



# Food security in rural sub-Saharan Africa: Exploring the nexus between gender, geography and off-farm employment



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## ABSTRACT

How to eradicate hunger and achieve food security remains a key developmental issue, particular in countries south of the Sahara. Most of the empirical literature focuses on agriculture-based interventions although it is well known that rural households have a gamut of income generating activities that constitute their livelihood. This article uses panel data for six African countries to examine the association between off-farm income and household food security and tests key hypotheses that have not been previously explored. We hypothesize that the association between food security and off-farm income is neither gender-neutral nor the same for households living in low and high agroecological potential areas. Because a nontrivial number of households do not earn off-farm income, we also hypothesize that the food security effect of nonparticipation differs by gender and geography. The results show that although off-farm income has a strong statistically significant association with food security the correlation magnitudes are not as strong. However, off-farm income has a significantly stronger association with food security among female-headed and poor region households than it has among male-headed and rich region households in most countries. The gender-related result supports the notion that households tend to benefit more from women's greater control over resources than when such resources are controlled by men. We also show that nonparticipation in off-farm income is more costly, food security wise, for female-headed households and households who live in low agroecological potential regions than it is for male-headed households and those who live in high potential regions. The rural nonfarm sector in high agroecological potential areas tends to be associated with greater poverty reduction among female-headed households than among male-headed households. From a policy and development practice perspective, the results suggest that focusing rural development policies on factors that raise farm productivity alone (e.g., input subsidies) may not lead to gender-neutral welfare outcomes. This means that interventions such as rural nonfarm microcredit schemes that targets female-headed households or women in general could help achieve gender-equitable poverty reduction, as others have shown.

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## 1. Introduction

Poverty manifests through the lack of basic needs. Although what constitutes basic needs could be contested there is no doubt that food is one of the most important basic needs of life, and in fact, the right to food is a fundamental human right (Mechlem, 2004; Committee on World Food Security, 2012). Although the world produces more than enough food for its population, approximately 33%–50% is lost through food wastage (Lundqvist, de Fraiture, & Molden, 2008; FAO, 2011a), leaving millions of people with inadequate food at all times. The situation is more severe in sub-Saharan Africa (SSA) where an estimated 233 million people (nearly 1 in every 4 persons) are undernourished (Conceição, Levine, Lipton, & Warren-Rodríguez, 2016; Worldhunger, 2016).

For decades, national, regional and global policy initiatives have been designed or even legislated to reduce or end food insecurity (FIS). The second agenda of the Sustainable Development Goals, for example, is to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture”, a testament to how important humanity considers the problem. All these notwithstanding, the question of how to ensure adequate food and nutrition for the poor and vulnerable in a sustainable manner remains a challenge for a growing world population estimated to reach 9.7 billion people by the year 2050. This article seeks to contribute to the debate by analyzing the contribution of off-farm employment (OFE) to achieving household food security (FS) in rural SSA using a unique panel dataset for six countries.

A number of authors (e.g., Babatunde and Qaim, 2010; Owusu, Abdulai, & Abdul-Rahman, 2011; Tsiboe, Zereyesus, & Osei, 2016; Zereyesus, Embaye, Tsiboe, & Amanor-Boadu, 2017) have studied

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the impact of off-farm income (OFY) on FS in some African countries. What then does this article contribute to this body of literature? First, whereas most of the existing studies make comparison based on independent case studies in different countries, this article uses a unique panel dataset collected using the same instruments over the same period across six African countries.

Second, the studies that link OFE with FS have not considered the heterogeneous nature of the former. This study, however, takes into account this heterogeneity by considering the effect of OFY on household FS at different point of the income distribution. Our assumption here is that since different OFE activities yield different returns to household labor, estimating the differential effects of OFY on FS at specific points of the OFY distribution would pick up any heterogeneity that may be present. Not all households in rural SSA supply labor to activities outside their own agricultural production, meaning that some households adopt an 'agricultural specialization strategy'.<sup>1</sup> It is important to examine the welfare outcome of such a strategy vis-à-vis engagement in low- and high-return OFE activities. To the extent that these different strategies occur under different asset constraints (Barrett, Reardon, & Webb, 2001), with coping type OFE being even less remunerative than specialization in agriculture (Wuyts, 2001), one could also expect their association with FS to be different. However, to date, this has not been explored.

Third, the literature (Newman and Canagarajah, 2000; Canagarajah, Newman, & Bhattamishra, 2001; Lanjouw and Feder, 2001; Rijkers and Costa, 2012) suggests that OFE activities and their impacts differ by gender. Yet, to date, none of the literature examining the relationship between OFY and FS has considered the possibility that the association could be different for women and men. This article seeks to fill this gap by asking whether the FS effect of OFY is identical for male- and female-headed households (MHHs and FHHs).

Finally, geography and agroecological potential matters for FS and its determinants (Smith, El Obeid, & Jensen, 2000; Farrow, Larrea, Hyman, & Lema, 2005) because most of the causes of FIS are geography-dependent, not least through agroecological differences. Spatial differences in the relationship between OFY and FS has previously been noted (Reardon, Delgado, & Matlon, 1992), and improving our understanding of the agroecological potential differences in the association between OFY and FS could enhance the formulation and implementation of 'place-specific' policies (Elbers, Fujii, Lanjouw, Ozler, & Yin, 2007), which are more relevant and effective than 'global' policies. The design of the surveys employed for this article offers the opportunity to explore such spatial nuances in a manner that has not been previously studied.

The rest of the article is structured as follows. The next section presents a synopsis of the relevant FS literature. The conceptual framework as well as the motivation for the variables used in the analysis is presented in Section 3. Section 4 describes the sample and presents detailed descriptive analysis. Section 5 contains the empirical econometric model and the identification strategies employed. The econometric results are presented and discussed in Section 6. Section 7 then concludes.

## 2. Food security

### 2.1. Synopsis

FIS is caused by the failure of an entire food system, not only production or just one strand of it (Erickson, Ingram, & Liverman, 2009). Thus, the causes or determinants of FS can be found along

the entire chain from production, storage, processing, to the distribution of food. Factors that impact negatively on production such as drought or climate variability, poor soil fertility and low adoption of productivity enhancing inputs could all impact negatively on FS (Stocking, 2003; Gregory, Ingram, & Brklacich, 2005; Wossen and Berger, 2015). Climate variability is predicted to continue to reduce rainfall at the onset, leading to a reduction in the already low yields in SSA (Wossen and Berger, 2015) and exacerbating the already precarious FS situation.

In general, any effort at increasing production and narrowing agricultural productivity gaps help reduce FIS (Lobell, Cassman, & Field, 2009; van Ittersum et al., 2013). However, because of food waste (Parfitt, Barthel, & Macnaughton, 2010), including postharvest losses (Hodges, Buzby, & Bennett, 2011; Tefera, 2012), increasing production alone is not enough for combating FIS. Improving food storage after harvest through affordable storage structures is important (Tefera et al., 2011; Gitonga, De Groot, Kessie, & Tefera, 2013). In addition to making food available to households throughout the year if enough is produced, the availability of grain storage facilities help reduce seasonal price variability, which is an important determinant of FS (Cornia, Deotti, & Sassi, 2016; Harttgen, Klasen, & Rischke, 2016); food processing has a similar impact and therefore also contributes to reducing FIS (Godfray et al., 2010).

Beyond the household, it has been argued that FIS is more a problem of food distribution than it is of production (Tscharntke et al., 2012). This means that factors that negatively affect food distribution (e.g., poor transportation infrastructure) would have a negative impact on FS by reducing food access. High transportation cost, for example, has been shown to be a major constraint to food access through its effect on prices (Martin, 2012; Kaur and Kaur, 2016).

Although food aid and feeding programs could be important solutions during severe and emergency FIS situations, policies that create gainful employment and promote agricultural productivity growth are more fundamental and sustainable options for the attainment of long-term FS (Barrett, 2010). This is because poverty is one of the most important causes of FIS (Smith et al., 2000; Wight, Kaushal, Waldfogel, & Garfinkel, 2014), yet food aid is not a sustainable solution to the poverty problem.

If household FIS is considered fundamentally a problem of low incomes and poverty then one could argue that the solution to the problem may not necessarily lie in increasing food crop production or productivity, but rather facilitating multiple livelihood strategies, which could raise incomes (Gladwin, Thomson, Peterson, & Anderson, 2001). This argument is based on the premise that nonfarm employment or nonfood cash crop production yields higher returns than resource allocation to food crop production. However, Jayne (1994) and Dzanku (2015), for example, have shown that, such conclusions are often reached without accounting for the acquisition cost of staple foods forgone due to the decision to shift resources away from or allocate more resources to food production. Also, not all types of nonfarm employment yield higher returns than agricultural specialization does (Micevska and Rahut, 2008; Scharf and Rahut, 2014). An important question then is whether the association between FS and OFY is the same throughout the earnings distribution. This article addresses this question.

### 2.2. Off-farm employment and food security

For several decades, the relationship between OFY and household welfare was skewed towards income or consumption poverty as the main outcome variable of interest. However, some literature have emerged on the impact of OFE on FS (e.g., Babatunde and Qaim, 2010; Owusu et al., 2011) and on food expenditures

<sup>1</sup> As pointed out by an anonymous reviewer, one cannot distinguish between 'choice' versus 'necessity' specialization.

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