



Factors Affecting Food Security of Rural Farming Households Left Behind in Northern Ghana

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Abstract

Internal migration has been recognised as important household livelihood strategy in the migration discourse. It helps to insure migrant households against risks as conceived by New Economics of Labour Migration Model. In view of this, some household heads embark on internal migration for livelihood purposes in their bid to support their households. They therefore, maintain links with their households left behind. This paper looks at this migratory pattern and its effects on household food security in the place of origin. The study employed questionnaire to collect primary data from 300 households selected through multi-stage sampling technique. The findings show that the factors which are significant for achieving household food security include ability to raise income (i.e. remittances); own farm production as well as access to farmland. It advocates economic empowerment of rural farming households to enable them continue to cater for their food needs and thereby build their resilience against shocks.

Key Words: household, consumption, food security, migration, welfare, remittances, left behind.

Introduction

The term food insecurity and security are usually employed to indicate whether people have adequate provision of food for consumption or not (Ayalew, 2006). Food security pertains to issues on access to sufficient quality and amount of food for human consumption. On the other hand, food insecurity represents a condition in which people have inadequate access to basic food intake to provide them with energy and nutrients required for productive lives (Cox *et al.*, 2001). There are several factors that could lead to household food security.

Generally, factors such as income level, health, food output, infrastructure, access to markets, natural disasters, drought, etc determine whether rural farming households could attain food security or not (Songsore, 2001). It has been asserted that food security regarding small holder rural farming households is undermined by factors such as low income generation, small farm size, large household size, low utilization of improved farming inputs, etc. Male out-migration could restrict the size of household farm and output; and thereby exacerbate poverty because of decline in household labour supply (Yaro and Hesselberg, 2010; de Haan, 2000; Rogaly, 2003, Khan *et al.*, 2003). In view of this, poor rural farming households are often unable to produce or buy adequate amount of food to satisfy their food needs. Therefore, they are susceptible to suffer from ill-health conditions associated with malnutrition (Yaro and Hesselberg, 2010)

It is observed that unhealthy people are less productive because they are compelled to use their time and limited financial resources to seek medical treatment at the expense of their other basic needs i.e. food. This situation usually reduces the hours available for working on their fields and consequently, retards their efforts to increase output and exit poverty. It is estimated that fall in productivity due to hunger can lead to about 10.0 percent decline in per capita gross domestic product (Oni *et al.*, 2010). In addition, the meagre resources squandered on settling health care bills further plunges households into deprivation and thereby reduce their access to food. In view of this, the UN Standing Committee on Nutrition considers that proper nutrition constitutes a significant basis for poverty reduction and attainment of the Millennium Development Goals related to improvement in education, child mortality and maternal health (POST, 2006). The international community consistently draws attention to the plight of the poor and the need for bringing down the proportion of population living in poverty hence, MDG One was dedicated to halving the proportion of hungry or undernourished population by 2015 (UN, 2000).

It has been recognized that availability of and access to sufficient and quality food are critical elements among the basic human needs identified within a hierarchy of concerns highlighted by Maslow (Handy, 1985). According to Maslow, within this hierarchy, "lower order needs are dominant until satisfied, whereupon the higher order needs come into operation.... If you are starving, your needs for self-esteem or status will be unimportant; only food matters" (Handy, 1985:30). Thus, adequate stock of food available to a household is relevant to ensure human security which is paramount to livelihood sustainability of the poor.

It has been acknowledged that migration could have both positive and negative effects on both places of origin and destination of migrants (Oderth, 2002; David *et al.*, 1995; Deshingkar and Grimm, 2004). Mendola (2006) argues that out-migration of adult members of a rural farming household could affect those left behind through labour-loss and remittances. Some of the likely adverse consequences of migration of males in farming households on those left behind include labour shortage which could result in increased workload compared to their counterparts in households where adult male members are not in migration (Agyei, 2012, Yaro and Hesselberg, 2010). This could also result from the affected households' inability to hire farm labourers to maintain or increase food output. This could lead to reduction in farm size and undermine subsistence crop production and household food security. Similarly, if the households do not have disposable income to enable them procure food from the market, their food needs would not be met (food insecurity). Consequently, this could undermine the health status of the household members, particularly children.

Some of the implications of household food insecurity are that, it could compel households to conscript children of school-going age to household labour; some children may resort to engagement in some economic activities as a survival

strategy (Ghana Statistical Service, 2003; Agyei, 2012). These tendencies are likely to interfere with their education or skills training. Thus, this phenomenon could also lead to absenteeism and negatively affect learning outcomes; and eventually undermine human capital development.

On the other hand, out-migration of household heads could result in benefits for their households which remain in the place of origin through remittances inflow. This postulation is based on the New Economics of Labour Migration (NELM), which contends that migration results in the flow of remittances. Such transfer incomes could help ease budgetary constraints faced by households left behind (Stark, 1991). For instance, cash remittances could facilitate access to food from the market, provision of educational materials, payment of fees, hiring of labour to scale up farming activities, etc. This could help reduce involvement of children in economic activities at both household and non-household levels; and thereby facilitate improvement in school attendance and better learning outcome. Eventually, this could improve the household's asset base, provide opportunity to generate income; and thereby reduce poverty in the medium to long term (Moser, 2008). This would have multiple effects on access to food, decent shelter, healthcare, etc. which would further enhance their livelihoods (Adaawen and Owusu, 2013; Lucas, 2005; Taylor, 1999). This paper is based on a systematic investigation of socio-economic issues related to out-migration of household heads on food security of their households left behind in the Nadowli-Kaleo District in the Upper West Region of Ghana.

The key research question emanating from the above is whether out-migration of household heads undermines food security of their households left behind? The specific research questions are:

- i) What is the relative significance of the sources of food for household consumption?
- ii) Which factors are significant in determining food security in households left behind?
- iii) What are the implications of the factors determining food security for household welfare?

2.0 Research Methods

2.1 Sampling and Data Collection Methods

The study employed quantitative data obtained from primary source. A structured instrument was administered through face-to-face interview conducted by trained enumerators. A multi-stage sampling technique was adopted for the selection of households. The sample size of 300 households was based on the rule of thumb (Fitz-Gibbon & Morris., 1987); and considered to have sufficient observations to facilitate meaningful statistical analysis and inferences. The choice of household as research focus was based on its relevance as key social and economic unit; and ability to provide valuable insights into living conditions (Corberrt, 1988). The unit of inquiry was the wife of the household head who has embarked on internal migration for livelihood purposes for at least 24 months.

2.2 Data Processing and Analysis

The completed questionnaires were captured and processed using Epi-data software, and later exported to the Statistical Product and Services Solutions (SPSS) Version 16 for the relevant statistical analysis.

The unit of analysis was the Dagaaba household in the migrant-sending communities. The household was considered to be the preferred unit for analysis (Corberrt, 1988); and the fact that the decisions about production, investment and consumption in farming households in northern Ghana, are taken at the household level (Songsore, 2001). It is worthy to note that Dagaaba¹ is a patriarchal society and as such husbands are the heads of their households. They are therefore, responsible for decisions pertaining to production and investment as well as intra-household resource allocation whilst wives are in charge of decisions concerning food preparation and consumption (Apusigah, 2009).

2.3 Regression Analysis

Binary Logistic regression analysis was conducted to determine the outcome of male out-migration on livelihood outcomes such as food security. The dependent variable for the model was food security (access to food throughout the year). On the other hand, the selected explanatory variables included household size, number of dependents, presence of economically active females, access to farmland and irrigation facility as well as increase in household farm output and income. Whereas independent variables were mixture of categorical and continuous data, the dependent variable (household food security) in the model was coded categorical and dichotomous. The model was used to predict whether households achieved food security or not. Although the logistic regression equation is non-linear, it has the same linear function. The logistic regression equation for household food security model in this study was stated as:

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + \alpha_nX_n)}} \quad (1)$$

Where Y denotes household food security;

P (Y) is the probability of household having food security;

E is the base of natural logarithms;

b₀ is the coefficient of the constant; and

b₁ represents the coefficient of predictor variable.

The necessary condition that must be satisfied for performing binary logistic regression is that dependent variable (Y) is a categorical variable measured at two levels i.e. Yes / No (a case either belongs to Yes or No). Instead of predicting the value of dependent (Y) from the independent variables, binary logistic regression rather predicts the probability of dependent (Y) occurring given the values of the selected independent variables. Consequently, the value of Y obtained from the logistic regression equation is probability which is always between zero and one. Where the value

¹Dagaabas are the indigenes of the Nadowli-Kaleo District

of Y is closer to zero, it is an indication that occurrence of an event is not likely (lower chance). However, when the outcome variable is closer to one, it indicates a high likelihood of event occurring.

In terms of the adequacy of sample size, the literature has not offered specific rules applicable to logistic regression (Peng et al, 2002a). According to Peng, *et al* (2002b), some authors (Lawley & Maxwell, 1971; Tabachnick & Fidell, 1996, 2001) on multivariate statistical analysis opined that “a minimum ratio of 10 to 1, with a minimum sample size of 100 or 50, plus a variable number that is a function of the number of predictors”. Consequently, the sample size of 300 households was deemed adequate to ensure that sufficient sampling units existed for a meaningful statistical analysis and inferences about the population.

In binary logistic regression, the goodness of fit of the model denoted by -2 Log Likelihood (-2LL) is assessed by comparing an observed situation and the predicted values based on a statistical test similar to that of the Chi-square (χ^2). A relatively higher values of -2LL indicate that, more of the variance is left unexplained by the model and vice versa (Ofori and Dampson, 2011).

One of the indices employed in assessment of logistic regression model is odds ratio [Exp (B)] which measures change in the chances that a variable belonging to a target group for a unit rise in the predictor variable. Odds ratio [Exp (B)] value ranges from zero to infinity; where Exp (B) is greater than one (>1.0), it means that the probability of the dependent variable occurring increases; and the vice versa.

Another index is Cox and Snell R^2 which compares the log likelihood for the model with that of the baseline model. This index is an indication of the extent of variance in the outcome variable explained by the model. Nagelkerke R^2 is an adjusted version of Cox and Snell R^2 and ranges from zero to one. It is considered as a better measure than Cox and Snell R^2 . Finally, Hosmer and Lameshow's Goodness of fit which is similar to Chi-square test of the hypothesis that there is a significant difference between observed (actual data) and the predicted values.

3.0 Findings

3.1 Household Characteristics

The 300 respondents were aged between 18 and 76 years; with an average of 41 years. Concerning their educational attainment, majority of the wives in the selected households had no education (over 70%). It emerged that only one out of every five wives in the selected households had formal education (primary, secondary and tertiary). With respect to primary occupation, majority of them were engaged in farming (89.0%). In addition, they undertook trading, agro-processing (*shea* butter), brewing of local beer (*pito*), food vending and charcoal burning. Comparatively, a high proportion of the wives (69%) indicated that they undertook multiple livelihood activities.

The sizes of the households in the survey were between two and 15 persons with an average of 6.3 persons. This was slightly higher than 5.5 persons recorded by GLSS5 for the Upper West Region (GSS, 2014). In terms of economically active members (both male and female) in the selected households, it ranged from one to eight with an average of 2.7 persons. When the economically active members were disaggregated on the basis of gender, it emerged that relatively high percentage of the respondent households (70.0%) had economically active males. This implies that in the absence of the head of households, there were economically active males.

Analysis of the duration of migration revealed that it ranged from two to over 20 years. It was found that four out of every five out-migrants had been away for two - 10 years. While 12.7 per cent of them had spent 11 - 20 years in migration, the remaining 7.3 per cent had been away for over 20 years. It also emerged that they embark on periodic visits to the places of origin; and three out of every four migrants returned within six months prior to the study.

3.2 Access to Land and Farm Output

On the question of access to land for farming, two out of every three households indicated that they had adequate access to land for producing food for consumption. The farm sizes of the selected households ranged from less than an acre to over seven acres with an average of 3.0 acres. More than one out of every two households had farm size smaller than the average. About 20.0 percent of them reported that their farm sizes had increased within the last two years while 20.0 percent of them had not experienced any change. On the other hand, three out of every five households (60.0%) encountered decline in farm size within the same period.

In terms of farm output, the analysis revealed that just three out of every five of the selected households achieved a rise in farm output in the year preceding the survey. The crops that they cultivated included groundnut, maize, millet, beans, rice and yam. The value² of the total farm output for the farming season preceding the survey was Gh¢ 184,221.00 and the average was Gh¢ 614.07.

3.3 Remittances

In terms of remittances, it was found that nine out of every 10 migrant-sending households received support from the head within the year preceding the study. The types of remittances included cash, food items, clothing, household appliances and farm inputs. The majority of the households indicated that they received food and cash remittances within the 12 months prior to the survey. It was found that the total annual remittances ranged from Gh¢75.00 to Gh¢1,220.00 with a mean of Gh¢269.13. In terms of the volume of yearly remittances, 22.1 per cent of the households received less than Gh¢100.00, while 23.0 per cent of them indicated that they had over Gh ¢400.00.

3.4 Sources of Food for Household Consumption

In order to access livelihood outcomes of the households in terms of food security, the respondents were asked to indicate their sources of food for consumption and their respective contributions. The sources of food for household consumption indicated by the selected households included own farm production, food remittance, purchases from market and food gift (inter-household transfer). It emerged that on average, food procured from market (39.8%) and

²Based on wholesale prices of the selected crops quoted by the Upper West Regional Directorate, MOFA.

households' own farm production (32.9%) formed the main sources of food supply for household consumption, accounting for 72.7 per cent. On the other hand, food remittance and gift respectively accounted for 16.1 percent and 11.2 percent of household food basket.

A total of 87.0 percent of the households left behind indicated that they received food remittances. It was estimated that cash equivalent of food remittances³ to the households left behind ranged from Gh¢100.00 to Gh¢1,080.00 per annum with a mean and median of Gh ¢142.05 and Gh¢100.00 respectively. In terms of adequate provision of food for household consumption, 232 out of 300 households representing 77.0 per cent indicated that they had adequate access to food for household consumption throughout the year. This means that only 23.0 percent of the respondent-households did not achieve food security.

3.5 Results for Food Security Model

A total of 293 households provided information suitable for binary logistic regression. They comprised 230 that was food secured and 63 who did not achieve household food security. In view of this, the model was based on 98 per cent of the sampled households. Hosmer and Lameshow's Goodness⁴ of fit test which ascertains the observed with the predicted cases for the two outcomes of food security employing all the variables in the model also show a good fit. A test⁵ of the model with selected predictors against a constant only model was found to be statistically reliable; separating households that achieved food security from those who were food insecure. The variance was responsible for the quite high Nagelkerke R² (.157) and this means that just 15.7 per cent of the shared variance between performance and the set of predictor variables can be explained by the model. Table 1 presents the result of the logistic regression model.

Table 1: Results of Binary Logistic Regression Model for Household Food Security.

Predictor Variable	B	S.E.	Wald	Df	Sig.	Exp(B)
Increase in farm output	.329	.166	3.913	1	.048	.720
Access to farmland	.422	.215	3.870	1	.049	1.525
Increase in income	.524	.186	7.870	1	.005	1.688
Access to Irrigation	-.090	.204	.195	1	.659	.914
Economically active females	-.013	.261	.003	1	.959	.987
Household size	.016	.184	.007	1	.932	1.016
Number of dependents	-.015	.216	.005	1	.945	.985
Constant	-3.420	.935	13.374	1	.000	.033

Table 1 indicates that only three out of the seven variables selected for the model were statistically significant (income, access to land and increase in food output). Thus, access to irrigation facility, household size, economically active persons and number of dependents were found to be in significant (p-values >0.05).

The results of the regression model show that the log of odds of a household achieving food security is positively related to increase in income, food output and access to farmland (p-values <0.05). It was found that the odds in favour of a household achieving food security rises by 0.72 for each unit change in that household's ability to raise food production, while increase in odds are higher for access to land (1.53) and increase in income (1.69).

4.0 Discussion

The ability of the model to correctly categorize the households in terms of adequate access to food for household consumption emerged to be remarkably high. Thus, the model's sensitivity was very high. In addition, a careful look at the cases shows that the model made a reasonably accurate prediction of the cases. These observations to a large extent demonstrate the model's superiority of increase in household income over increase in farm output and access to farmland in predicting household food security.

The finding that food procured from the market formed the largest component (39.8%) in the household food basket confirms the assertion by the Ghana Statistical Service (GSS, 2008) that food is the principal portion of household expenditure in Ghana. It contributes to explain spending of cash remittances on consumption rather than investment (Waddington, 2003; Agyei, 2012; Adaawen and Owusu, 2013). It also reinforces the view held by adherents of food first approach (Hardy, 1985).

In addition, it emerged that on average almost one-third of the food consumed by households was obtained from their own farms. This finding is contrary to the views of some authors that the household left behind could become remittance-dependent and forgo productive activities (Azam and Gubert, 2004, Gubert, 2000; Germanji and Swinnend 2004).

The finding that a rise in household disposable income promotes its access to food for consumption is consistent with that of earlier studies (Adaawen and Owusu, 2013; Asfar, 2003; Dayal and Karen, 2003; Ellis, 2003). This means that remittance to households left behind boosts their incomes and thereby enhances their ability to procure food from the market. With increase in disposal household income, a rural farming household is able to deal with effects of low production, poor harvest, post-harvest losses, etc.

It has been asserted that own farm production of food crops contributes significantly to ensuring food security as Quaye (2008). However, in terms influence on ability of household to attain food security, own farm production was found to be significant but relatively inferior to increase in income. One of the reasons adduced for this assertion is that increase in farm output does not guarantee access to food throughout the year. This is because a rise in own food output is not related to a household's food requirement, which is strongly determined by household size and composition, all things being equal. It can also be argued that a household can increase its food production without achieving food security because of storage losses (Agyei, 2012). In addition, sometimes farming households are compelled to sell some

³ There was no means of verifying the amounts quoted by the respondents.

⁴ ($X^2 = 26.412$; $df = 7$; $p = 0.000 < 0.001$)

⁵ ($X^2 = 26.40$; $df = 7$ and $p = .000 < 0.01$)

of their food output in order to address some challenges like payment of educational and health care bills. Furthermore, farmers usually reserve part of the harvest (grains and yam) as planting materials for the next farming season. Even though this constitutes productive asset, it is a leakage from the household food stock in the short term. This is because it contributes to depletion of food stock and thereby undermines household food security.

Access to farmland contributes to food security but it is less significant than income. It should be noted that possession of farmland does not constitute a sufficient condition for securing food security. This is based on the fact that using farmland to increase food output depends on combination of other factors of production including labour, farm inputs (fertilizer, seeds and pesticides), access to irrigation facility, conducive ecological conditions (weather), etc. Thus, possession of farmland by a household per se would not ensure food security.

5.0 Conclusion

This paper was based on the study of food security situation in 300 households in which the heads (males) have embarked on internal migration. The research questions pertained to the relative significance of the sources of food for household consumption; factors significant in determining food security in households left behind and their implications for household welfare. The results of the survey revealed that the respondent-households engaged in crop cultivation and livestock rearing. Their farm sizes ranged from less than acre to about seven acres with an overall average of 3.0 acres. It was found that three out of every five households had experienced a decline in farm size within the last two years preceding the survey. However, majority of the households had access to land for farming and there was significant association between access to land and food security. It was just one-third of the respondent-households that indicated that they had difficulties with access to farming land.

In terms of sources of food for household consumption it emerged that purchases from market and own farm production formed significant proportion, followed by remittance and food gift. It was revealed that majority of households had access to food throughout the year. The paper shows that factors which are significant for a migrant household to achieve food security include its ability to raise income including remittances and own farm production as well as access to farmland (order of importance).

These findings have policy implications for livelihoods, household welfare and overall development. For livelihoods, there is the need for economic empowerment of poor rural farming households to enable them cater for their food needs. Building their capacity in terms of livelihood assets in order to take advantage of available economic opportunities would contribute significantly to sustainable improvement in access to food. Particularly, provision of irrigation facilities and access to farm inputs would help to raise output and income and, eventually enhance their capacity to meet their food needs.

The relatively weak significance of own farm production towards attainment of household food security underscores the need for promoting off-farm income generating activities in order to boost the capacity of households to access food and thereby, build their resilience against shocks. Among other things, pursuit of multiple livelihood activities would facilitate improvement in household income and promote access to food in order to meet their nutritional needs. This is critical to upgrading of household welfare and overall development in the migrant-sending communities.

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