Journal of Development Economics*, 116, 252–265. <https://doi.org/10.1016/j.jdeveco.2015.06.001>
- 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>
- Cox, D., & Jimenez, E. (1992). January. "social security and private transfers in developing countries: The case of Peru". *The World Bank Economic Review*, 6(1), 155–169. <https://doi.org/10.1093/wber/6.1.155>
- Crush, J. S., & Caesar, M. S. (2018). Food remittances and food security: A review. *Migration and Development*, 7(2), 180–200. <https://doi.org/10.1080/21632324.2017.1410977>
- De, P. K., & Ratha, D. (2012). Impact of remittances on household income, asset and human capital: Evidence from Sri Lanka. *Migration and Development*, 1(1), 163–179. <https://doi.org/10.1080/21632324.2012.719348>
- Djajić, S. (1986). International migration, remittances and welfare in a dependent economy. *Journal of Development Economics*, 21(2), 229–234. [https://doi.org/10.1016/0304-3878\(86\)90059-3](https://doi.org/10.1016/0304-3878(86)90059-3)
- Ebadi, N., Ahmadi, D., & Melgar-Quiñonez, H. (2020). Domestic and international remittances and food security in sub-Saharan Africa. *Remittances Review*, 5(1), 37–54. <https://doi.org/10.33182/rr.v5i1.842>
- Ebadi, N., Ahmadi, D., Sirkeci, I., & Melgar-Quiñonez, H. (2018). The impact of remittances on food security status in the global south. *Remittances Review*, 3(2), 135–150. <https://doi.org/10.33182/rr.v3i2.543>
- Edwards, C. A., & Ureta, M. (2003). International migration, remittances, and schooling: Evidence from El Salvador. *Journal of Development Economics*, 72, 429–461. [https://doi.org/10.1016/S0304-3878\(03\)00115-9](https://doi.org/10.1016/S0304-3878(03)00115-9)
- FAO. (2009). Declaration of the world summit on food security. Rome. 7 pp. (also available at <ftp://ftp.fao.org/docrep/fao/Meeting/O18/k6050e.pdf>)
- FAO. (2015). Modeling food insecurity in bivariate and regression analyses.
- FAO, IFAD, UNICEF, WFP, & WHO. (2019). The state of food security and nutrition in the world 2019. In *Safeguarding against economic slowdowns and downturns*. FAO.
- Friedman, M. (1957). The permanent income hypothesis. In: Friedman, M. (ed) *A theory of the consumption function*. Princeton University Press, 20–37.
- Gebre, G. G. (2012). Determinants of food insecurity among households in Addis Ababa city, Ethiopia. *Interdisciplinary Description of Complex Systems: INDECS*, 10(2), 159–173. <https://doi.org/10.7906/indecs.10.2.9>
- Greene, W. (2002). The bias of the fixed effects estimator in nonlinear models. Working paper. New York University.



- GSS. (2016). 2015 labour force report. Ghana Statistical Service. [LFS REPORT\\_fianl\\_21-3-17.pdf](https://statsghana.gov.gh/LFS_REPORT_fianl_21-3-17.pdf) (statsghana.gov.gh). Accessed on 18<sup>th</sup> September 2021.
- Gubert, F. (2002). Do migrants insure those who stay behind? Evidence from the Kayes area (Western Mali). *Oxford Development Studies*, 30(3), 267–287. <https://doi.org/10.1080/1360081022000012699>
- Habtewold, T. M. (2018). Determinants of food security in the Oromiya Region of Ethiopia. In *Economic growth and development in Ethiopia* (pp. 39–65). Springer. [https://doi.org/10.1007/978-981-10-8126-2\\_3](https://doi.org/10.1007/978-981-10-8126-2_3)
- Karamba, W. R., Quiñones, E. J., & Winters, P. (2011). Migration and food consumption patterns in Ghana. *Food Policy*, 36(1), 41–53. <https://doi.org/10.1016/j.foodpol.2010.11.003>
- Khan, Z. R., Midega, C. A., Pittchar, J. O., Murage, A. W., Birkett, M. A., Bruce, T. J., & Pickett, J. A. (2014). Achieving food security for one million sub-Saharan African poor through push–pull innovation by 2020. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 369(1639), 20120284. <https://doi.org/10.1098/rstb.2012.0284>
- Kuire, V., Mkandawire, P., Arku, G., & Luginaah, I. (2013). ‘Abandoning’ farms in search of food: Food remittance and household food security in Ghana. *African Geographical Review*, 32(2), 125–139. <https://doi.org/10.1080/19376812.2013.791630>
- Lucas, R. E., & Stark, O. (1985). Motivations to remit: Evidence from Botswana. *Journal of Political Economy*, 93(5), 901–918. <https://doi.org/10.1086/261341>
- Mallick, D., & Rafi, M. (2010). Are female-headed households more food insecure? Evidence from Bangladesh. *World Development*, 38(4), 593–605. <https://doi.org/10.1016/j.worlddev.2009.11.004>
- Mango, N., Zamasiya, B., Makate, C., Nyikahadzoi, K., & Siziba, S. (2014). Factors influencing household food security among smallholder farmers in the Muzdi district of Zimbabwe. *Development Southern Africa*, 31(4), 625–640. <https://doi.org/10.1080/0376835X.2014.911694>
- Masa, R., Khan, Z., & Chowa, G. (2020). Youth food insecurity in Ghana and South Africa: Prevalence, socioeconomic correlates, and moderation effect of gender. *Children and Youth Services Review*, 116, 105180. <https://doi.org/10.1016/j.childyouth.2020.105180>
- Mitiku, A., Fufa, B., & Tadese, B. (2012). Empirical analysis of the determinants of rural household food security in southern Ethiopia: The case of Shashemene District. *Basic Research Journal of Agricultural Science and Review*, 1(6), 132–138.
- Moniruzzaman, M. (2022). The impact of remittances on household food security: Evidence from a survey in Bangladesh. *Migration and Development*, 11(3), 352–371.
- Mora-Rivera, J., & van Gameren, E. (2021). The impact of remittances on food insecurity: Evidence from Mexico. *World Development*, 140, 105349. <https://doi.org/10.1016/j.worlddev.2020.105349>
- Negesse, A., Jara, D., Temesgen, H., Dessie, G., Getaneh, T., Mulugeta, H., & Negesse, Y. (2020). The impact of being of the female gender for household head on the prevalence of food insecurity in Ethiopia: A systematic-review and meta-analysis. *Public Health Reviews*, 41(1), 1–14, 15. <https://doi.org/10.1186/s40985-020-00131-8>
- Obi, C., Bartolini, F., & D’Haese, M. (2020). International migration, remittance and food security during food crises: The case study of Nigeria. *Food Security*, 12(1), 207–220. <https://doi.org/10.1007/s12571-019-00990-3>
- Ogunniyi, A. I., Mavrotas, G., Olagunju, K. O., Fadare, O., & Adedoyin, R. (2020). Governance quality, remittances and their implications for food and nutrition security in sub-Saharan Africa. *World Development*, 127, 104752. <https://doi.org/10.1016/j.worlddev.2019.104752>
- Poirine, B. (1997). A theory of remittances as an implicit family loan arrangement. *World Development*, 25(4), 589–611. [https://doi.org/10.1016/S0305-750X\(97\)00121-6](https://doi.org/10.1016/S0305-750X(97)00121-6)
- Quisumbing, A. R., & Pandolfelli, L. (2010). Promising approaches to address the needs of poor female farmers: Resources, constraints, and interventions. *World Development*, 38(4), 581–592. <https://doi.org/10.1016/j.worlddev.2009.10.006>
- Rahman, A., & Mishra, S. (2020). Does non-farm income affect food security? Evidence from India. *The Journal of Development Studies*, 56(6), 1190–1209. <https://doi.org/10.1080/00220388.2019.1640871>
- Ratha, D., Kim, E. J., Plaza, S., Riordan, E. J., & Chandra, V. (2022). Migration and Development Brief 36: A War in a Pandemic: Implications of the Russian invasion of Ukraine and the COVID-19 crisis on Global Governance of Migration and Remittance Flows. KNOMAD-World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.
- Regmi, M., & Paudel, K. P. (2016). Impact of remittance on food security in Bangladesh. In *Food security in a food abundant world* (Vol. 16, pp. 145–158). Emerald Group Publishing Limited. [10.1108/S1574-871520150000016006](https://doi.org/10.1108/S1574-871520150000016006)
- Regmi, M., & Paudel, K. P. (2017). Food security in a remittance based economy. *Food Security*, 9(4), 831–848. <https://doi.org/10.1007/s12571-017-0705-z>
- Sachs, J., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2022). *Sustainable development report 2022*. Cambridge University Press. <https://doi.org/10.1017/9781009210058>
- Sahn, D. E., & Stifel, D. C. (2003). Urban–rural inequality in living standards in Africa. *Journal of African Economies*, 12(4), 564–597. <https://doi.org/10.1093/jae/12.4.564>
- Sam, G. A., Boateng, F. O., & Oppong-Boakye, P. K. (2013). Remittances from abroad: The Ghanaian household perspective. *International Journal of Business and Social Science*, 4(1), 164–170.



- Selepe, B. M., Mtyingizane, S. S., & Masuku, M. M. (2015). Factors contributing to household food insecurity in Mhlontlo area, eastern cape, South Africa. *Journal of Hospitality and Tourism*, 4(1), 2223–814X.
- Silvestri, S., Sabine, D., Patti, K., Wiebke, F., Maren, R., lanetta, M., & Cristina, R. M. (2015). Households and food security: Lessons from food secure households in East Africa. *Agriculture & Food Security*, 4(1), 1–15, 23. <https://doi.org/10.1186/s40066-015-0042-4>
- Smith, M. D., Kassa, W., & Winters, P. (2017). Assessing food insecurity in Latin America and the Caribbean using FAO's food insecurity experience scale. *Food Policy*, 71, 48–61. <https://doi.org/10.1016/j.foodpol.2017.07.005>
- Stark, O. (1991). *The migration of labor*. Basil Blackwell.
- Stark, O., & Levhari, D. (1982). On migration and risk in LDCs. *Economic Development and Cultural Change*, 31(1), 191–196. <https://doi.org/10.1086/380135>
- Stark, O., & Lucas, R. E. (1988). Migration, remittances, and the family. *Economic Development and Cultural Change*, 36(3), 465–481. <https://doi.org/10.1086/451670>
- Sulemana, I., Bugri Anarfo, E., & Quartey, P. (2019). International remittances and household food security in sub-Saharan Africa. *Migration and Development*, 8(2), 264–280. <https://doi.org/10.1080/21632324.2018.1560926>
- Sumata, C., & Cohen, J. H. (2018). The Congolese diaspora and the politics of remittances. *Remittances Review*, 3(2), 95–108. <https://doi.org/10.33182/rr.v3i2.567>
- Tarasuk, V., Mitchell, A., & Dachner, N. (2016). *Household food insecurity in Canada, 2014*. Research to identify policy options to reduce food insecurity.
- Taylor, J. E., Rozelle, S., & De Brauw, A. (2003). Migration and incomes in source communities: A new economics of migration perspective from China. *Economic Development and Cultural Change*, 52(1), 75–101.
- Thu Le, H., & Booth, A. L. (2014). Inequality in Vietnamese urban–rural living standards, 1993–2006. *Review of Income and Wealth*, 60(4), 862–886.
- Tsiboe, F., Zereyesus, Y. A., & Osei, E. (2016). Non-farm work, food poverty, and nutrient availability in northern Ghana. *Journal of Rural Studies*, 47, 97–107. <https://doi.org/10.1016/j.jrurstud.2016.07.027>
- World Bank. (2018). Record high remittances to low- and middle-income countries in 2017. Retrieved from: <http://www.worldbank.org/en/news/press-release/2018/04/23/record-high-remittances-to-low-and-middle-income-countries-in-2017>
- World Bank. (2019). Migration and remittances, recent developments and outlook. Migration and Development Brief 31. Available at [World Bank Document](#)
- Yang, D. (2008). International migration, remittances and household investment: Evidence from Philippine migrants' exchange rate shocks. *The Economic Journal*, 118(528), 591–630. <https://doi.org/10.1111/j.1468-0297.2008.02134.x>
- Zereyesus, Y. A., Ross, K. L., Amanor-Boadu, V., & Dalton, T. J. (2014). Baseline Feed the Future Indicators for Northern Ghana 2012. Monitoring, Evaluation and Technical Support Services (METSS). Baseline Feed the Future Indicators for Northern Ghana 2012 Monitoring, Evaluation and Technical Support Services (METSS).

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## APPENDIX A

**TABLE A1** Food-security-related questions from GLSS 7

Number	During the last 12 months:
1	Was there a time when you or others in your household worried about not having enough food to eat because of a lack of money or other resources?
2	Still thinking about the last 12 MONTHS, was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?
3	Was there a time when you or others in your household ate only a few kinds of foods because of a lack of money or other resources?
4	Was there a time when you or others in your household had to skip a meal because there was not enough money or other resources to get food?
5	Still thinking about the last 12 MONTHS, was there a time when you or others in your household ate less than you thought you should because of a lack of money or other resources?
6	Was there a time when your household ran out of food because of a lack of money or other resources?
7	Was there a time when you or others in your household were hungry but did not eat because there was not enough money or other resources for food?
8	Was there a time when you or others in your household went without eating for a whole day because of a lack of money or other resources?

Source: GLSS 7.