

COMPARATIVE ANALYSIS OF CONSTRAINTS TO FOOD SECURITY ALONG THE URBAN-RURAL CONTINUUM OF MID-SIZED TOWNS IN TANZANIA

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ABSTRACT

This study on which this article is based assessed the varying constraints to food security along the urban-rural continuum in Morogoro and Iringa, Tanzania. A cross-sectional survey of 279 randomly selected households was conducted using a multi-stage sampling procedure. Both descriptive and inferential analysis approaches were applied to assess the status of and the varying constraints to food security among the surveyed households. The results show great variations in constraints to household food security along the continuum. Households located in urban and peri-urban areas had more food security than the households situated in rural settings. Food security among urban and peri-urban households was greatly constrained by low income, higher food prices, and expenditure on non-food items whereas household food security in rural settings was mainly affected by limited market access, shortage of farm labour, lack of access to agricultural inputs, drought, and soil infertility. Since constraints to household food security vary greatly along the urban-rural continuum, interventions to improve food security should adequately address these variations.

Keywords: Household, food security, constraints, urban-rural continuum

INTRODUCTION

Background Information

A household's food security is achieved when a household has the opportunity to obtain food with certainty in terms of quantity, quality, safety and in culturally acceptable ways, whether through home production, commercial purchase, or transfers (Ecker and Diao, 2011). Generally, access to food has improved fast and significantly in countries that have experienced rapid overall economic progress, notably in Eastern and South-Eastern Asia (FAO, IFAD and WFP, 2015). Access also improved in countries with adequate safety nets and other forms of social protection in Southern Asia and Latin America (World Bank, 2018). By contrast, countries in sub-Saharan Africa are still experiencing difficulties in achieving sufficient levels of food security. Without increased efforts, there is a risk of falling far short of achieving the SDG target of hunger eradication by 2030 (FAO, IFAD, UNICEF, WFP and WHO, 2018). A similar situation applies in Tanzania whereby the average national food insecurity stood at 9.7% in 2011/12 (NBS, 2014; Tumaini and Msuya, 2016).

Many studies have reported different constraints to achieving household food security worldwide (Godfray *et al.*, 2010; Premanandh, 2011; Crush and Frayne, 2011; WFP, 2013; Zeyaur *et al.*, 2014; UNDP and URT, 2015). The more serious fundamental constraints in developing countries including Tanzania have been found to involve a heterogeneous mix of issues. These include chronic poverty which results from inadequate employment and lack of income generating activities, continuing population and consumption growth (Dessus *et al.*, 2008; Godfray *et al.*, 2010; UNDP and URT, 2015), reduced yield of crops due to low productivity of land, labour and other production inputs, and unfriendly climatic conditions (Jones and Thornton, 2003; Fischer *et al.*, 2005; FAO, 2010; Zeyaur *et al.*, 2014). Others have included food losses due to rodents, pests and diseases, and poor infrastructure such poor harvesting, transport and storage facilities (Grolleaud, 2002; Premanandh, 2011; UNDP and URT, 2015). In addition, the impact of trade liberalisation, unsuitable cropping systems, and lack of access to reliable markets have also resulted in household food insecurity (FAO, 1997, Donovan and Massingue, 2007; World Bank, 2008; Oriola, 2009).

Nevertheless, little is known about the spatial variation of constraints to achieving household food security and its relationship along the urban-rural continuum.¹ Information on spatial variation of constraints to household food security

¹ In this article, urban-rural continuum is conceptualized as a spatial location covering areas considered as urban, peri-urban and rural.

can be very useful in understanding the dynamics involved and help in proper resource allocation when it comes to intervention targeting (Maxwell *et al.*, 2008). Hence, the study on which this article is based assessed varying constraints to food security along the urban-rural continuum in Morogoro and Iringa, Tanzania. The findings of this study may be considered as inputs to design and implement context-specific policies and programmes to improve household food security.

MATERIALS AND METHODS

Description of study area

The survey was conducted in Morogoro and Iringa Municipalities and the surrounding peri-urban and rural areas in November/December 2015 and February/March 2016. Morogoro Municipality covered the urban and peri-urban areas while the rural part extended to two surrounding districts of Morogoro and Mvomero. On the other hand, Iringa Municipality was included with two surrounding districts of Iringa and Kilolo. According to projections from the 2012 Population Census (URT, 2013), Morogoro Municipality had a population of 315,866 while Iringa Municipality had a population of 256,348 in 2012. Like in many urban areas in Tanzania, rural-urban migration is one of the most critical issues in these Municipalities. According to Lawi (2013), population growth in small and medium-sized towns such as Morogoro and Iringa results in socio-economic problems notably unemployment, poor provision of social services, including health services, and inadequate clean water, poor sanitation, and high rates of household food insecurity.

Research design and sampling procedure

The study on which this article is based used a cross-sectional research design whereby data were collected once from 279 sampled households. The sampling unit for this study was a household situated along the urban-rural continuum. A multi-stage sampling procedure was adopted in the selection of the households. The first stage involved a purposive selection of two study sites, namely Morogoro and Iringa Municipalities. This was followed by a purposive sampling of four rural districts in both sites to form the urban-rural continuum. Grid cells were then created on maps of the study sites using Geographical Information System (GIS). Thereafter, a random sampling method was employed to select 10 grid cells each in urban, peri-urban, and rural settings. Five households were randomly selected from each grid cell making a total of 300 households out of which 279 participated in this study. The sample size was determined based on experience from previous similar studies by Schlesinger [24] and Chagomoka *et al.* (2016). The GIS random sampling approach was more appropriate as it avoids human selection biases of locations and households (Kondo *et al.*, 2014).

Data collection procedures

A structured questionnaire was used to collect primary data. The questionnaire included standardized Household Food Insecurity Access Scale (HFIAS) questions consisting of a list of 9 specific questions about accessibility to food in the household during previous 30 days (Coates *et al.*, 2013). Also, information on the main source of food for the household and perceived key constraints to achieving food security for the household were captured by the questionnaire. Four options were provided, and a respondent was asked to select only one option which he/she considered to be the main source of food for the household. These options were: (1) own food production, (2) purchase from market, (3) donations from relatives, community, and government or non-governmental organizations (NGOs), and (4) collection from open places (e.g. uncultivated vegetables and fruits, edible insects and mushrooms). Regarding key constraints to achieving food security, a list of the constraints was provided and a respondent was guided to tick all the constraints that were applicable to his/her household. The respondent was preferably the spouse in charge of food provisioning and cooking in the household or the head of household. Data was collected between November and December 2015 in Iringa and between February and March 2016 in Morogoro. Generally, the period between November and March is a time of reduced food availability as the food stocks from prior harvest have been depleted, and consequently many households experience food shortages.

Data analysis

Descriptive statistics including frequencies, percentages, means, standard deviations and cross-tabulations were conducted to describe the status of food security among the surveyed households including the main source of food for the household and constraints to achieving food access security. The Household Food Insecurity Access Prevalence (HFIAP) status indicator was used to categorize the interviewed households into four levels of household food security: food secure, mildly, moderately and severely food insecure (Table 1). Households were categorized as increasingly food insecure as they responded affirmatively to more severe conditions and/or experience those conditions more frequently (Coates *et al.*, 2013). Differences in proportions of the main source of food and the constraints were assessed by using chi-square analysis, whereby a p value of ≤ 0.05 was considered significant.

Table 1. Categories of food security status

Household food security category	Conditions
Food secure	if [(Q1a=0 or Q1a=1) and Q2=0 and Q3=0 and Q4=0 and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]
Mildly food insecure	if [(Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]
Moderately food insecure	if [(Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2) and Q7=0 and Q8=0 and Q9=0]
Severely food insecure	if [Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3]

Source: *Adapted from Coates et al. 2013.*

Results

Status of food security along the urban-rural continuum

Using the Household Food Insecurity Access Prevalence (HFIAP) status indicator, it was established that households located in places regarded as urban are more likely to have food security as compared to those situated in peri-urban and rural settings (Table 2).

Table 2. Percent distribution of households according to their food security access category along the continuum (n = 279)

Status of food security	Urban (n = 89)	Peri-urban (n = 93)	Rural (n = 97)
Food secure	53.9	47.3	25.8
Mildly food-insecure	11.2	17.2	12.4
Moderately food-insecure	19.1	23.7	34.0
Severely food-insecure	15.7	11.8	27.8

Chi-Square value = 22.471; $p \leq 0.001$

Source of food for households

As presented in Table 3, overall 91% of the surveyed households in urban area sourced most of their food from market purchase compared to, respectively, under two-thirds (60.3%) and over a quarter (28.9%) of peri-urban and rural households. Likewise, over two-thirds (70.1%) of rural households derived their food from own food production compared to about a third (33.3%) and a few (9%) of peri-urban and urban households respectively. The contribution of donations from relatives and friends was negligible in all the three spatial locations.

Table 3. Reported main source of food for households along the continuum in percentage (n = 279)

Source of food for household	Urban (n=89)	Peri-urban (n=93)	Rural (n=97)
Own food production	9.0	33.7	70.1
Market purchase	91.0	60.3	28.9
Donations	0.0	0.0	1.0

Chi-Square value = 82.250; $p\text{-value} \leq 0.001$

Constraints to household food security along the continuum

Overall, there was significant relationship between constraints to achieving household food security and spatial location of the household along the urban-rural continuum. Table 4 shows that there was a higher prevalence of low income in urban areas compared to rural and peri-urban areas ($p \leq 0.01$). It does not however show that food insecurity was disproportionately driven by low income in urban areas as compared to rural ones.

Likewise, food access in urban and peri-urban households had greater incidence of being affected by rising food prices and expenditure on non-food items (both at $p \leq 0.001$) as compared to rural households. On the other hand, food security in rural households was reported to be affected more by inadequate and lack of agricultural inputs, drought and soil infertility ($p \leq 0.000$). Constraints such as limited market access and shortage of farm labour affected food security more in peri-urban and rural households as compared to urban households.

Table 4. Constraints to achieving food security in households along the continuum (n = 279)

Constraint	Affirmative responses (%)			P-Value
	Urban (n=89)	Peri-urban (n=93)	Rural (n=97)	
Low income	67.4	43.5	52.6	0.005
Rising food prices	59.6	50	13.3	0.000
Limited market access	7.9	21.7	16.3	0.034
Shortage of farm labour	0.0	5.4	2.8	0.028
Lack of access to agricultural inputs	6.7	7.6	23.7	0.000
Drought	7.9	19.8	54.6	0.000
Soil infertility	7.9	13	30.6	0.000
Expenditure on non-food items	23.9	28.6	3.1	0.000

DISCUSSION

According to the study on which this article is based, households located in urban and peri-urban areas are more food secured than households situated in rural settings. In most cases households situated in urban settings have higher living of standards essentially because they have superior endowments in terms of higher level of education, assets, and access to services and employment opportunities as compared to rural households (World Bank, 2014). According to Tanzania Household Budget Survey 2011/2012 findings, urban and peri-urban households have higher standard of living as compared to those in rural settings (URT, 2014).

Similarly, households in urban and peri-urban settings source most of their food from market purchase whereas households in rural areas rely mostly from own food production. Such findings are somehow expected because extensive farming does not take place in areas regarded as urban and peri-urban. However, the fact that over a quarter of households in rural areas depend on market purchase for their food imply own food production may not be the sole source of food for a number of households in rural settings. These findings are consistent with a study by WFP in Tanzania which found that urban households buy most of their foodstuffs while those in rural areas produce most of what they eat (WFP, 2013). An over-reliance on any one food source can adversely affect household food security during times of food shocks. Households that produce much of what they eat will be more vulnerable if there is a drought or major pest damage while households that buy much of their food from the market will be more vulnerable to income and food price shocks.

Whereas food security among households in areas regarded as urban and peri-urban was more likely to be affected by low income, rising food prices and expenditure on non-food items, food security among households in rural areas was mostly affected by lack of agricultural inputs, drought, soil infertility, shortage of labour and limited market access. One possible explanation is that urban dwellers in many cities and towns of developing countries buy much of what they eat and rural dwellers depend more on own food production, something which shakes their food security when household income and food prices change (Maxwell *et al.*, 2000; Ruel and Garrett, 2004; Dessus *et al.*, 2008; UNDP and URT, 2012). Also, it can be because of less developed infrastructure and services such as roads, transportation system and communication, which affect food security mostly in rural and peri-urban areas. These results are in conformity with studies by Maxwell *et al.* (2000), Ruel and Garrett (2004), Crush and Frayne, (2011), and Tacoli *et al.* (2013), which have also reported similar results in both urban and rural settings. Shortage of labour for farming is a serious problem in many rural areas as most of youth have resorted to carrying passengers on motorcycles and/or moved to urban centres searching for greener pastures.

CONCLUSION

The study on which this article is based assessed the extent to which constraints to household food security varied along the urban-rural continuum in Morogoro and Iringa, Tanzania. Based on the findings it is concluded that food security among urban and peri-urban households is greatly constrained by low income, higher food prices, and expenditure on non-food items. On the other hand, household food security in rural settings is mainly affected by limited market access, shortage of farm labour, lack of access to agricultural inputs, drought, and soil infertility.

Since constraints to household food security vary greatly along the urban-rural continuum, interventions to improve food security should adequately address these variations. As low income affects household food access security, programmes aimed at boosting household's income should be promoted along the continuum. Specifically, more employment opportunities should be created and the existing ones be strengthened to supplement what households currently have. Farmers should be supported to grow drought-tolerant crop varieties such as cassava, pearl millet, cowpea, groundnuts and sorghum. Affordable irrigation farming should be promoted whenever possible which may include water-use-efficient techniques such as simple and affordable drip-irrigation.

The effect of limited market on household food security confirms the need to improve infrastructure and communication services such as roads, and transportation system to ease movement of agricultural inputs and produce. The effect of soil infertility implies that agricultural extension services should integrate the use of sufficient quantities of manure or fertilizers to replenish the soils. Affordable soil fertility replenishment approaches, which use resources naturally available in the community, should be developed and farmers should be encouraged to apply them in their fields.

Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ethical restriction.

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