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Planting to feed the city?

Agricultural production, food security and multi-spatial livelihoods among urban households in Ghana

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PLANTING TO FEED THE CITY?

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Agricultural Production, Food Security and Multi-Spatial Livelihoods among Urban Households in Ghana

Hayford Mensah Ayerakwa



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DOCTORAL DISSERTATION

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Abstract <p>The 2010 population and housing census in Ghana revealed that more than half of the Ghanaian population lived in urban centers. Critical to the phenomenon of urbanization is the question of how to sustainably feed the urban population especially the urban poor as rapid urbanization has the tendency to urbanize poverty. This has led to renewed policy debate about the implications of farming in cities to the food security of urban residents.</p> <p>This thesis aims at contributing to the debate by delineating the non-market sources of food and analyze their implications for urban households in terms of food security. In doing this, the thesis analyzes the interplay that exist between the various agricultural engagements by urban households in both urban and rural areas as well as food transfer receipts to urban households and how they contribute to household food security in small and medium sized cities in Ghana.</p> <p>The thesis employs a mixed methods approach-quantitative and qualitative methods- to investigate the concept of urban food security. The analytical framework employed is grounded on the access pillar to household food security.</p> <p>The findings of the thesis are presented in three articles preceded by a 'kappa'. I argue that the debate on the contribution of urban agriculture to urban household food security seems to over concentrate on urban agriculture alone without accounting for the other food provisioning opportunities available to the household including food production in peri-urban and rural spaces. Expanding the scope also helps to account for other non-market food sources such as food transfer receipts that are found to play important roles in the food security of urban households. The thesis establishes that, households with multiple food provisioning opportunities, especially those who engage in both urban and rural agriculture have better food security outlook than those who do not.</p> <p>The implications from the findings is that policies aimed at addressing urban food security through own food provisioning should not be treated in isolation. Rather, such policies should account for the active rural-urban interactions characteristic of many countries in sub-Saharan Africa and how they could be harnessed to complement each other for better food security and livelihood outcomes.</p>		
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To Steve and Clara Opare-Obisaw

With God all things are possible Luke 1:37

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This thesis is about understanding the food security outlook of the increasing urban population in Ghana from the perspective of own food production and food transfer receipts. I wish to thank and acknowledge the hard work of the urban farmers who produce and supply vegetables to the increasing urban population. To those who spend ours commuting to rural areas to produce food for their families, this work is about you and thus acknowledge your efforts. We can collectively work to make life and this world a better place for all.

All these would not have been possible without God-To Him alone be all the glory!

List of Articles

Article 1.

Ayerakwa, H.M. (2017). Urban Households' Engagement in Agriculture: Implications for Food Security in Ghana's Medium Sized Cities. *Journal of Geographical Research*

Article 2.

Ayerakwa, H.M., Dzanku, F.M. and Sarpong, D.B. (*submitted to a peer reviewed journal*) Effects of food production on household food security in a small and medium-sized city in Ghana

Article 3.

Ayerakwa, H.M. (*Under peer review*) Food Transfer Receipts as Multi-Spatial Livelihoods among Urban Residents in Ghana

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List of Acronyms

CAADP	Comprehensive Africa Agriculture Development Programme
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GPS	Global Positioning System
GSS	Ghana Statistical Services
HFAP	Household Food Insecurity Access Prevalence
ISSER	Institute of Statistical, Social and Economic Research
METASIP	Medium Term Agriculture Sector Investment Plan
MoFA	Ministry of Food and Agriculture
MoTI	Ministry of Trade and Industry
NGO	Non-Governmental Organization
SAP	Structural Adjustment Programme
UA	Urban Agriculture
UPA	Urban and Peri-Urban Agriculture
UN	United Nations
UNDP	United Nations Development Programme
WFP	World Food Programme

1. INTRODUCTION

1.1 Introduction

It was mid-morning on August 5, 2015 when I interviewed the Chief of Sisala Line, Mr. Issaka Ibrahim in Techiman on his understanding of the urbanization trends towards Techiman and the nature of non-market sources of food the city's residents were engaged in. He has been living in what has become his new home for nearly 40 years since he moved to Techiman as a youth in his early twenties in search of better living conditions. At the time of his arrival, his present home was then a farm village but now sits at the center of the town. He narrates how things have changed quickly such that the once rural town that served as farmland to his family now buzzes with various economic activities and population growth even though his profession as farmer remains unchanged. The cost of remaining a farmer continues to increase. He narrates how he and other people in his community need to travel nearly 20 kilometers to rural areas in order to secure agricultural land for farming. The cost of shuttling between the farm and Techiman on a daily basis is beyond the means of his household. As a result, he has decided to spend four days (Monday to Thursday) on the farm and return on Friday to spend the weekend with his family.

The account of Mr. Ibrahim was not different from many other people I interviewed on the subject of urban agriculture, urbanization and urban food security. As population increases, demand for food also increases. Interestingly, much work seems to have been done on how producing food in the urban space can contribute to address the concerns of feeding the urban population. This notwithstanding, existing studies on urban agriculture have been biased in favor of metropolitan areas and do not situate urban agriculture in a wider context of other self-produced sources of food available to urban residents. What we do not know is whether the contextual factors (including cultural, environmental and institutional) are the same in small and medium-sized cities.

The rate of urbanization and whether food production can keep pace with population growth have been an issue of concern and analysis dating back to the past couple of centuries since Malthus' days (Salih, 1995). The 2010 population and housing census in Ghana suggests that more than half of the Ghanaian population (50.9%) reside in urban centers (GSS, 2013). Whereas this development presents lots of potential benefits, most of the towns that are increasingly being classified as urban are yet to experience the economic transformation that will impact on the livelihoods of the citizenry. As a result, most livelihoods in these newly classified cities continue to hinge around agriculture in various ways (GSS, 2014, 2013). Agriculture also continues to play a significant role in centers with a longer urban history.

Agricultural production in Ghana is subsistence and rainfed in nature. It is also a function of land and other productive inputs available to the particular farmer or household in question. It is possible to find people resident in urban areas who derive their livelihood from cultivating plots in the cities or outside the city either for own consumption or commercialization purposes. While people in rural areas can in most instances produce their own food, those in urban areas are constrained to do so and mostly depend on food purchases while others engage in urban agriculture or rely on food transfer receipts or both.

One way of addressing the concerns of urban food security is thus through own production to supplement urban households purchases. This however is encouraged when urban residents have access to agricultural productive lands and are supported by appropriate legislations that will promote investments in this type of agriculture. Such policies also need to account for geographical diversity and context specific strengths and weaknesses (Riley and Legwegoh, 2014).

The question of how to feed the growing urban population through paths of production that connect rural and urban areas and whether these sources can contribute to urban households' food security is the entry point of this thesis. What can we learn about the different food provisioning arrangements among urban households and their implications for the food security of these households? How does the interplay of urban, peri-urban and rural food production systems as well as food transfer receipts contribute to provide better food security outcomes to urban agricultural households in the changing dynamics of the city? These questions are explored in detail in the pages of this thesis. It is important however to note that, the focus of the thesis is on small and medium sized cities in Ghana.

1.2 Research background and questions

Globally, there is a renewed interest in urban food security research in sub-Saharan Africa partly due to high rates of urbanization and the urbanization of poverty (Riley & Legwegoh, 2014) which places a strain on urban food systems. Recent hikes in global food prices (2007-2008) together with consumer protests in some African cities reignited the debate about where food should be produced for the urban population and how it can be produced in a sustainable manner (Lerner & Eakin, 2011). This phenomenon has resulted in policy recommendations in favor of urban and peri-urban agriculture.

The practice of urban and peri-urban agriculture in African cities has been an age old activity. With farming as the mainstay of most African economies, present day cities were once farmlands that supplied food to households. However with population growth comes alternative demands on urban agricultural land for development into infrastructure including housing, schools, roads, and for government's own uses. The research and policy debate on whether to permit or prohibit urban agriculture has received varied reactions from both sides of the divide. The discussions have been divided along the school of thought that believes urban agriculture should be encouraged and supported for its contributions to food security and livelihoods, and as a poverty alleviation mechanism in urban centers (Mwangi & Foeken, 1996; Obosu-Mensah, 1999; Armar-Klemesu, 2000; Mougeot, 2000; Nugent, 2000; Maxwell, 2001; Danso, et al., 2002; Drechsel, et al., 2006, FAO, 2001). The other side of this divide by contrast believes urban agriculture is not an efficient pro poor initiative that should be encouraged in cities. This is because urban agriculture is not necessarily practiced by the poor who generally lack access to the most important resource-land to engage in own food production (Zezza & Tasciotti, 2010; Crush, et al., 2011; Lee-Smith, 2013; Stewart, et al., 2013; Frayne, et al., 2014).

Food production by urban residents however goes beyond the urban boundaries to include production in peri-urban and rural areas. Another dimension to the discussion of urban food security relates to food transfer receipts from other peri-urban and rural households that are found to constitute an important part of the urban households' food basket. These dynamics are overlooked in many studies of urban food security.

In this thesis therefore, the food security of residents of small and medium sized towns in Ghana is contextualized in relation to their own food production

in a variety of localities and transfers of food to the households. How these various arrangements contribute to urban household food security is traced in this thesis. The overarching aim of the thesis therefore is to delineate the non-market sources of food and analyze the implications of these sources for urban households in terms of their food security.

In particular, the thesis is guided by the following research questions:

RQ#1: What are the sources and types of own food production arrangements available to urban households and how do they contribute to urban household food basket in the context of small and medium sized cities in Ghana?

RQ#2: How does own food production affect household food security in the context of small and medium sized cities in Ghana?

RQ#3: How does the interplay of food production in rural areas and food transfers contribute to urban households' food basket in the context of small and medium sized cities in Ghana?

RQ#4: What are the determinants of household food (in) security and food transfer receipts among urban households in the context of small and medium sized cities in Ghana?

By answering these questions, the thesis aims to contribute to the understanding of urban food security by looking at the entirety of urban residents own food production opportunities either on urban or rural land and its effect on household food security. In addition, the thesis contributes by exploring other sources of food provisioning arrangements such as rural-urban and intra-urban food transfers available to households and their resultant implications for the urban household food basket. The focus of the thesis on small and intermediate sized cities is novel in that almost all works in the field of urban agriculture and urban food security to date has focused on large urban areas. As a result, the thesis contributes significantly to addressing the knowledge gap in the field of urban agriculture and urban food security in Ghana from the context of small and intermediate urban areas which have been generally understudied in Ghana.

1.3 Structure of the thesis

The thesis is a compilation of three journal articles which forms the core of the document preceded by the *kappa* (translated from Swedish as the ‘coat’). The contents of the *kappa* have been grouped into chapters and discusses the empirical, methodological and theoretical approaches employed in the thesis. In addition, the main arguments from the individual articles are synthesized and discussed in relation to established empirics. The under listed are the chapters in the *kappa*.

Chapter 1 presents the general introduction to the thesis which outlines the questions to be answered in the thesis. In particular, the research questions guiding the whole thesis as well as the potential contributions of the thesis are also discussed in the first chapter.

Chapter 2 reviews and discusses relevant literature in the fields of urban and peri-urban agriculture, rural food production by urban residents as well as other multi-spatial livelihood opportunities available to urban households and their implications for urban household food security. The goal of the chapter is to provide the reader with appropriate empirical background that will help to put the discussions in the thesis in context.

Chapter 3 takes a deeper look into the nature of urban and peri-urban farming in Ghana as well as other forms of own food provisioning arrangements among urban households. The chapter also introduces the reader to Ghana by highlighting important socio-economic characteristics as well as some institutional arrangements governing urban land use that makes it an important case for the study.

Chapter 4 provides a discussion of the conceptualization of urban food security. In particular, the discussions focus on the normative approaches to measuring food security as well as other explanations for lacking food security. The latter deals with the food availability theory and the entitlement theory. The various components in the food security equation - that is availability, access and utilization are also discussed in the chapter. Other theories related to urban livelihoods that can be used to analyze differences in urban food security are also discussed in the chapter.

In Chapter 5, the methodological approaches adopted in the thesis are discussed. The chapter begins with a description of the study sites as well as

the sampling design and sample selection in the study. The types of data and how they were collected and analyzed are discussed in this chapter.

Chapter 6 contextualizes the research findings by synthesizing the findings in relation to the various research questions posed in Chapter 1. In doing this, the main arguments from the articles regarding the effects of urban households' food production on household food security are summarized in relation to the theoretical underpinnings presented in the thesis.

Finally, Chapter 7 presents the main conclusions from the thesis highlighting the need to contextualize the findings of the study in the discussions on urban food security. Thus, policies relating to urban food security through food production should not be generalized but be localized to account for specific socio-cultural contexts.

The second part of the thesis focuses on the individual articles which directly answers the different research questions in Chapter 1. Each article aims at addressing at least one of the research questions in the main body of the thesis. Additionally, the papers are written to account for the different geospatial dynamics associated with the findings. In this regard, the data is analyzed along city specific contexts, Techiman and Tamale. The focus of the different articles are presented below:

Paper 1 descriptively analyzes the different sources of food production opportunities available to urban households and their contribution to the household food basket. The types of food, and where foods are produced as well as the uses of these foods by urban households are discussed in the paper. The income earning opportunities tied to agricultural production are also discussed.

In paper 2, the effects of own food production in urban and rural space on food security are estimated. The particular contributions of the different forms of agricultural production to household food security are discussed in the paper. That is the importance of agricultural production – whether carried out in rural or urban areas - to urban household food security is estimated. The general determinants of urban household food security in small and medium sized cities in Ghana are also estimated.

Paper 3 considers the interplay that exist among food transfers, urban agriculture and rural agriculture and how they relate to urban households food provisioning and security. In particular, the types of food transfers received and their uses among households as well as the factors determining food transfer receipt among urban households are discussed in the paper.

2. AGRICULTURAL PRODUCTION AMONG URBAN RESIDENTS

2.1 Introduction

The sources of food available to urban residents and their resultant implications on urban household food security vary across specific households. In this thesis, three main sources of urban foods are observed and discussed—that is engagement in own food production arrangements in urban and peri-urban areas as well as in the rural areas; the second is food transfers from family and friends in rural and urban areas; and finally market channels. The focus in the thesis is on the non-market food sources, that is own production and in kind receipts of food. The decision to choose a particular channel as a main source of food to the household or as a complementary source depends on assets and social capital¹ available to the household. Details of these are discussed in the review in this section.

This section therefore reviews relevant literature associated with urban households' food production in both urban and rural spaces and how these practices relate to their food security situation. In particular, the review focuses on food production in urban and rural areas by urban residents, urban households' food production in rural areas and other multi-local livelihoods. The literature on gender dynamics of food production and the various motivations for engaging in own food provisioning—whether for subsistence or commercialization purposes – is also reviewed. Finally, the effects of own food production on the livelihoods of producing households as well as the more general determinants of urban food security are discussed.

¹ This is discussed in Chapter 4

2.2 Agricultural production in urban and peri-urban areas

Urban agriculture (UA), defined as the growing of crops and/or raising livestock in an urban space for own consumption and/or sale to other city dwellers (Ayerakwa, 2017) has received considerable interest in the literature measured by its growing importance as a research and policy issue (Badami & Ramankutty, 2015). The number of people engaged in the practice globally according to the United Nations Development Programme (UNDP) stood at 800 million in 1996 and represented almost a third (30%) of the global urban population at the time. This figure though widely cited in the literature (see for example Smit, et al., 1996; Koc, 1999; Lee-Smith, 2010; Mougeot, 2010, 2011; Redwood, 2012) has in recent times been criticized as being exaggerated. Based on available data from 15 developing countries, a more plausible estimate of urban households engaged in agriculture ranges from 11% in Indonesia to about 70% in Vietnam and Nicaragua (Zezza & Tasciotti, 2010).

Nonetheless, the first status report on *Urban and Peri-Urban Horticulture* by the Food and Agriculture Organization (FAO) suggests that UA provides locally grown fresh fruits and vegetables to over 22 million people in Africa's cities. Thus, the report argues urban agriculture plays an important role in food supply and income generation opportunities in Africa. As a result, the practice of urban and peri-urban horticultural production could potentially see expansion and contribute to achieving zero hunger in African cities provided the sector receives the necessary support (FAO, 2012).

Recent studies in selected African cities reveal varied degrees of engagement in urban and peri-urban agriculture (UPA) suggesting that the potential of UPA in addressing poverty as well as food insecurity is highly contextual. Frayne et al. (2014) report in their study of 11 Southern African countries that engagement in urban agriculture varies significantly across cities with participation ranging from as low as 6% in Windhoek, Namibia to over 60% in Blantyre, Malawi among the urban sample. Zezza and Tasciotti (2010) in their work on urban agriculture, poverty and food security based on evidence from a sample of developing countries conclude that, although no clear regularity is found in the participation rates of countries, the four African countries² in the sample demonstrated the highest shares of cash income

² The African countries are Ghana, Nigeria, Madagascar and Malawi

derived from urban agriculture in the sample ranging from 26% in Malawi to 71% in Nigeria.

In Ghana for example, urban agriculture is practiced in backyards of households, on own plots outside the home, private plots awaiting development, government reserved plots as well as areas clearly demarcated as non-habitable (for example wetlands, areas along rail lines etc.). These locations are largely private lands, public lands or semi-public lands. The private lands include homestead or land away from the farmer's residence; these lands may be owned by the farmer or leased. The public lands include national parks and conservation areas whilst the semi-public lands are for example the school yards, hospitals and prison farms.

At the turn of the millennium, urban and peri-urban agriculture has received considerable recommendations by activists for its potential to contribute to initiatives of poverty alleviation, especially in developing countries (Smit, et al., 1996; UNDP, 1996; Armar-Klemesu, 2000; Cofie & Drechsel, 2007; Lee-Smith, 2010; Mkwambisi, et al., 2011; Mougeot, 2011; FAO, 2012). These important roles of urban and peri-urban agriculture to the livelihoods of practicing urban households and by extension the cities in which they are practiced have well been documented in the literature to include increased access to nutritious food; provision of fresh fruits and vegetables to urban dwellers; reducing food purchases and supplementing farming households income from surplus sales and serving as a source of employment to sellers of farm products from urban and peri-urban plots etc. (Smit & Nasr, 1992; Smit, et al., 1996; Maxwell, et al., 1998; Armar-Klemesu, 2000; Cofie & Drechsel, 2007; Dubbeling, et al., 2010; Lee-Smith, 2010; Satterthwaite, et al., 2010; Mkwambisi, et al., 2011; FAO, 2012; Badami & Ramankutty, 2015). Aside from such positive effects on urban livelihood, UA is also associated with a number of eco-system services as well as social and environmental aspects such as waste recycling, reduction in soil erosion, beautification of cities etc. (Badami & Ramankutty, 2015).

Even though there is not outright condemnation of the potential benefits associated with urban agriculture, it continues to receive criticism in the literature. Central to the criticism is the premise that, the potential benefits of urban agriculture to urban households have been over exaggerated by activists. Additionally, information on the scale and scope of the practice in Africa remains piecemeal with inconsistent data and methodologies (Zezza & Tasciotti, 2010; Crush, et al., 2011; Lee-Smith, 2013; Stewart, et al., 2013; Frayne, et al., 2014). The lack of empirical evidence on the scale and scope as

well as the impact of urban agriculture on food security further validates the skepticism (Stewart, 2013).

In this thesis however, a new perspective to the debate is introduced. The thesis argues that, assessing urban food security from the perspective of urban and peri-urban food production alone leaves a gap about other food provisioning arrangements available to the household. In effect, analysis of the effect of own production on urban household food security should encompass *all* agricultural production opportunities available to the household. This subject is explored in detail in papers 1 and 2 where the various sources of food to the urban household and its effects on household food security are examined.

2.3 Urban residents food production in rural areas and multi-spatial livelihoods

Although urban-rural linkages (especially regarding food production) are receiving increasing attention in the urban food security literature, very little is known about the scale of urban households' agricultural production in rural areas in Ghana (Ayerakwa, 2017). Data from a handful of other African countries confirms that rural farming by urban residents is perceived as an important source of food to producing households. The approach adopted to cultivate rural farmlands include owning land in rural areas that are cultivated by other people or the owners themselves used in rearing livestock and crop cultivation (Krüger, 1998; Andersson, 2002; Foeken & Owuor, 2008). Apart from the fact that access to rural land is fairly easy and cheaper (monetarily), the motivation for rural farming is grounded on access to cheap rural labour (Makoka, 2005; Bryceson, 2006). As noted by Foeken and Owuor (2008), food produced in rural areas was found to be the most important source of livelihood among urban farmers in Nakuru, Kenya.

The practice of rural farming by urban residents is part of a strategy adopted by urban residents to minimize risks associated with households' livelihoods in urban areas (Sarpong & Asuming-Brempong, 2004). In most instances, this engagement does not lead to a spilt in the household structure, but may require the main farmer (mainly the man) to be absent from home a few days in a week if the farmland is considered too far to warrant daily commuting (Frayne, 2004a; Foeken & Owuor, 2008; Frayne, 2010). In other cases, women may travel seasonally to engage in rural agriculture (Andersson Djurfeldt, 2012).

The safety net role of rural agriculture is manifested in the extent to which urban farm families are prepared to travel to cultivate rural land in order to produce food crops.

In the city of Tamale in Ghana for example, some urban residents prefer to migrate during the main farming season to rural areas in order to have access to arable land to grow staple crops for household consumption (Chagomoka, et al., 2015; Chagomoka, et al., 2016). Similar findings are observed for urban residents in Nakuru, Kenya where urban households own land in rural areas which are used to raise livestock or grow crops (Foeken & Owuor, 2008). As an emerging field of literature, not much is known about the proportion of urban residents involved in rural food production, however.

Whereas a number of urban households resort to rural farming as a source of food for their households, available evidence suggests a number of households rely on food transfers from rural areas as a source of food in meeting the household food requirements in urban areas (Crush and Caesar, 2017). This phenomenon has led to what is referred to in the literature as multi-spatial or multi-local livelihoods where households maintain linkages between urban and rural areas as sources of food or income (Foeken & Owuor, 2001; Start, 2001; De Haan & Zoomers, 2005; Foeken & Owuor, 2008; Tacoli, et al., 2008; Dick & Schmidt-Kallert, 2011; Crush, 2013). The motivation for engagement in multi-spatial/local livelihood is also connected to risks associated with increased food prices due to globalization and volatility in food prices and incomes among urban residents (Andersson Djurfeldt, 2015; De Haan & Zoomers, 2005).

Economic pressure may lead people to migrate to cities in search of better conditions of life, mainly through employment opportunities in the informal sector. As a livelihood strategy, the whole family does not migrate at the same time, especially for married migrants. For fear of uncertainty, households prefer at least one of the members (mostly men) to first relocate to the urban area in order to secure appropriate housing. Families of married migrants tend to follow later. Between the times a household member migrates to the urban area and when they finally settle with appropriate employment opportunities, they maintain strong linkages between the newly formed household in urban area and their rural relatives (Krüger, 1998; Potts, 2010; Andersson Djurfeldt, 2015a, 2015b).

In the urban areas where migrant farmers do not have access to food production on a subsistence basis but have to depend almost entirely on the market, the need to maintain strong links with rural households become more important.

These relationships translate into food remittances that cushion the urban household from total dependence on the market economy for food. This occurrence supports the assertion that rural to urban food transfers are important components of the discussion of urban food security (Frayne, 2004b) as urban households increasingly depend on such food sources for their livelihoods.

This thesis though not nationally representative, makes the first attempt at providing the scale of this practice from the perspective of the study areas. Another important gap that the thesis seeks to fill relates to multi-spatial livelihoods. Presently, not much data exists on multi-spatial livelihood in Africa. The thesis therefore contributes to enriching understanding of the subject from the perspective of small and medium sized cities in Ghana. In addition, the estimated underlying factors explaining food transfer receipts also provides knowledge relevant for policy.

2.4. Gender dynamics of urban households' agricultural production

The practices of urban agriculture in Africa and the people involved generally vary from country to country. While researchers in some countries like Ghana and to a large extent West Africa conclude that the practice is male-centered, females are found to dominate the practice in the Southern African countries (Andersson, 2002; Foeken & Owuor, 2008; Obuobie, et al., 2014). In Ghana, less than 10% of all urban open-space farmers are women who cultivate primarily indigenous vegetables (Obuobie & Hope, 2014). However, marketing of produce from urban space is done by the wives of the male farmers or other market intermediaries who are mostly women retailing in leafy vegetables (Gbireh, 1999; Obosu-Mensah, 1999; Armar-Klemesu, 2000; Obuobie, et al., 2014).

Andersson (2002) report in her study on food security in Rusape, Zimbabwe that urban agriculture is mostly practiced by vulnerable groups of persons including elderly females with many dependents (Andersson, 2002). Similar findings are reported from Nakuru, Kenya where women were found to engage in multiple livelihood activities including urban agriculture in their quest to cope with the declining purchasing power of their household's income (Foeken & Owuor, 2008). A study of urban agriculture in 11 Southern African countries

reveal that, urban agriculture is practiced most in countries that have economic fragility like Malawi, Zimbabwe and Lesotho where there is increasing hardship and urban poverty. (Kutiwa, et al., 2010; Tawodzera, 2010; Crush, et al., 2011; Frayne, et al., 2014)

The participation of women in urban agriculture does not preclude the contribution of men to farming activities in the cities. Generally, men provide the labor force for commercial agriculture activities in return for wages compared to women whose primary goal is own consumption and as a source of revenue to supplement household incomes (Hovorka & Lee-Smith, 2006). In cities where women dominate urban agriculture, the majority of men have casual employment as artisans in various sectors of the urban economy not related to agriculture. In certain southern African countries, urban agriculture is generally perceived to be associated with women, discouraging male participation in such activity (Mudimu, 1997).

Generally, women are predominant among urban farmers in countries in Eastern and Southern Africa, like Uganda, Kenya, Namibia, Zimbabwe, Malawi, Zambia, Mozambique etc., whereas men predominate in Ghana and Nigeria (Mascarenhas, 1999; Anosike & Fasona, 2004; Dima & Ogunmokun, 2004; Nabulo, et al., 2004; Obuobie, et al., 2004; Frayne, et al., 2014).

Other studies from Port Harcourt, Nigeria, and Senegal reveal that women predominate as agricultural laborers with men as owners of horticultural enterprises (Ba Diao, 2004; Oruwari & Jev, 2004). The dominance of women urban farmers in many parts of Africa according to Hovorka (2005) is related to reasons that the main responsibility for household sustenance and well-being is still borne by women and that women also tend to have lower educational status than men and therefore more difficult in finding formal wage employment.

Food production in rural areas by urban residents however falls in the domain of male household members. In Ghana and most African countries, men generally assume the headship roles of household and are therefore expected to provide food to feed the household members while women concern themselves with preparing the food for family consumption. In addition, the labour intensive nature of farming in rural areas does not encourage women resident in urban areas to consider rural farming. Rather, they tend to serve as market intermediaries who buy food and supply same to urban markets (Foeken & Owuor, 2008; Chagomoka, et al., 2015; Chagomoka, et al., 2016).

In this thesis however, female participation in agriculture and its effect on household food security are explored using female headed households as a proxy. Papers 2 and 3 for instance capture the gender dimensions to urban food security.

2.5 Motivation for engagement in urban and peri-urban agriculture

The reasons for engaging in UPA may vary across different regional, geographical and cultural contexts. Generally however, the reasons for participating in UPA food production relates to household consumption and commercialization purposes. In the literature, a principal motivation for engaging in urban agriculture generally in Africa and in particular to Southern African countries has to do with economic hardships. Historically, these hardships have been associated with Structural Adjustment Programmes (SAP) that most African countries subscribed to in the 1980s due to deficits in the fiscal balances of the economy. This led to retrenchment of civil servants in many countries in Africa (Smart, 2015). In most instances, SAPs led to loss of jobs with widespread urban poverty, leading to the search for alternative livelihood strategies which includes urban agriculture. The decision for people to resort to urban agriculture was found in Zimbabwe to correlate with the difficult economic conditions of 1991/1992 partly due to the IMF/World Bank Structural Adjustment Programmes (SAPs) (Mbiba, 1995). The implementation of the SAP was perceived to have contributed to unemployment leading to the decline in income levels of residents (Andersson, 2002). (See also Rakodi, 2002; Tacoli, 2002). These conditions compelled urban residents to find alternative means of detaching their households' food security from the market economy that became very inflationary, by engaging in UA to cushion the effects of rising food prices.

There are many factors which have contributed to the expansion of UA, but of particular importance is the desire to ensure food and economic security (Smart, et al., 2015) through food availability, access, and utilization, and also through income and employment generation. Peoples' motivation to participate in urban and peri-urban agriculture is part of a coping mechanism (Burger et al., 2009) and a response to inadequate food access. It is observed in Uganda for example that participation in urban agriculture is as a result of insufficient access to food and that 95 percent of urban farmers began farming

in order to increase their access to food (Bukusuba, et al., 2007). The practice thus strengthens resilience against social, political, economic and other external shocks which tends to affect one's ability to have sufficient food (Maxwell, 1995; Maxwell, et al., 1998; Warren, et al., 2015). According to Hovorka (2003) women are actively engaged in urban farming and the sale of agricultural produce with the motivation of contributing to household income and curbing the impact of poverty and food insecurity.

Smart et al., (2015) argue that in the unfortunate occurrences such as economic meltdown, natural disaster and civil wars, the most at risk are the urban poor. As a result, survival strategies such as urban and peri-urban agriculture become an essential element to ensure food and economic security to such groups. When food is grown it is either consumed by the producer and his or her family or sold, therefore creating a larger pool of people getting access to food in addition to the direct nutritional and employment benefits to producers.

Depending on the preferred needs of households, the ranking of factors that influence the decision of households or individuals to participate in urban agriculture may differ from income to food security and employment reasons. For instance in a study conducted in Freetown, Sierra Leone, 20 percent of the participants indicated that they were not engaged in urban agriculture on full time basis as they had other sources of employment (Lynch, et al., 2013).

The motivation to participate in agricultural production is analyzed in paper 1 by assessing the different uses of own food provisioning to the household-whether it is motivated by consumption or commercialization purposes.

2.6 Motivation for engagement in rural agriculture

Similar to the motivations to cultivate urban and peri-urban plots, the decision to cultivate rural plots by urban households may vary across space and household. This notwithstanding, cultivating rural plots over time has been found to serve as accumulation across space as a way of developing multi-local livelihoods (Andersson Djurfeldt, 2012). These practices not only cushion the household against urban price increases but also provides opportunity for such farmers to reduce their reliance on the market as well as providing them the opportunity to remit food to other urban food insecure households (Crush & Caesar, 2017).

Even though consumption may be the underlining reason for most urban households who engage in rural agriculture, some urban residents do same for profit motives. These individuals with investment capacity prefer larger land areas to be able to cultivate for commercialization purposes. More so, labour is generally cheaper in the rural areas than in the urban centers.

Other motivations to engage in rural agriculture stems from the declining real income and the increasing economic insecurity (Devereux, 1999) in urban areas that tend to put a strain on household income and food security.

In addition, farming in rural areas provides an incentive for urban households to maintain family and kinship ties and contribute their part to the social contract among rural families. It is important to note that, construction of households in Ghana and most countries in sub Saharan Africa is characterized with spatial and functional features (Yaro, 2006; Andersson Djurfeldt, 2012). Even though most households in urban centers are nuclear in nature, they maintain a wider spatially intertwined relations with other members of the extended family in both urban and rural areas (Guyer, 1981; Budlender, 2003; Adepoju, 2005; Andersson Djurfeldt, 2012). Maintaining these relations have both social and economic implications forming part of the social contract among families. Beyond urban-rural cash remittances, rural farming provides opportunity for this social and economic obligation to be fulfilled.

Similarly, Sarpong and Asumeng-Brempong argue that, farming in rural areas is a form of social insurance among some urban workers who wish to return to their kinsmen after retiring from active formal wage employment mostly located in urban areas (Krüger, 1998; Sarpong & Asuming-Brempong, 2004). Maintaining a rural plot or farm thus facilitates reintegration into the rural community in such situations. Beyond these reasons, households who engage in rural farming improves their access and possibly utilization of food.

The above notwithstanding, engaging in rural agriculture is not an option opened to everyone, however. Rather, the practice thrives on social and kinship capital that can be drawn by households that have a connection to such established channels. This backdrop makes it imperative for urban households to continue to belong to rural extended households-making the concept of multi-spatial livelihoods more relevant today than ever.

2.7 Conclusions

Overall, the review concludes that urban and peri-urban farms are mostly characterized by the production of fresh produce (mostly vegetables) as part of subsistence by the producing households or motivated by commercial purposes or both. (FAO, 2012; Obuobie and Hope, 2014). The review identifies a number of benefits associated with UPA including its ability to clean up the city through the use of recycled waste (Mougeot, 2005), provision of direct cash incomes and access to food (Ayerakwa, 2017) and contribution to urban employment and reduction of inequalities (Dubbeling et al., 2010; Armah-Klemesu, 2000).

Generally because the urban poor form a significant proportion of urban populations in low-income countries and are more likely to be highly vulnerable to food insecurity (Badami & Ramankutty, 2015), participation in urban agriculture serves as a supplement or as a means to diversify livelihoods (Arku, et al., 2012). The general belief that it is the urban poor that are involved in urban agriculture or depend on food transfers from rural areas as a livelihood strategy has been disputed by many authors with evidence to show that many well to do households in society are equally involved (Van Veenhuizen & Danso, 2007; Zezza & Tasciotti, 2010; Mkwambisi, et al., 2011; Padgham, et al., 2015; Ayerakwa, 2017).

It is further argued that, the political economy of urban land holding makes it difficult for the poor to have access to urban farm lands even if they have the desire to do so. Urban farmers are therefore not “the poorest of the poor” but represent a large spectrum of income classes with some having obtained significant resources and networks to engage in urban and peri-urban agriculture.

A number of knowledge gaps are identified which the thesis seeks to address. They include the over emphasis on urban and peri-urban food production in the discussion of urban food provision and security. This thesis seeks to bring all agricultural production opportunities to bear in the discussion of urban food security moving away from the over concentration on urban and peri-urban agriculture.

As observed in the literature review, cash remittances from urban to rural households has received much attention in economic literature. However, much less is known about the reverse where rural households remit food to urban residents. This thesis therefore contributes to addressing the gap by

examining this emerging trends from the perspective of Ghana. The determinants of urban households food transfer receipt are also estimated. Of particular interest is to empirically establish the driving factors for engagement in agriculture across space-whether driven by consumption or income related motives.

3. RESEARCH SETTING: GHANA

3.1 Introduction

This section presents the background to the country of study-Ghana! Ghana presents an interesting case for the study of food production among urban residents for several reasons. In particular, Ghana is one of few middle income countries in sub-Saharan Africa. The nation is also going through the urbanization transition with a number of small and medium sized cities increasingly expanding mainly due to high fertility rates and rural-urban migration. The growth in population brings expansion in access to urban markets but also leads to loss of agricultural lands in towns and cities. The important question of the role of non-market sources of foods in small and medium sized cities to the food security of urban households remain unanswered. The role of the market in providing food for urban residents remains unknown as long as households receive food transfers or continue to provision through agriculture in rural and urban areas. With much empirical works and policies that turn to bias large urban cities, the contextual differences tied to multi-locality among small and intermediate sized cities bring new perspective to policy that can improve the food security situation of urban households in Ghana.

The chapter therefore discusses the overview of the Ghanaian economy with emphasis on the agricultural sector. The section takes a deeper look into the nature of urban and peri-urban agriculture in Ghana as well as some urbanization trends in the country.

3.1 Overview of the Ghanaian economy

Ghana is a West African country and occupies a total land area of about 239,460 square kilometers (km²). The country is divided into 10 administrative regions. It is bordered to the north by Burkina Faso, Togo to the east, Côte d'Ivoire to the west, and the Gulf of Guinea to the south (Figure 3.1).

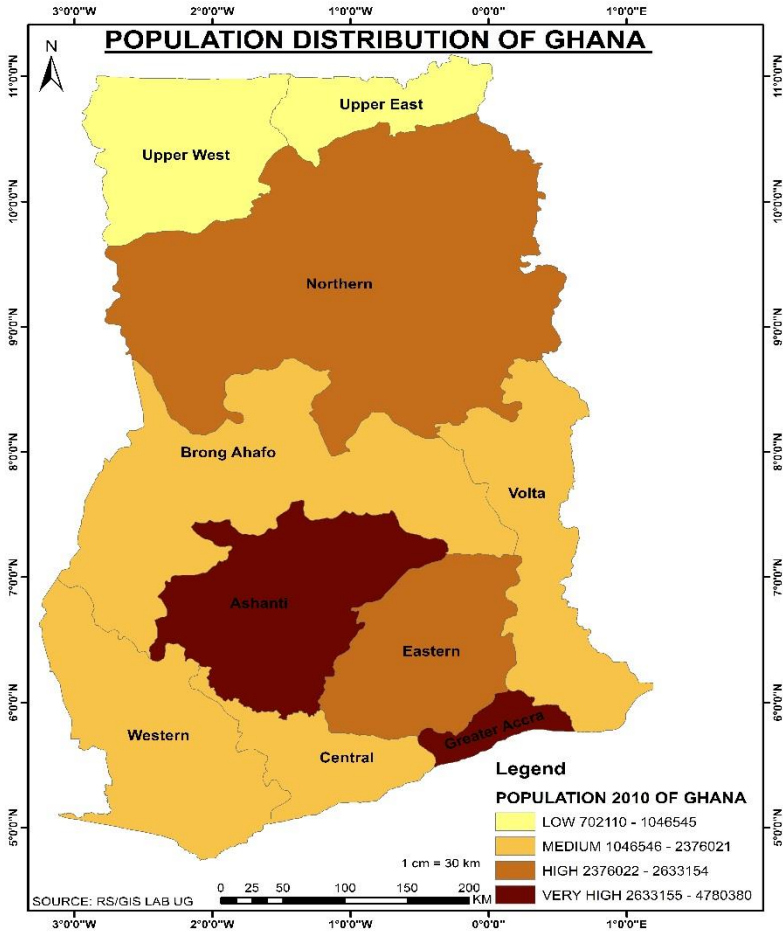


Fig 3.1
Map of Ghana showing regional population distribution

On average, annual rainfall patterns vary across regions but ranges between 800 mm in the southeast along the coast in Accra to about 2,200 mm in the extreme southwest with annual temperatures averaging about 30°C. The country’s population is estimated to be about 28 million as at 2015³ based on 2010 census data (GSS, 2013).

Over the period 2005-2013, Ghana recorded an impressive economic growth with per capita GDP reaching US\$1858 in 2013. This growth trend has however slowed down in recent years. For instance, from a high GDP growth rate of 9.1% in 2008, GDP growth peaked at 14% in 2011, mainly due to oil revenues (Figure 3.2). Since then, the growth rate has consistently declined to as low as 4% in 2014 and a further decline to 3.9% in 2015 (ISSER, 2016). Although the agricultural sector remains the smallest contributor to GDP (20.3%), it continues to employ nearly half of the total country’s labour force (44.7%) (GSS, 2014; ISSER, 2016).

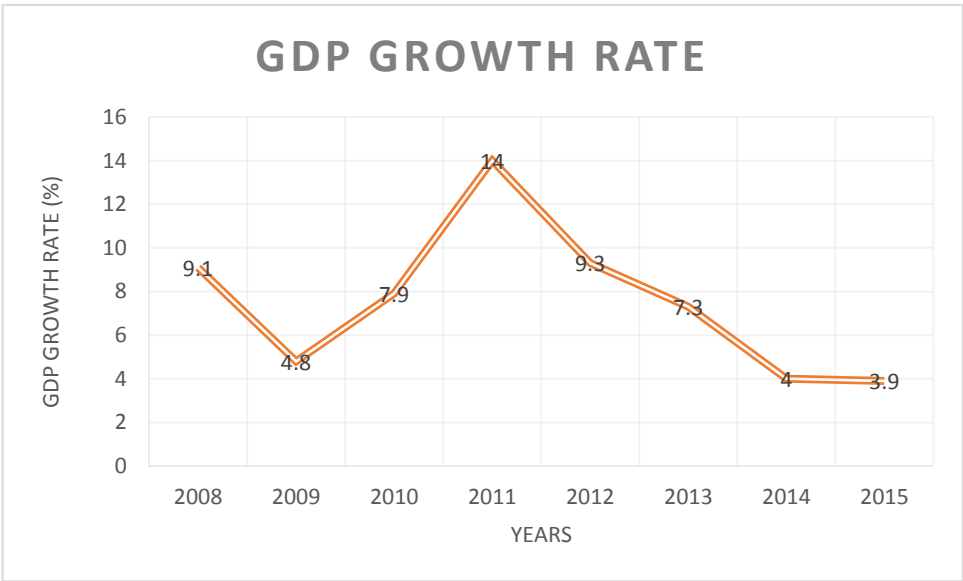


Figure 3.2
Ghana’s GDP growth rate (2008-2015)

³ This is based on calculations of the annual population growth rates

As presented in Figure 3.3, the contribution of the agricultural sector to the Ghanaian economy declined from over 30% in 2008 to as low as about 20% of GDP by 2015. At the same time, the share of the services sector to the economy increased from about 49% in 2008 to over 54% in 2015. Industry’s share of GDP has been mixed averaging about 23.3% over the period 2008-2015. As indicated earlier, however, in terms of employment agriculture continues to serve as the backbone of the Ghanaian economy, while the sector also provides access to food for the majority of urban and rural dwellers.

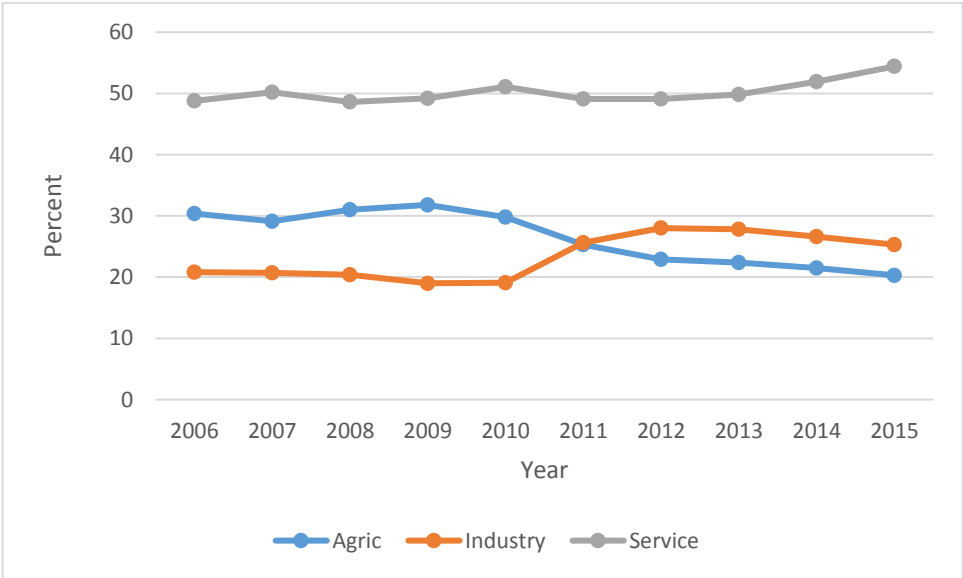


Figure 3.3
Sectorial contribution to the Ghanaian economy (share of GDP)

Agricultural production however is generally done outside of cities but with pockets of farms scattered in open areas in cities. Foods for urban consumers are generally sourced from rural areas with the help of market intermediaries. Urban and peri-urban agriculture in Ghana has become an important component of Ghana’s agricultural development programme in the recent past and contributes significantly to the food needs of urban households, although actual productivity levels remain difficult to measure as a result of the uncoordinated nature of the practice in urban areas. Policies in favour of food production over the years has been biased in favour of rural production. With

the emphasis on rural agricultural production and the uncoordinated nature of urban and peri-urban agriculture, there is the tendency to underestimate the contribution of urban agriculture to national gross domestic production.

Ghana, like many other African countries is a signatory to the Comprehensive Africa Agriculture Development Programme (CAADP) which is a policy framework of the African Union aimed at transforming agriculture in the Africa region. Under the CAADP agreement, member countries commit to invest 10% of discretionary budgeted expenditure to agriculture sector development. This is expected to translate to an annual agriculture sector growth of 6%. Ghana's performance in relation to these targets averaged 10.4% from 2008-2011⁴. The average sector growth rate between 2008 and 2015 is 4.6%, falling short of the CAADP targets. This notwithstanding, Ghana is the first country in sub-Saharan Africa to have achieved Millennium Development Goal 1-halving extreme poverty by 2015. Available data suggests that the number of poor population has also reduced from about 7 million in the early 1990s to about 1 million in 2015. Nevertheless, over a quarter of the population are still below the poverty line of US\$ 1.25/day (MoFA, 2016).

3.2 Urban and peri-urban agriculture in Ghana

Urban farming in Ghana traces its root to colonial rule in the 16th century (Anyane, 1963). The practice however gained prominence in the post-independence era as a means to address the food crises of the 1970s. The launch of 'Operation Feed Yourself' contributed to the production of food everywhere in the 1970s and a general acceptance of the practice of urban farming (Anyane, 1963; Asomani-Boateng, 2002; Danso, et al., 2002; Drechsel, et al., 2014).

Urban farming in Ghana focuses on crops with some livestock rearing. Drechsel et al., (2014) identify three common systems associated with urban farming- intensive market production on larger open spaces; rainfed farming on plots designated for construction which is usually present in low density settings but also at the urban periphery; and home gardens (or back yards)

⁴ Data from 2012 to date are not available although some evidence suggests a consistent decline in the agriculture sector growth rates.

cultivated primarily for home consumption. The greatest challenge to raising livestock in cities concerns the indiscriminate roaming of livestock along the streets and in the city centers which disturbs city dwellers and disrupts the urban landscape.

Although the practice of urban agriculture is accepted nationwide, the enterprise has thrived in the big cities like Accra, Kumasi and in recent times Tamale and Takoradi. Farmers in these cities cultivate mainly exotic leafy vegetables such as lettuce, cabbage, spring onions, carrot as well as some indigenous crops (common in Tamale).

Generally, most urban farmers have had previous farming experiences in rural areas before migrating to urban centers, mainly to pursue economic improvement. The farmers are generally illiterate with others having some level of primary education. The illiteracy rates are higher in the northern region (62.82%) relative to the Greater Accra and Ashanti regions (10.7% and 17.4% respectively) (GSS, 2014; Obuobie, et al., 2014).

Since most urban residents have previous knowledge of agriculture, rural farming appeals to urban residents in the event of loss of agricultural production on urban land or difficulties with access to food. Food production in rural areas by urban residents may not be a common phenomenon in big cities such as Accra and Kumasi. However, in medium and intermediate sized cities where distance and access to rural land is possible, households more easily draw on their kinship ties to cultivate food. These foods are usually grains and tubers that are stored over long periods for consumption in urban areas. These arrangements form part of the household's mechanisms to minimize or neutralize any form of risk that may destabilize their consumption patterns.

3.2.1 Regulatory framework guiding urban agriculture in Ghana

Agriculture in Ghana is largely rainfed with pockets of irrigation across the country. This makes farmers vulnerable and prone to food insecurity in the event of changes in weather and climatic conditions. The overall policy framework guiding agricultural production in Ghana is anchored on the Ghana Shared Growth and Development Agenda (GSGDA) which covers the period 2014-2017 and has agricultural modernization in a sustainable environment as its core objective (Commission, 2014; ISSER, 2016).

Sustainable agricultural production will require appropriate policy formulation and implementation. Even though urban agricultural production is widely acknowledged in different policy documents across ministries and agencies, the policies seem fragmented and uncoordinated (MoFA, 2016).

Presently, there are several institutions that have policy mandate to work together in harnessing the potential of urban and peri-urban agriculture in Ghana (Obuobie & Hope, 2014). These are presented in Table 3.1

Ministry	Type of policy mandate
Ministry of Food and Agriculture	Development and growth of agriculture in the country including setting of standards and extension support (including urban and peri-urban agriculture).
Ministry of Trade and Industries	Formulation, implementation and monitoring of internal and external trade. Bodies under the MoTI set standards for local and imported fresh and processed foods and drugs. They also ensure chemical safety by monitoring quality and usage.
Ministry of Health	The ministry works through the Ghana Standards Authority to establish standards on food products that conform to international standards. Sections of the standards on food safety touch on hygiene, microbiological, packaging and labelling requirements. On urban UPA, they ensure that hazardous chemicals are not used for agricultural production.
Ministry of Local Government and Rural Development	The ministry has the responsibility to promote the establishment and development of a vibrant and well-resourced decentralized system of local government including the facilitation and the promotion of a clean and healthy environment and of horticultural development.
Ministry of Environment, Science, Technology and Innovation	The ministry through the Department for Town and Country Planning has an advisory role to the assemblies in planning and zoning for different land uses including spaces for urban and peri-urban agriculture.
Ministry of Tourism, Culture and Creative Arts	This ministry has the mandate to supervise and regulate practices and standards of catering enterprises and ensuring that food sold are safe for consumption.
Ministry of Water Resources, Works and Housing	The main responsibility of the ministry is ensuring access to safe water and sanitation including water for irrigation. They therefore work with MoFA to ensure safety in the use of waste water for irrigation purposes.

Table 3.1
Ministries with policy regulatory mandate in urban and peri-urban agriculture

For example, the Ministry of Food and Agriculture (MoFA) which has the primary responsibility for food production in Ghana acknowledges in their Medium Term Agriculture Sector Investment Plan (METASIP) the important contribution of urban and peri-urban agriculture in Ghana in terms of employments, livelihoods and poverty alleviation (MoFA, 2010). The METASIP acknowledges practical challenges including access to land and quality of water for irrigation as some of the constraints affecting the practice of urban agriculture.

In particular, there are three by-laws that specifically make provisions for urban and peri-urban agriculture in Ghana—two at the national level and one at the district level. The national level laws are found in the Medium Term Agriculture Sector Investment Plan (METASIP) developed in 2010 and the National Irrigation Policy of 2011.

The only district level by-law governing the practice of urban agriculture is the Accra Metropolitan Assembly's by-law on urban agriculture and food safety. The by-law recommends that all urban agriculture activities must take place on backyards of the individuals involved. It also requires all persons interested in participating in urban agriculture in Accra to obtain approval from the metropolitan Public Health unit before doing so.

These by-laws have largely remained on the books of the respective assemblies and ministries. The uncoordinated nature of urban and peri-urban agriculture is not about the lack of appropriate legislations to regulate the sector. Rather, it is the lack of enforcement of the regulations which is a function of resources. In other words, the lack of budgetary allocations for the effective enforcement of regulations is the reason for policy failure in UPA.

3.3 Urbanization trends in Ghana

Ghana's population has witnessed significant increases in the last 50 years or so. With less than 8 million population in 1960, Ghana's population growth has increased to about 28 million as at 2015. Closely tied to the increasing population growth are corresponding urbanization trends with the urban population crossing the 50% mark (GSS, 2013). The share of urban population over the same period has increased from 23% to over 53% (Table 3.2). Annual urban population growth rates continue to vary but averages about 4%. Overall, about two-thirds (65%) of the population resides in localities of their birth with

another 15% living in localities other than their birth but from the same region. Nearly a fifth (18.7%) of the population live in regions outside of their birth—an indication that urbanization is driven both by natural growth and migration. Migration from one locality to another in the same region or outside the region is a common phenomenon in both urban and rural Ghana. Migration to urban areas has generally been influenced by employment motives (formal and informal).

Year	Population '000	% Urban	Annual urban growth rate
1960	6,727	23.1	-
1970	8,559	28.9	4.7
1984	12,296	32	3.3
2000	18,912	43.8	4.6
2010	24,659	50.9	4.2
2015*	27,899	53.0	3.5

Source: Ghana Statistical Services (2013). * Based on own calculations

Table 3.2

Trends in population growth and urbanization in Ghana

Generally, classification of communities in Ghana into urban or rural is based on the population sizes. After every census, every community that has about 5,000 inhabitants or more are classified as urban. As shown in Table 3.3, the greater Accra region remains the most urbanized in the country with the Upper East region being the least urbanized.

The Central, Ashanti and Brong Ahafo regions are found to be the most rapidly urbanizing in the last 15 years. Over the period 1960-2010, all regions experienced significant growth in urban population in the country. The population growth trends in Techiman and Tamale like many other cities in Ghana, is attributed to the post-independence relaxation of the restrictive rural-urban migration laws which resulted in increased inter regional movements (Drechsel et al., 2014).

Region	1960	1970	1984	2000	2010
Western	24.7	26.9	22.6	36.3	42.4
Central	28.0	29.1	28.8	37.5	47.1
Greater Accra	72.6	85.3	83.0	87.7	90.5
Volta	13.1	16.0	20.5	27.0	33.7
Eastern	21.1	24.6	27.7	34.6	43.4
Ashanti	25.0	29.7	32.5	51.3	60.6
Brong Ahafo	15.6	22.1	26.6	37.4	44.5
Northern	13.0	20.4	25.2	26.6	30.3
Upper West	5.0	7.3	10.9	17.5	16.3
Upper East	3.9	6.7	13.9	15.7	21.0
Total	23.1	28.9	32.0	43.8	50.9

Source: Ghana Statistical Services (GSS, 2013)

Table 3.3

Proportion of urban population by region (1960-2010)

3.4 Institutional arrangements governing urban lands in Ghana

Land in Ghana is mostly owned by families and chiefs with about a tenth owned by the state (Kasanga, 1988; Abdulai & Ndekugri, 2007). As a result, access to land for various uses is generally through traditional institutions. In most urban centers (and in some cases rural areas), government continue to acquire lands from the requisite traditional institutions for purposes of establishing state institutions and agencies as well as decentralizing governance. In most instances, the government acquires a lot more land than it requires in anticipation of future developmental needs. This means most state acquired lands are not immediately used for their intended purposes and thus makes it possible for other uses such as urban farming.

The traditional and state systems of landownership complement one another (Abdulai & Antwi, 2005; Abdulai, 2006). Whereas families and chiefs can lease their interest to individuals and businesses, certificate of ownership can only be issued by the state following the submission of requisite documents from the party leasing their interest.

Even though processes to obtaining land for urban and peri-urban farming across cities in Ghana are not clearly defined, individuals and families from whom such lands were acquired may continue to have the opportunity to cultivate the land. In other instances, employees of the various state institutions in whose merit the land was acquired may decide to cultivate the land or permit same from other persons known to them.

On the other hand, individuals and businesses are also able to acquire land from the traditional institutions and defer development of such property. As a way of securing their investment, they permit family and friends to cultivate the land to register presence on the property. A common phenomenon in such scenarios is the erection of brick walls around the plot sending a signal to everyone that the interest in that land has been transferred to someone.

3.5 Institutional arrangements governing urban land use in Techiman and Tamale

As noted earlier, nearly 90% of all lands in Ghana belong to individuals, families, and stools/skins (Abdulai & Ndekugri, 2007). The remaining 10% are held by the state, which is generally an acquisition from the traditional authorities who are the allodial owners.

Ownership of land in both Techiman and Tamale are vested in the hands of chiefs who hold it in trust of the community. Natives of particular communities are generally permitted to cultivate such lands without paying ground rent while non-natives are permitted based on shared cropping arrangements or payment of ground rent. These arrangements affect the types of agriculture households can engage in. For instance, in Techiman, as a result of the land ownership structure and the fairly small size of the city, farmers are able to move to peri-urban and rural areas to cultivate other family or community lands for food at no extra cost. In the event that farmers are made to pay ground rent, the fees are usually moderate and serves as an incentive for urban farmers to travel to rural localities to cultivate land.

In contrast, the rapid nature of urbanization and infrastructural development in Tamale (mostly by private developers) continue to shift the urban boundary to include the peri-urban spaces. Urban farmers who may have the intentions of engaging in peri-urban or rural farming still have to travel long distances to access land for production. These peri-urban lands can only be used for

agricultural production purposes as long as they remain outside of the urban development boundary. This means that, rural lands continue to be counted as peri-urban lands and then urban lands depending on the speed with which development spreads to these areas.

As Tamale continues to expand, access to peri-urban or rural land becomes a challenge and expensive to acquire for agricultural production. This may partly explain why male households will migrate (temporally) several kilometers to rural areas to cultivate land during the main production season and return with the food items after the season.

4. CONCEPTUALIZING URBAN FOOD SECURITY

4.1 Introduction

In this chapter, the key concepts relating to urban household food security and livelihoods are discussed. While the discussion on food security has many parts (i.e. availability, access and utilization), the thesis focuses on the access component. In addition, the conceptualization focuses on food production by urban residents within the urban boundary and also outside the urban boundaries in the rural areas. Using the urban livelihoods framework, the various contextual conditions that can affect asset ownership of household members and their productive capabilities are discussed. The unit of analysis for the thesis as a whole is the household. To this end, the concepts will be connected to the household level. In addition, the different normative approaches to studying food security are also discussed in this section.

4.2 Household Food Security

As mentioned in the introductory chapter, food security has been on the global radar since 1948 with the signing of the Universal Declaration of Human Rights. Food security assumed global attention after the world food crises in the 1970s-1972 to 1974 (UN, 1948). The concept and interest in food security however received a surge in the 1980s partly due to the famine in African countries; structural adjustment programs which led to deterioration in basic needs; and encouraged general intellectual enquiry in the field (Maxwell & Smith, 1992).

The concept of food security has since undergone several definitional changes. However, the mostly widely cited relates to the definition agreed to at the 1996

World Food Summit, which states that food security represents ‘a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’ (FAO, 1996).

4.2.1 The three pillars of food security

Building on this food security definition, food security has generally been conceptualized in terms of what has been commonly referred to as the three pillars of food security: availability, access, and utilization (Barrett, 2010). Fundamentally, the concepts relate to each other. For instance, availability is necessary but not sufficient to ensure access to ‘sufficient, safe and nutritious food’. On the other hand, access is necessary, but not sufficient for effective utilization (Webb et al., 2006; Barrett, 2010). Similarly, availability, access and utilization could be disrupted in an unstable environment such as civil unrest, harsh climatic conditions etc.

The World Food Programme defines food availability as ‘the amount of food that is present in a country or area through all forms of domestic production, imports, food stocks and food aid’ (WFP, 2009: 170). The term availability as observed by Riely et al., (1995) has the potential to focus on national and regional related analysis instead of the household level. However, availability at the national level does not guarantee access at the micro or household level. For example, although the national food balance sheets in the 1980s indicated food availability in most African countries, there were distributional challenges that prevented households from accessing food and hence remained food insecure.

Access to food on the other hand is defined as a situation where the household has the ‘ability to acquire adequate amounts of food regularly through a combination of purchases, barter, borrowings, food assistance or gifts’. (WFP, 2009: 170). Access thus relates to choice sets available to the household, community or region subject to economic and markets conditions such as prices and income earning opportunities; policies and production related opportunities available to the household. These conditions depend on the types of policies that support production opportunities as well as the sociocultural belief systems including societal norms and practices through which food can be appropriated by the household. The close relationship between food security and poverty as well as to the socio-economic and political disenfranchisement becomes clearer using the access lens (Barrett, 2010).

Another pillar relevant to food security is utilization of food. This concerns the types of foods that households can afford and use. Critical to this concept is whether foods consumed are safe and can deliver the appropriate nutrition to the individual or household. In essence, utilization is concerned with dietary quality, especially accessing micronutrients associated with adequate intake of essential minerals and vitamins (Barret, 2010).

A household is therefore considered food insecure when its members are unable to obtain sufficient quantities of food necessary for a normal and healthy life. This condition may be the result of lack of food or income to purchase food, or other factors such as poor distribution channels (FAO, 2012).

Generally, urbanization poses complex challenges to poor households to satisfy the three conditions that could make them food secure. This notwithstanding, urban residents with access to productive resources to engage in own food production are able to overcome the challenge of food availability which has generally been a macro level analysis and appropriate food at the household level. Such households also reduce their dependence on the cash economy for food and thus are able to access food for domestic consumption. At the same time, the greatest challenge of the urban poor who may feed on cheap imported foods that lack the requisite micronutrients are addressed by the consumption of own produced foods including vegetables and fruits.

Again, there is the interplay that exist between availability, access and utilization of food through the mechanism of food transfers. Increasingly, food transfers are becoming an important component to urban residents and contributes substantially to meeting their food security needs (Krüger, 1998; Andersson, 2002; Frayne, 2004a; Foeken & Owuor, 2008; Andersson Djurfeldt, 2012). Food transfers received by urban households satisfies the condition of accessibility of food to the household. However, the motivation for these transfers remains largely speculative. One thing that is obvious however is the fact that, these foods are sent to close relatives and friends (Krüger, 1998; Frayne, 2004a).

Food security could also be viewed as a continuum such that, at the lower range, the focus is on access to food- making sure that households have adequate amounts of food at all times while at the upper range, the focus could be on food utilization-ensuring that, households obtain all requisite micronutrients needed from the consumption of particular foods. This continuum may influence households' decision and choice of what to produce and where to produce. The decision of a household to produce food in either

rural or urban space therefore may be a reflection of this continuum and how households perceive their choices to complement their food security needs.

In general therefore, the concept of food security/insecurity can be related to the socio-economic, political, cultural and environmental factors available to the household, community, nation or region. Unfortunately, sub-Saharan Africa remains the only continent in the world to still have severe food production shortfalls and this has largely been blamed on economic development failure, even though evidence abounds to the effect that economic growth of a nation does not necessarily translate into food security for all (Sen, 1981; Salih, 1995).

4.2.2 Household food security and productive assets

Conceptually, food insecurity could be classified as an issue of general decline in food access, entitlement failure, and as a human rights issue.

Improvements in the asset wealth of households (including the provision of infrastructure and production equipment) are means which enable people to pursue livelihoods to improve their access to food. Access to productive assets for instance enables households to invest in the production of food for own consumption and also store values which serves as an insurance in the event of shocks.

Assets available to households or communities constitute a ‘stock of capital’ that can be stored, accumulated, exchanged or depleted and put to work to create an income flow (Rakodi, 1998). The natural capital is the wealth of natural resource stocks including land, water and other resources (Carney, 1998; Rakodi, 1998; Booth et al., 1998).

Households can also exchange the labour assets for income either through direct channels such as monetary exchange through formal wage employment or through indirect channels such as production of goods and services for sale (World Bank, 1991). The household is therefore able to appropriate their entitlements based on the type of assets they command. Ownership of land in urban space provide households the opportunity to engage in agricultural production, rent the space for income, or provide other investments that bring returns to the households. In such cases where the household is able to command resources, there is a higher likelihood of food security relative to other households with no command over assets or other resources.

The factors influencing exchange entitlement given particular ownership are identified as whether the household member in question can find employment or not which is tied to income earning opportunities among members of the household (Sen, 1981; Dreze & Sen, 1989). For household members to fully engage in trading their labour assets for income, it will depend on how long they are prepared to work and at what wage rate and how much it costs them to buy whatever they may wish to buy (Sen & Dreze, 1999). Also, an assessment of what could be produced with the household's own labour assets and resources as well as the costs of purchasing the resources and the value of the products that can be produced all contribute to making the household decide whether to exchange their labour assets or invest it in production of goods.

4.3 Normative approaches to food security

The human rights approach to studying food security derives from the Universal Declaration of Human Rights (1948) which recognizes the inherent dignity and equal rights of all people of the human race to have the right to live and access to basic human livelihood in a dignified way. Article 25(1) of the declaration states that 'everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control'. In addition, the right of people to freely participate in the cultural life of their community, enjoy the arts and to share in scientific advancement and its benefits are also guaranteed in article 27(1). These articles embody the totality of the vulnerable in society and how their human dignity ought to be guarded to create an environment that enables them to fully participate in society.

A good point to start in the food security discussion will be an advocacy, based on human rights that seek to provide some level of assurance to the vulnerable of a certain minimum food entitlements that will guarantee their human dignity. These guarantees work in an environment where there is rule of law and good governance through democracy which allow all people in society to participate in making decisions that affect them (Eyben & Ferguson, 2000; Mikkelsen, 2005; Li, 2007). However, civil and political rights granted through democratic elections and freedoms alone do not achieve development without

the granting of economic, social and cultural rights although these rights were more easily achieved under democratic rule than dictatorship (Yaro, 2004). This kind of contract (what Sen refers to as a political contract) makes it a demand on political leadership to act and make decisions that will be in the interest of the people (Dreze & Sen, 1989; Yaro, 2004) especially decisions about hunger, production, distribution and utilization of natural resources.

The right based approach essentially argues that, the war on fighting hunger cannot be left to a certain marginalized group in society to battle their way to survival. Rather, it should be a deliberate and collective effort to ensuring that, everyone is entitled to a fair share of food and other resources enough for a meaningful life. This will require comprehensive global, continental, regional, national, societal, household and individual level contributions (Effah-Abedi, 2014) to create an enabling environment that will birth individual and collective potentials in a well-defined social, economic, environmental and political framework. The approach advocates a non-discriminatory methodology in the fight against hunger.

Although the right based approach sounds superior in the food security debate, the main bottleneck has to do with the implementation of these international ratifications which although countries are signatories to, sometimes find it difficult to implement. The problem with this approach is the extent to which social, economic, and cultural rights are enforced. Resource constraints, inappropriate policies and the dilemma in assigning rights in societies with conflicting interests groups impedes the agenda of this approach. Often times, groups with the 'loudest' voice or representation turn to have a major stake in deciding what the landscape can be used for at the expense of the poor and vulnerable.

Following the above, 'access to food could be determined by the food entitlements derived from the human and physical, assets and stores, access to communal property and a variety of social contracts at the household, community and state level' (Maxwell & Smith, 1992). Entitlements failure will therefore increase the likelihood of vulnerability and food insecurity.

4.4 Explanations for lacking food security

This sub-section discusses the various theories that seek to provide insights on why households remain food insecure. Specifically, the food availability decline and the entitlement theories to food security are discussed.

4.4.1 The food availability decline (FAD) theory

This theory which is largely national and regional in scope focuses on food supplies as a major cause of food insecurity. This has generally been analyzed as a supply and demand nexus with great emphasis on quantities of available food versus needs and net imports needs versus capacity to import (Von Braun, 1992; Salih, 1995). This foundation led to the crusade for countries to invest in agriculture with the firm belief that, once supply is enhanced, food will be in abundance and thus address the insecurity problem. The approach called for investment and policies that built on the 'complementarity of food and crop production'. This according to Yaro (2004) led to huge investments in green revolution technologies designed to increase food supplies for both national self-sufficiency and for export. The returns on these investments have been encouraging; especially in Asia and Latin America where productivity per acre increased many fold.

The food availability decline approach argues that, an acute decline in the supply of food is a necessary condition for famine to emerge (Fine, 1997). Hence under normal circumstances a growing supply of food relative to population is sufficient to guarantee the absence of famine (Yaro, 2004).

This approach largely depended on the use of supply and demand methods to measure deficits in relation to aggregate requirements resulting in supply related factors such as irrigation, land access, innovation and technology receiving greater attention with one central goal of improving food production to match the needs of the growing population.

The approach however fell short in addressing the problem of food insecurity in several countries despite the increasing world food production. At the macro level, higher production was recorded but most poor households and individuals could not access available foods due to poor distribution channels. This led to the harsh realization that food availability alone does not ensure food access by all. The revelation led to the decline of this approach and the emergence of the entitlement approach (Nyborg & Haug, 1995).

4.4.2 The entitlement theory

A major conceptual shift was experienced with the introduction of the entitlement approach to food security/insecurity analysis which moved the focus from a short-term phenomenon to a long-term perspective. The entitlement approach finds its root in the work of Amartya Sen (1981) which has since been regarded as a fundamental theoretical underpinning of the concept of food security. In his essay on poverty and entitlements Sen (1983) summarized the entitlement approach which concentrates on the ability of people to command adequate food given the established societal procedures including production possibilities, opportunities through trade, state allocations etc. The ability to command enough food through these channels enable a person to avoid starvation. If a person is found starving it is a reflection of the individual's inability to command enough food, or the lack of ability to appropriate the established channels to their advantage. The entitlement framework has its analytical structure grounded in neoclassical general equilibrium theory (Fine, 1997) and seeks to examine what conditions are necessary to ensure an individual's set of entitlements (Yaro, 2004).

Entitlements according to Sen are the set of alternative commodity bundles that a person can command in society using the totality of rights and opportunities that he or she faces. Entitlements, he argues depend on the legal, political, economic and social characteristics of the society in question and the person's position in that society (Sen, 1983). These commodity bundles in themselves must be enough to meet the minimum daily calorie and nutritional requirements in a sustainable way without which a person may face starvation. In a later work Sen and Drèze, argue that the understanding of entitlements should be at the individual level where the ability of the individual to acquire food and other commodities within the prevailing economic, social and legal arrangements is the focus (Sen & Dreze, 1999).

The approach also analyzed the concept of poverty and starvation and indicated that, starvation has to do with the kind of relationship that exists between a person and their ability to access essential commodities in a sustainable manner.

Entitlement theory has however received diverse criticism including the fact that the approach is vague and has several interpretations and associations attached to the term entitlement. As a result, the approach does not specify one particular cause of famine but a general conclusion that famine is a reflection of failure in entitlements (Sen, 1995). This has led to the use of the concept in

different applications and interpretations way beyond its relevance as a framework for analyzing famines within the boundaries of an economy. Secondly, the approach seeks to imply that individuals could translate their endowments into food to address the problem of famine but there is no linear progression in the conversion of assets into food (Faridi & Wadood, 2010; Daie, 2014; Davies, 2016). People may rather preserve their assets for future vulnerabilities (Waal, 1989; Al-Hassan, et al., 1997). In some cases, the poor would rather choose to be food insecure and put their assets in productive investments than to lose the possibility of future livelihood (Waal, 1989).

The entitlement theory also has a weakness in confining its analysis into one final outcome - food Yaro (2004). The approach is only a part of a whole and an analysis of entitlements as an entity does not give a complete picture. In the words of Davis (1996), food security is only a part of livelihood security strategy and the decision of a people within any geographical boundaries are borne out of a complex web of economic, social and political interrelationships that develops over time. The entitlement approach primarily considers the household as the unit of analysis but this becomes problematic once the argument is stretched to the larger population. The approach therefore fails to outline a framework that would link the micro level issues to the macro variables. Whereas Sen argues that famine does not occur in a democracy, the approach in a way does not fully explain the complex cause of famine in certain regions especially, Africa where victims of famine are only the result of selfish political interests that render them powerless in the distribution and access to resources.

4.5 Household food security, assets and urban livelihoods

Conceptually, the livelihood framework has been used to assess and understand poverty and deprivation, mostly in rural settings but it has been generally accepted to have applicability in urban and peri-urban contexts as well (Rakodi, 1997; Carney, 1998; Moser, 1998; Rakodi, 1998; Tacoli, 1998a; Rakodi, 2002). A livelihood according to Carney (1998) consists of capabilities, assets (including both material and social resources), and activities necessary for a means of living. When the livelihood in question is able to withstand complex occurrences such as shocks and stresses without compromising the natural resources base, we classify such a livelihood as sustainable (Carney 1998:2)

Broadly speaking the point of departure for the livelihood framework focuses on identifying what the poor have (the wealth of the poor) instead of what they lack (UNDP, 1998; Moser, 1998). Even though rural and urban are generally treated as two distinct settings, there are commonalities in the principles underpinning the livelihood approach in these two settings. This notwithstanding, contextual differences relating to economic, social, governance and environmental factors exist between rural and urban settings and also among different urban settings (Meikle, et al., 2001). It is therefore imperative to understand and account for these contextual differences as they have the potential to influence the livelihoods of the urban poor.

To have an appreciation of the urban sustainable livelihood framework requires an understanding of the fundamental predisposition that poverty is not a static or a permanent condition. Rather, people may move in and out of relative poverty subject to the opportunities, threats, stresses and shocks that confront them-these could be social, economic, governance or even environmental aspects (Chambers, 1995; Moser, 1998; Meikle, et al., 2001). Survival among the urban poor therefore is based on different multifaceted coping strategies that draw on their assets (Chambers, 1995; Rakodi, 1997; Burnell, 1998). Such assets can be classified into tangible and intangible (Sen, 1992; Moser, 1998).

As indicated earlier, livelihood options are generally different across rural and urban and inter-urban settings depending on contextual factors (Meikle, et al., 2001). Depending on the opportunities, threats or shocks that may confront households, they respond by allocating their asset portfolios including social

capital, and capabilities either as a short-term or long-term strategy (Meikle, et al., 2001; Development, et al., 1994).

Swift analyzed vulnerability and insecurity as a function of assets which is classified as investments (human investments including education and health; individual productive assets such as houses and land; and collective assets such as irrigation systems and access to common property resources); stores (food, jewelry and money); and claims on other networks including kinship relationship, friendships, community, government or international community (Swift, 2006:44).

4.5.1 Elements of Sustainable Livelihood

For any livelihood approach to be described as sustainable, it must have the following characteristics as espoused by Meikle et al., (2001).

First, the livelihood must take into account how to translate available assets (both material and social), capabilities and all the activities that the household engages in that can help to give them a livelihood (Sen, 1992; Chambers, 1995). The opportunities may be diverse depending on the spatial location of the household and the type of resources at their disposal (Wratten, 1995; Moser, 1998; Tacoli, 1998b). Additionally, the livelihood must account for social networks and any institutions that enhances access to resources (De Haan, 1999).

Secondly, the livelihood must have the potential to respond to change. That is, it should be flexible and adaptable and must have the ability to withstand and recover from shocks in a sustainable manner, at least in the long term (Chambers & Conway, 1992; Singh & Titi, 1994).

Thirdly, the livelihood must be based on the choices, capabilities and priorities of the affected people keeping in mind that the people with capabilities are at the core of the framework. As a result, they should be treated as such but not as helpless vulnerable.

Fourthly, the livelihood must also be household and community centered. Thus it must be sensitive to the community and the context specificities. This is important because different members of the household will contribute differently depending on their capabilities and specific roles assigned them which also draws on the social capital and kinship relations available to members of the household (Putnam, et al., 1994; Moser, 1996).

4.5.2 The Urban Context and the Sustainable Livelihood Framework

In order to have a complete appreciation of the sustainable livelihood framework and its applicability to the urban context, I revisit the key issues relating to the urban context outlined in earlier sections. In particular, the social, economic, governance and environmental contexts are discussed in this section.

4.5.2.1 The Urban Social Context

As noted by Meikle et al., (2001), the cosmopolitan nature of cities makes them diverse and fluid in structure, departing from the otherwise more organized and stable rural structure. Social capital presents itself as an important asset available to both urban and rural households. Social capital is used to represent the organizational trust, norms and networks with the potential to improve societal efficiency. Social capital also relates to the wider social relations and networks available to both urban and rural people. This is considered an important resource for both urban and rural families and has received considerable attention in the literature as a major asset in the event of crises (Moser, 1996; Douglass & Friedmann, 1998).

One important component of social capital is the remittance of cash from urban households to rural networks. Even though this type of remittance has gained considerable attention in the economic literature, recent trends suggest that there is also a flow of resources in the form of food from rural areas to urban households (Andersson Djurfeldt, 2012, 2015a). This is done as part of the social contract that may exist between individuals, groups or communities. In effect, the underlining characteristics of social capital is grounded in relationships and context specific scenarios. Social capital thus is expressed through strong rural-urban linkages that are often activated to support each other in crises. Social capital therefore transcends beyond the boundaries of the city to include the wider rural-urban interactions (Tacoli, 1998). Thus, households with stronger social capital would have a lower likelihood to experience food insecurity relative to those with weak social capital.

4.5.2.2 The Urban Economic Context

Urban areas and cities present a variety of opportunities for residents to generate wealth but at the same time also a myriad of challenges to the urban poor as they tend to depend on the cash economy for their livelihoods. The commercial nature of urban areas where basic necessities of life such as food and shelter are obtained through the market places extra burden on poor households to get cash income in order to command food and other needs (Wratten, 1995; Satterthwaite, 1997; Meikle, et al., 2001). This leads the urban poor to consider a range of activities including urban farming and engagement in informal related businesses as a means of livelihood. Notwithstanding the challenges confronting the urban poor, most rural people, especially the youth continue to migrate to urban centers for the opportunities that it presents them. As noted by Meikle et al., (2001), the urban informal economy is not the reserve of the poor as other non-poor households are also found to actively engage in that sector. In fact, evidence abound that, urban agriculture is not necessarily practiced by the poor as they lack access to land which is considered an important resource of production (Ayerakwa, 2017; Mkwambisi et al., 2011). It is noteworthy however that, not all households are able to find productive land for own food production or actively engage in the informal industry. As a result, the food security situation of the urban poor worsens when poverty is urbanized.

4.5.2.3 The Urban Governance Context

In the spirit of decentralization, management and the provision of infrastructure are the responsibilities of city authorities. The urban poor like most city dwellers depend on these infrastructure and services to map out their livelihood strategies. However, in the provisions of infrastructure, the poor are often left out or discriminated against for reasons that, they live in unauthorized structures or engage in either unauthorized business or operate businesses in unauthorized locations (Katepa-Kalala, 1997; Walker & Meikle, 1999). For example, in Ghana, urban food production mostly takes place on state reserved lands which does not provide any form of tenure security for the farmers to make any meaningful investments. These practices are considered a nuisance to city development by the local government and thus refuse to provide any form of services that will promote the practice to such farmers (Ayerakwa, 2017).

4.5.2.4 The Urban Environmental Context

In developing countries experiencing increasing urbanization, access to decent housing and related services become expensive to the poor as towns and cities grow. The quality of housing and working conditions and its related health implications of the poor have received attention in the literature (Meikle et al., 2001). In most developing countries like Ghana, the urban poor are often concentrated in densely populated neighborhoods or uncompleted structures with minimal or no social amenities. The lack of basic social amenities such as water and toilet facilities exposes the poor to the inhuman sanitary conditions leading to infectious diseases (Werna, 1998). The decision of poor men and women to live in 'low scale' neighborhoods is often a trade-off to sacrifice their health and 'luxury' in order to preserve their assets to engage in productive activities that will guarantee some form of livelihood. On the contrary, if a household member falls ill due to insanitary conditions, it could also deny the same household the opportunity to engage in any form of livelihood activity (Miekle et al., 2001; Douglas 1998).

4.5.2.5 The Urban-Rural Multi-Spatial Context

Increasingly there is a consensus that the urban and rural context must not be treated in isolation as happenings in either urban or rural areas have implications for each other. For instance, in Ghana and by extension most developing countries in Africa, there is a strong interaction between urban and rural areas in the form of people and goods. Some urban residents live in areas classified as rural but work in urban areas while a number of urban residents live in areas classified as urban but source their livelihoods from rural areas including farming in rural areas and seasonal migration. Other households depend on food transfers from rural areas to supplement their food needs in urban areas. As a result, rural-urban interactions play an important role in understanding how urban residents, especially the urban poor construct their livelihoods (Tacoli, 1998)

Multi-spatial livelihoods may result from the command over natural resources either in urban or rural areas in combination with social networks. Urban households who wish to participate in rural farming for example will need to draw on this important relationship to be able to command land for production. Similarly, households draw on the social network capital to receive cash remittances from urban networks as part of their livelihoods in the rural areas. In essence, the lack of social networks hinders the ability of households to command social capital for food production or food transfers which has

implications on their food security (Andersson, 2002; Andersson Djurfeldt, 2012, 2015a).

4.6 Conclusions – linking concepts to the research questions

Urban households are faced with the option of appropriating their assets into production, consumption and exchange. Assets can be transformed into production directly or through exchange. Similarly, production and exchange can be used to create assets. This includes urban food production available to households for consumption and exchange of products for income through the market. As indicated earlier, households without productive resources such as land can still exchange their labour to acquire other forms of assets (investments and stores) or exchange for consumption.

Understanding urban food security needs therefore requires that, we analyze the contextual factors that independently or collectively explain the food security situation of the specific households in question and whether the underlining factors are the same across specific cities. For example, among urban residents who admit to engaging in own food production, the context differ from engagement in only urban agriculture to growing food solely in rural areas. Obviously, the factors underlining participation in own food production will differ by the type of production and also by city specific contexts. Similarly, the food provisioning arrangements tied to social or kinship relations may differ across different sociocultural settings. In effect, the different agricultural production arrangements and food transfer receipts may have different implications for the producing household's food security situation which is the focus of this thesis.

5. METHODOLOGY

5.1 Introduction

The quantitative data for this thesis forms part of a broader collaborative research project between Lund University, the University of Ghana and the University of Nairobi being carried out in Ghana and Kenya with the aim of understanding the social, economic and environmental challenges and prospects of urban agriculture under changing global and demographic realities. For the Ghana case study, Techiman municipality and Tamale metropolitan assemblies were selected. Interviews were however conducted in the urban areas of Techiman and Tamale. The two towns were jointly selected by the research team in Lund University and their Ghanaian collaborators based on the rapid population growth in the two cities tied to changing marketing structures and diets away from traditional consumption to modernized diets including exotic vegetables. These standards tend to favour urban agriculture production as proximity matters in the production of such vegetables.

The choice of the two cities (Techiman and Tamale) therefore allows for comparison and assessment of the scale and contribution of urban agriculture to urban food security.

The study employed a mixed method methodology to analyzing the phenomenon of food security and urban agriculture. Specifically, the thesis is written mostly based on the quantitative data. The qualitative data however provides the setting and background to which the results of the quantitative data are interpreted. The use of these two approaches give the advantage of obtaining information that supplement each other. In addition, the qualitative information aids in contextualizing findings of the study as well as other useful information such as socio-cultural information that may be impossible to capture quantitatively. This study therefore is biased towards quantitative methodology.

5.2 Study site selection and description

As indicated earlier, two medium sized cities, Techiman municipality and Tamale metropolitan assemblies in the Brong Ahafo and Northern regions respectively were purposively selected for the study in Ghana, breaking away from the metropolitan bias that has characterized earlier studies on agriculture in urban areas (Obosu-Mensah, 1999; Obuobie, et al., 2004; Probst, et al., 2012; Ayerakwa, et al., 2014; Danso, et al., 2014; Drechsel, et al., 2014). These earlier studies generally lacked context and scale. This gap however is filled in the thesis.

5.2.1 Techiman Municipality and Tamale Metropolitan Assemblies

Techiman municipality is located in a central area that connects to the Northern, Upper West and Ashanti regions as well as other big cities in the Brong Ahafo region of Ghana (Figure 5.1). The unique location of this municipality makes it very attractive to several traders of primary food stuff to converge to do business. The main market in Techiman is projected as the largest primary food market in Ghana, which also attracts several traders from neighboring West African countries (mainly from Togo and Cote d'Ivoire) on a weekly basis.

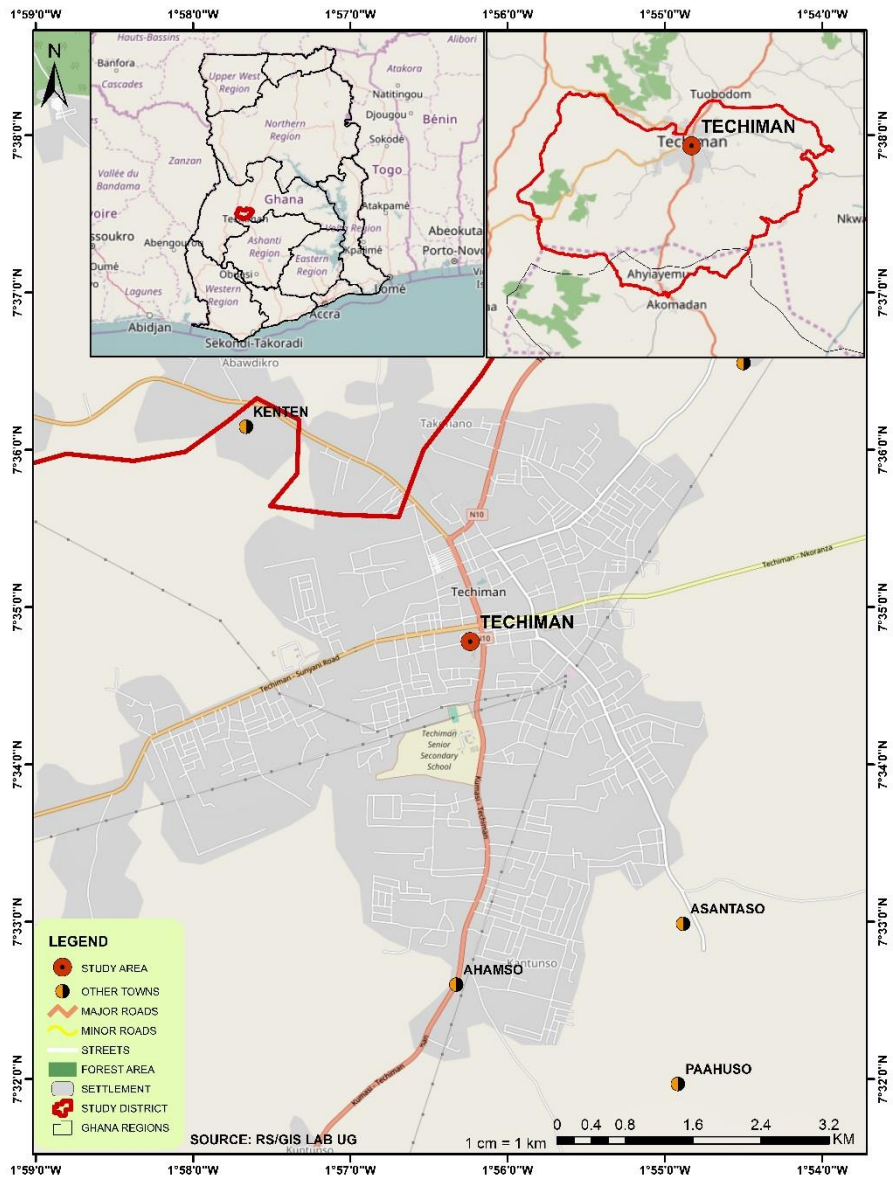


Figure 5.1
Map of Techiman township highlighting major roads

The municipality has a total land area of 669.7 square kilometers and has an annual rainfall ranging between 1250mm and 1650mm with an average temperature of 28°C (MoFA, 2014). The main agricultural activities include crop farming and livestock rearing (MoFA, 2014; GSS, 2013).

Despite being defined as urban area in the census data, the municipal's economy is mainly rural and dominated by the agriculture sector with nearly half of the municipal population engaged in agriculture (46.2%). The Ghana Statistical Services classifies households as agricultural if at least one member of the household participates in agricultural production (GLSS, 2012).

Nearly all urban and rural agriculture households (93% and 98% respectively) in Techiman are crop farmers. Even though rural farming is the dominant agricultural household type, comparing urban and rural households shows that the proportion of urban residents engaged in urban farming is substantial (about 49%) while a little over half (51%) of agricultural households remain rural

Tamale Metropolitan Assembly on the other hand is the administrative and regional capital of the Northern region of Ghana. The metropolis has a population of about 223,252 as at 2010 with more females (50.2%) than males. The share of the population in the metropolis who are urban is estimated at 80.8% with an average household size of 6.2 members but higher for rural Tamale (7 members). The main economic activity in the metropolis include formal wage employment, trading in food crops (common among women) and farming on urban spaces. Some urban households also have farms in rural areas although they reside in the city. For the farmers who engage in urban agriculture, vegetable production is their main focus, with products usually sold to urban consumers. More so, with Tamale as the administrative capital of the Northern region, it provides home to hundreds of government employees and other visitors who seek to do business.

Tamale can also boast of the presence of financial institutions, several dozens of Non-Governmental Organizations (NGOs) as well as private for profit organizations. Farming in the city mainly focuses on vegetable production whereas rural farming focusses on staples such as maize, millet, yam and groundnuts.

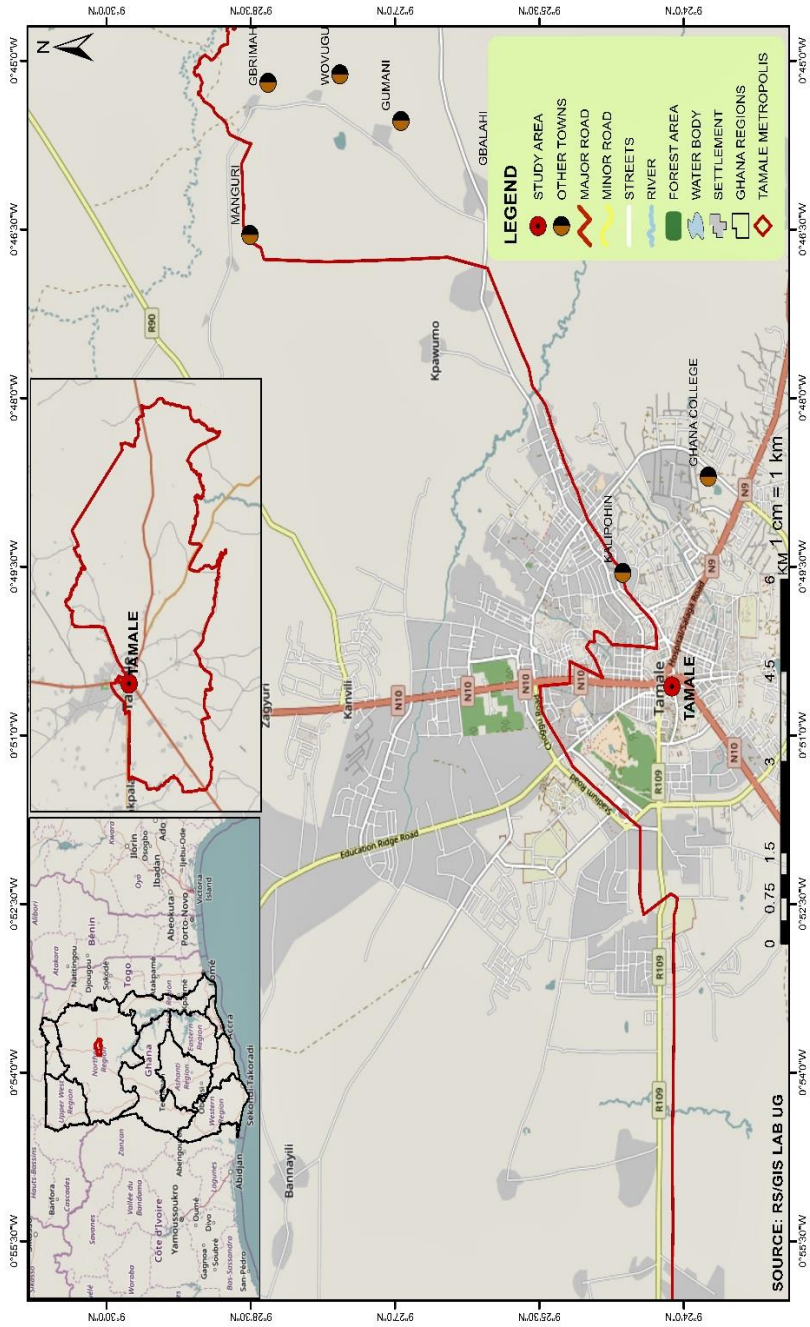


Figure 5.2
Map of Tamale township highlighting major roads and neighbourhoods

5.2.2 Characteristics of Techiman and Tamale

The choice of Techiman and Tamale for this study provides insight into the contextual nature of food security since the prospects for engagement in urban and rural agriculture in the two cities are different. Available estimates based on census data suggest that more than three-quarters (88.4% and 83.2%) of households in Techiman and Tamale respectively are employed in the private informal sector. Higher proportions of households are employed in the public formal sector (11.3%) in Tamale than Techiman (5.7%). Whereas the household structure in Techiman is mostly nuclear (head, spouse and children) (27.9%), the household structure in Tamale is mostly extended (household head, spouse, children and other family relatives).

Table 5.1 suggests that nearly half (46.2%) of households in Techiman Municipality participate in agriculture compared to about a quarter (26.1%) in Tamale Metropolitan Assembly. Of this however, about 57% are engaged in urban farming in Tamale compared to about 49% as found in Techiman- an indication that, urban farming is more pronounced in Tamale relative to Techiman.

Most of these farmers practice mixed cropping and supplement their farming activities with animal rearing which serves as investment or insurance among family members for payment of hospital bills during illness, payment of school fees, and even providing a befitting burial in the event of death of a member of the household. The data also suggests that, one in every four (24.5%) households in Techiman are involved in rearing livestock compared to about 12.9% in Tamale. The share of urban households engaged in animal rearing is however higher in Tamale than in Techiman (49.8% and 42.4% respectively).

Livestock are usually kept in urban areas and allowed to graze on open grounds or kept within an enclosure and fed. Unlike Techiman, the proportion of agricultural households engaged in urban agriculture relative to rural agriculture is 57% and 43% respectively in Tamale. Crop production and tree planting and rearing of livestock remain the three most practiced types of agricultural activities in the metropolis.

Techiman							
Type of activity	Total		Urban		Rural		
	N	%	N	%	N	%	
Total households	34,137	100.0	23,566	69.0	10,571	31.0	
Households engages in agriculture	15,781	46.2	7,769	49.2	8,012	50.8	
Crop farming	15,073	95.5	7,222	47.9	7,851	52.1	
Tree planting	146	0.9	94	64.4	52	35.6	
Livestock rearing	3,870	24.5	1,639	42.4	2,231	57.6	
Fish farming	7	0.0	6	85.7	1	14.3	
Tamale							
Agricultural activities	Total		Urban		Rural		
	N	%	N	%	N	%	
Total Households	35,408	100.0	29,322	82.8	6,086	17.2	
Households engages in Agriculture	9,251	26.1	5,244	56.7	4,007	43.3	
Crop Farming	7,842	22.1	4,150	52.9	3,692	47.1	
Tree Planting	48	0.1	27	56.3	21	43.8	
Livestock Rearing	4,575	12.9	2,278	49.8	2,297	50.2	
Fish Farming	7	0.0	5	0.0	2	0.0	

Source: Calculations based on GSS 2010 population and housing census data

Table 5.1
Agricultural activities in the Techiman and Tamale Assemblies

While households in small cities like Techiman could have access to food from own production from surrounding villages, households in intermediate sized cities like Tamale on the other hand may not have the same opportunity. This is because proximity and access to rural land for production may be easier in small towns than intermediate sized towns. Even if urban households do engage in rural agriculture in the intermediate sized cities, it may come at a higher cost, since land is farther away.

Another important characteristic across the sample cities relates to the context of engagement in agriculture. For example, less than a third of households in Tamale engage in agriculture compared with nearly half of households in the case of Techiman. Similarly, the share of rural households engaged in

agriculture is higher in Techiman than Tamale even though they all participate in agriculture. Moreover, Techiman and Tamale fall within two different agricultural ecological zones, the transition belt (Techiman) and the northern savanna belt (Tamale) with different production potentials.

	Techiman		Tamale	
	N	%	N	%
Household head population by sex	34,137	23.5	35,408	16.1
Household structure				
Nuclear (head, spouse and children)	40,590	27.9	42,817	19.5
Single parent nuclear	16,202	11.2	10,654	4.8
Single parent extended	21,330	14.7	28,150	12.8
Extended (head spouse(s) children head's relatives)	34,212	23.5	101,495	46.1
Marrital status	101,020		155,046	
Married	43,742	43.3	75,352	48.6
Widowed/divorced or seperated	8,385	8.3	10,233	6.6
Religious affiliation				
Non religious	7,843	5.3	374	0.2
Islam	40,545	27.4	202,003	90.5
Christianity	97,362	65.9	19,749	8.8

Source: Calculations based on GSS 2010 population and housing census data

Table 5.2

Demographic characteristics of urban households in Techiman and Tamale

Other demographic characteristics based on census data across the two cities are presented in Table 5.2. Nearly a quarter (23.5%) and a fifth (16.1%) of the households are headed by women in Techiman and Tamale respectively. The households are structured differently across cities, however. In Techiman, nearly a third (27.9%) of households are structured as nuclear (head, spouse and children) followed by those structured along the extended family system (head with spouse, children and head's family). In Tamale on the other hand,

households are structured primarily along the extended family structure (46.1%) followed by the nuclear family structure (19.5%). On the marital statuses of household heads, nearly half of household heads in Tamale are married (48.6%) compared to about 43.3% in Techiman. In contrast however, about 9.0% and 7.0% of household heads in Techiman and Tamale respectively are either widowed/divorce or separated. About two-thirds (65.9%) of household members indicate their religious affiliation as Christianity in Techiman. Households in Tamale on the other hand subscribe to the Islamic faith with over 90% indicating their allegiance to Islam.

5.3 Sampling Technique

As part of the broader research design, a total sample of 1,000 households from each sampled city was estimated to be interviewed. To start with, the focus of the study was to identify and interview households in urban Techiman and Tamale. As a result, the assistance of the local Planning Office was sought to give clear demarcations of the boundaries of the urban center. The Research Team and Officers from the assembly drove first to identify the city center. It was possible to locate the center of each city because the cities in question are not mega but medium sized in nature. Based on that information, each city was put into four quadrants with the center serving as the epicenter. The boundaries of each quadrant was also identified. The goal was to have proportional representation of households across the city.

In the second stage, sub communities within each quadrant were identified and proportionately stratified for equal representation. In the third and final phase, enumerators were divided into teams of four with each team responsible for a sub community. The spread of surveyed households in Techiman and Tamale are presented in Figures 5.3 and 5.4 respectively.

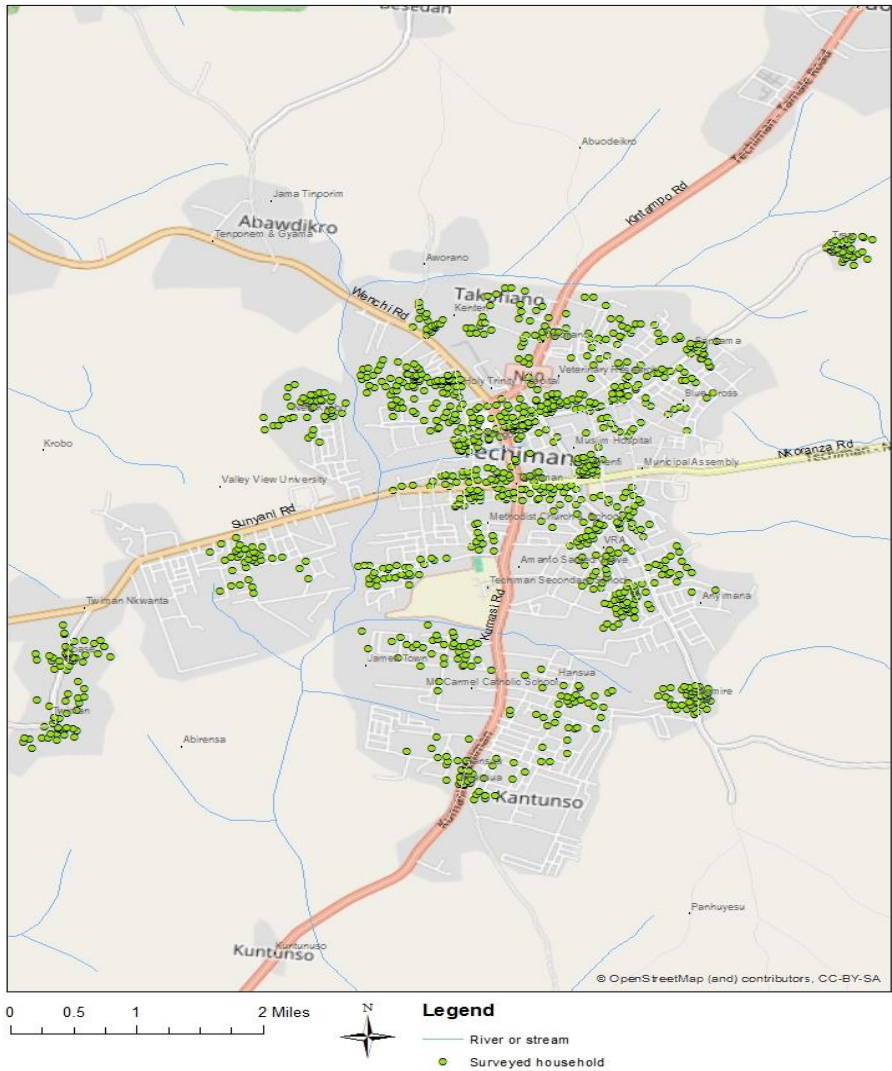


Figure 5.3
Map showing the distribution of sampled households in urban Techiman

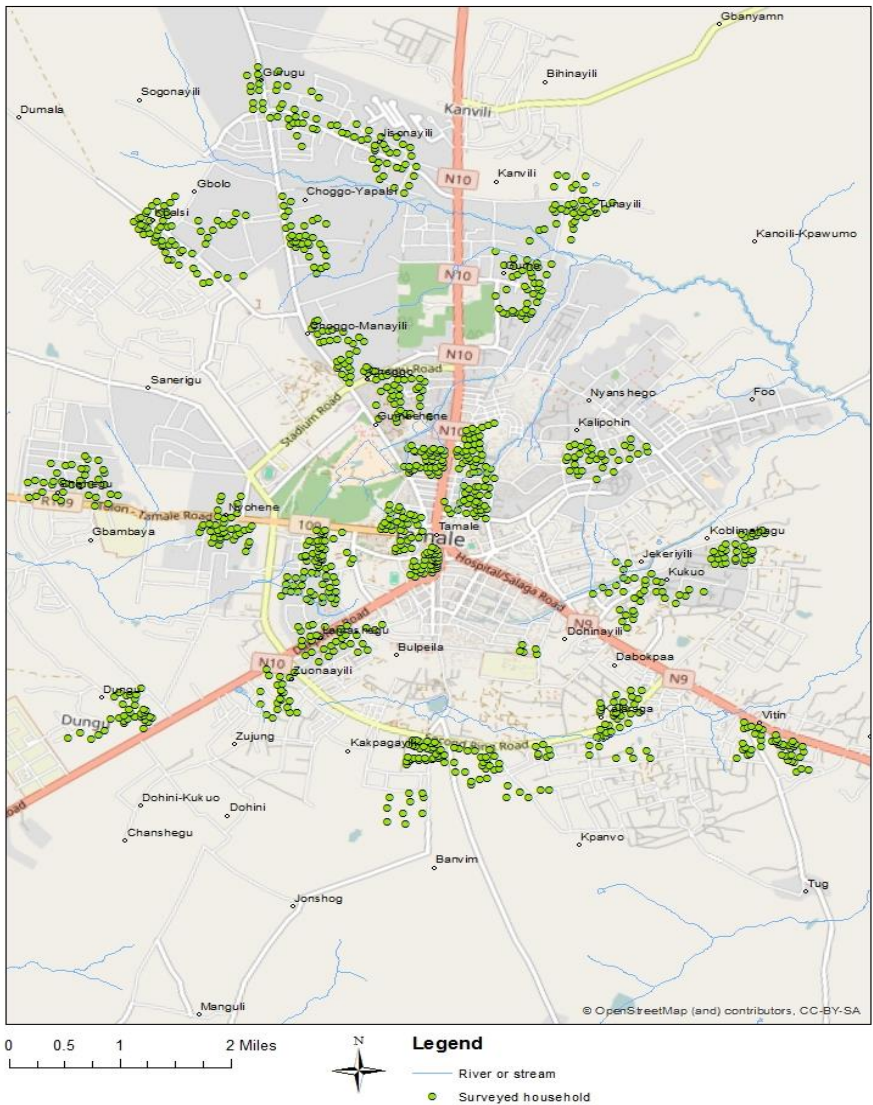


Figure 5.4
Map showing the distribution of sampled households in urban Tamale

At the sub community level, the sampling design was repeated by first identifying the center of the community with the help of the Assembly Member or other Opinion leaders. Similarly, each sub community was also divided into four quadrants with each team member surveying a quadrant, starting at the center of the community and moving in a serpentine path. Enumerators surveyed and interviewed one household in every third dwelling. Two households were however selected from each dwelling in densely populated sub communities. The questions were administered mostly to the heads of household. In the absence of the household head the most knowledgeable adult was interviewed.

Interviews were conducted in the language the respondent was most comfortable with. In Techiman, the local dialect Twi and English were mostly used while Dagbani and English were used in Tamale. A total of 2,020 households were surveyed in both cities distributed as: Techiman (1,019) and Tamale (1,001).

5.4 The survey instrument and survey administration

5.4.1 Quantitative data collection

To begin with, a standard questionnaire containing several household indicators on food (in) security was jointly designed for uniformity across project countries. Some of the captured indicators include questions on household demographic and housing characteristics, household cash incomes from all sources etc. Others include questions relating to household food access, dietary diversity, months of adequate food provisioning, food price changes, sources of food, urban agriculture, food transfers and food aid. As part of the project design and working closely with researchers from the University of Ghana, an advertisement was placed at the campuses of the University of Ghana in Accra and the University for Development Studies in Tamale to recruit enumerators for the study. Individuals were shortlisted based on agreed criteria including qualification (at least Bachelor's degree); experience with data collection and ability to speak any of the local languages spoken in the study area. A total of about 60 enumerators were finally hired to assist with data collection. Training of enumerators was put into two.

First, a two day training workshop was organized for enumerators that were hired in Accra at the University of Ghana. Discussions at the training focused on three things: understanding the meaning of each question, accurately translating the questions into the local language; and learning to efficiently use the survey tablets, including picking GPS coordinates of all households that were interviewed. This process was repeated for the second cohort of enumerators that were hired in Tamale who were used to survey the city of Tamale.

My role at the training was in two parts-assist with explaining questions to enumerators and to help translate questions into the local language and vice versa during 'role play' sessions. In the field however, I led a team of enumerators and assisted with community entry protocols. Thereafter, I supervised enumerators-moving from one household to another to address any difficulties that arose during interviews. Each day after the interviews, I assisted in coordinating the debriefing sessions. At these meetings, enumerators raised difficulties encountered in the field for redress.

The use of tablets instead of paper had an added advantage of potentially minimizing the error margin on the part of enumerators as we were able to build in logics in a sequence that questions were expected to be asked and answered. Supplementary paper questionnaires were however printed and handed to each enumerator in the unlikely event of machine breakdown.

The above notwithstanding and for the fact that the questionnaire was designed to be replicated in all project countries, it had an inherent limitation to address all the research questions in this thesis. To ameliorate this, a new design was developed to allow the collection of additional qualitative data that could help shed more light on the specific research questions of interest. The qualitative data collection was therefore designed to focus on the opinion leaders in the respective communities from which quantitative data was collected.

5.4.2 Interviews and Consents

There are sub-communities in each of the urban areas we visited with local leaders for each community. These leaders (chiefs/sub chiefs) are responsible for their people. With this in mind, the research team first visited the palace with the aid of the Assembly Member for the electoral area in question and introduced the project to the sub community leadership. After receiving the consent from these individuals, the teams then applied the study design to

recruit households into the study. In order to pick the GPS coordinates, all quantitative interviews were conducted at the residence of the selected household. Each interviewer began by introducing him/herself and the project to the household, highlighting that it was meant for research purposes and had no affiliations with any political groupings. Once consent was sought, interviews commenced. The respondent who in most cases was the head of the household, was encouraged to consult other household members for issues that other members could best provide answers to.

5.4.3 Qualitative data collection

After analyzing the quantitative data, there was a need to provide more context to explain the observed patterns as well as address the overall research objective of the thesis. To do this, a qualitative follow up study was designed to account for the limitations in the quantitative datasets, in the attempt to put findings of the thesis in context. With the qualitative interviews in mind, names and contacts of key informants including Chiefs, Assembly Members as well as other Opinion Leaders were purposively collected during the quantitative data collection to aid any future engagement.

During the follow up, selection of respondents to participate in the interview was conditioned on their locality and willingness to be interviewed. First, the sub communities were grouped according to quadrants and respondents selected from each quadrant. This was done to have a fair representation of opinions across the city. In each city, efforts were made to also solicit opinions of principal officers working in the field of agriculture as well as those with the mandate to plan and manage the city. In this regard, the qualitative interviews focused on institutions and individuals that control the use of land in urban settlements- that is local authorities who have the mandate of planning the city, the chiefs who are the owners of land and households who find their livelihoods in urban agricultural landscapes. Representatives of the Ministry of Food and Agriculture (MoFA) and key informants from non-governmental organizations and development partners working in the field of urban agriculture were also interviewed in each city.

As indicated earlier, key informants were selected from a list of opinion leaders compiled in each city during the quantitative data collection phase. A total of 21 interviews were conducted in both cities in August 2015. Personal consents were sought first for the interview and also for audio recording the interview

sessions to aid transcription. For persons who were not comfortable with recording, notes were taken instead.

All qualitative interviews were personally conducted, mostly in the Akan (Twi) dialect in Techiman and a blend of English and Twi in Tamale. Interviews began by fixing an appointment with a respondent, usually a day or two before the interview. Respondents were given the opportunity to decide the meeting place as may be convenient to them. Before the interview, they were reminded of the quantitative study in 2013.

Using interview guides designed in line with the research questions of the thesis, questions (and probing questions) were asked and recorded in addition to taking of notes as a backup. Data was collected on several indicators including land ownership structure, how such lands could be accessed in the cities for different uses, perception of urban agriculture among the different opinion leaders as well as the threats and opportunities, and other known policy frameworks (if any) guiding the practice of urban agriculture in the selected cities.

These questions, together with several other questions were very important in placing the contribution of urban food production to household food security in context. The list of participants during the qualitative interviews are presented in Table 5.3.

Name	Designation	Date of interview
Participant 1	Municipal Planning Office, Techiman	Aug. 4, 2015
Participant 2	Municipal Agriculture Office, Ministry of Food and Agriculture, Techiman,	Aug. 4, 2015
Participant 3	Chief, Techiman	Aug. 4, 2015
Participant 4	Assembly Member, Techiman	Aug. 5, 2015
Participant 5	Unit Committee Chairperson, Techiman	Aug. 5, 2015
Participant 6	Imam, Techiman	Aug. 5, 2015
Participant 7	Chief, Techiman	Aug. 5, 2015
Participant 8	Assembly Member, Techiman	Aug. 6, 2015
Participant 9	Chief, Techiman	Aug. 6, 2015
Participant 10	Chief, Techiman	Aug. 6, 2015
Participant 11	Chief, Techiman,	Aug. 7, 2015
Participant 12	Lecturer, University for Development Studies, Tamale	Aug. 10, 2015
Participant 13	The Executive Director, Urban Food Security Network (URBANET) Tamale	Aug. 10, 2015
Participant 14	Tamale Metropolitan Assembly, Tamale	Aug. 10, 2015
Participant 15	Works and Housing Department. Tamale	Aug. 10, 2015
Participant 16	Metropolitan Department of Agriculture	Aug. 11, 2015
Participant 17	Assembly Member, Tamale	Aug. 11, 2015
Participant 18	Assembly Member, Tamale	Aug. 11, 2015
Participant 19	Assembly Member, Tamale	Aug. 12, 2015
Participant 20	Assembly Member, Tamale	Aug. 12, 2015
Participant 21	Assembly Member, Tamale	Aug. 12, 2015

Table 5.3
List of participants during qualitative interviews

5.5 Method of Analysis

The analytical methods employed in this thesis are mostly quantitative in nature but with some qualitative underpinning that provides contextual insights into the econometric estimations. After successfully developing the appropriate models that fits the various research questions, the STATA statistical software (v 14.1) was used to analyze the data. The outputs of the quantitative analysis are descriptive in nature with econometric computations where necessary. The qualitative data on the other hand was first transcribed and analyzed along themes, looking for similarities and differences in relation to the research questions. The output of the qualitative data is largely used to provide city specific contexts and explanations for why particular patterns are observed in the quantitative datasets.

In article 1, the paper employs both quantitative and qualitative methods to analyze participation in agriculture among the different urban household types- that is urban agriculture based households, rural agriculture based households, urban and rural agriculture based households and non-agricultural households. Similar methods were used to analyze the cropping patterns, uses of own food produced, as well as food security and income shares accruing to households from different activities.

In article 2, a combination of descriptive statistics and econometric analysis were employed to ascertain the effect of participation in agriculture on the household's food security. In particular, the probit model was first employed to group households as food secure or otherwise. In the second phase, households were grouped along a continuum of food severity indicators (i.e. food secure, mildly food insecure, moderately food insecure and severely food insecure). This enabled us to fit an ordered probit model for the sample. The qualitative data was used to describe the research context of the paper, which allows the reader to interpret the results of the analysis in context.

In the third paper which looks at food transfers receipts and its associated determinants, households were classified into food transfer recipients or otherwise. Assuming a normal standard distribution of the error term, a probit model was fixed to estimate the determinants of rural-urban and intra-urban (urban to urban) food transfer receipts. The results are presented mainly in the form of tables, graphs and charts to show observed patterns and differences in the indicators of interest.

In the kappa however, the qualitative data is used to introduce the reader to the research background. Thus, setting the tone to enable the reader to have an appreciation of the settings in which the research was conducted.

5.6 Ethical considerations

The ethics of research requires that confidentiality of respondents are respected at all times without identifying participants by name, gender or providing any lead that will help third parties to identify particular respondents. In the quantitative data, all responses were aggregated and analyzed at the city level. Similar considerations were made for the qualitative data. However, in the event of direct quotation from a particular interview, reference is made to the individual. These consents were sought during interviews to publish portions of the interviews as part of the research output.

5.7 Data quality and limitations of the study

The survey instrument used for the study adapts several scales in measuring the food security status of sampled households. The benefit to this approach is that, one is able to capture a broad array of indicators. As in the case of this thesis, the approach enabled us to capture large number of households which would have been practically impossible with other forms of capturing food security data. Even though the measurement of food security is not limited to food access, the data is limited in its ability to measure nutritional security of urban households.

In addition, the data used for the thesis is cross sectional. However, a longitudinal study would have provided rich insights in the food security situations of selected households over time. Nonetheless, this type of studies can be constrained by funds and time.

In focusing on food transfers as part of multi-spatial livelihoods analysis, an important variable of interest would have been to see the quantities and frequencies of food transfers received by households. Lack of this important variable places a limitation on the kind of analysis that can be done.

Food security could be treated at the household level or at the intra-household level to test for levels of security within the same household. The data used for this thesis does not account for intra-household variables, making it impossible to address food security at that level.

6. SYNTHESIS OF THE FINDINGS

6.1 Contextualizing Research Findings

In this section, I revisit the research questions posed in Chapter 1. To start with, I choose to recap the research context to guide the discussions of the research findings. Ghana as a country has historical antecedents of rural-urban and north-south migration dating back to colonial days. This to some extent relates to the unequal distribution of infrastructure between the north and south as well as urban and rural areas. For example, most educational institutions were located in urban areas. As a result, all school going children who passed major promotion exams and had to continue their studies were compelled to relocate several kilometers away from home. Additionally, the lack of market access and market integration makes it convenient for other market intermediaries to travel to large cities to sell mostly agricultural produce and also purchase other commodities for use or resale in rural areas.

As indicated earlier, food production in the study cities-Techiman and Tamale have been a major source of food supply to households in those cities for decades. The farmlands were mostly located behind their homes and so were fairly cheaper (in terms of time and transportation cost) to engage in agriculture. Production was inspired purely by subsistence purposes and not commercial motives. However, population expansion has led to loss of agricultural lands for production. In the case of Ghana, and Techiman and Tamale in particular, population expansion has not been accompanied with corresponding expansion in economic growth and infrastructure development-economic growth has been slower relative to population growth. With farming as the mainstay of most displaced urban residents in the study area, some farmers prefer to move their farming practices outside the city boundary in order to have arable and adequate land for their production.

In addition, the definition of urban and by extension city in Ghana relates more to population growth and is not necessarily based on infrastructure or economic development. Historically, Techiman has been a farming community but with its strategic location, it serves as a good converging point for both farmers and market intermediaries to do business as it links to several other cities. Over time, the population of Techiman has increased and become a municipal area. This notwithstanding, proximity to rural areas and access to land for farming purposes remain fairly easy compared to residents of Tamale who have to travel several kilometers to access land for agricultural purposes.

Tamale on the other hand has a historical and cultural antecedent that encourages farming in and around houses. With increasing urbanization and migration of several thousands of people to the northern regional capital, the city continues to expand very fast and pushes agricultural lands farther away. This sometimes leads to temporary migration during farming seasons to distant rural areas for cultivation of rural lands, but return after the farming season. Historically and increasingly, rural-urban interactions have existed and continue to take new forms in the wake of urbanization and the urbanization of poverty.

The research questions posed in the thesis provide an indication of how the different types of food production in different contexts can impart on household food security. Following the contextual issues surrounding acquisition and use of land in Ghana and the study areas in particular, the sources of food constituting urban food baskets would be affected based on where land could be acquired for production. For instance, in Tamale where urban food production is considered as a cultural phenomenon, the practice of urban agriculture receives support from the metropolitan department of agriculture and other stakeholders including NGOs, academic community and the traditional authorities. As a result, access to essential foods such as green leafy vegetables with relatively shorter lifespan can be and continues to be produced and consumed in the city. This has implications on the producing households' food security in terms of access and utilization. In contrast however where not much urban agriculture is practiced, and access to peri-urban and rural land is fairly easy, there is little incentive for farmers to invest their resources in urban farming. As a result, production of certain types of food including vegetables are limited in Techiman. In such contexts, the factors that explain the food security situations will differ across cities.

6.2 Contextual Characteristics of the Sample

To place the articles in context, I present some contextual differences between Techiman and Tamale as found in the dataset. Overall, there are more households in Techiman who practice solely urban agriculture than in Tamale (26.3% and 15.0% respectively). The higher rate of participation in urban agriculture in Techiman is a result of the nature of the city. Techiman is still expanding and so even though most lands have been sold for residential purposes, both in the city and the peri-urban areas, they are yet to be developed. This provides opportunity for adjoining homes to grow crops (mostly maize) on such plots during the rainy season. Urban agriculture in Tamale on the other hand is intensive in nature and focuses on the production of vegetables for consumption and also the local market. The practice is more pronounced in the dry season where most farming activities are not possible due to climatic conditions.

The proportion of farmers in Tamale who practice both urban and rural agriculture (8.0%) and, only rural agriculture (19.9%) are higher than found in Techiman (2.4% and 15.3% respectively). As the city expands, open spaces for agriculture purposes shrinks and pushes urban farmers outside the city to peri-urban and rural areas. The data also suggests that nearly a third (30%) of household heads in Techiman are females compared to only about 14% in Tamale with mean ages of 44.4 and 47.1 years respectively. This is slightly higher than the mean age of male headed households for the two cities (42.3 years and 46.2 years respectively). Giving the cultural and religious orientation in Ghana, the male spouse automatically assumes the headship role of the household. In the event of death or the absence of the male spouse however, the woman assumes that role. It is also common to find females as head of their households when they are not married or married but live in separate cities from their spouse. I argue that, the high proportion of female headed households in Techiman could be the result of the busy trading enterprise in food stuff which generally falls in the domain of females.

Generally in Ghana, access to agricultural lands for food production is culturally biased in favour of males who often assume the headship roles of households. Assumption of these roles have implications for decision making on access and use of resources such as land which is an important factor of food production. All things being equal, cities with higher proportions of females as household heads potentially should have better access to productive resources such as land.

Comparing the education levels across the cities show that nearly half (47.3%) of all household heads in Tamale have no formal education compared to about a quarter (22%) in Techiman. This notwithstanding, more than a third (35%) of households in Tamale have either secondary level education or higher compared to Techiman that has about 31%. Educational attainment generally is tied to increased formal employment and income earning opportunities. It is thus perceived that, persons with little or no education would most likely be involved in agricultural production.

6.3 Summary of Articles

Article 1 addresses the first research question which seeks to understand the various sources and types of own food production arrangements available to urban households and how these sources contribute to the urban households' food basket in small and medium sized cities in Ghana. The paper had an overarching objective to quantitatively measure and analytically assess ways in which urban agriculture could be placed in the wider context of own food production. Three main contributions are made to this objective. First, the paper quantifies the various sources of own produced food; discusses the food security contributions to the households and the income earning opportunities tied to agricultural production in small and medium sized cities. To do this, the sample is disaggregated into four categories of households (urban agriculture only, rural agriculture only, urban and rural agriculture only, and households with no agriculture) allowing for in-depth analysis of the contribution of the different types of agriculture engaged in by urban households to self-provisioning and food security.

The results show that nearly half (43.4%) of surveyed respondents engaged in the production of their own food in the urban or rural areas or both, primarily for household consumption. Households who do not engage in agriculture raised their incomes through engagement in informal businesses. Engagement in agriculture by urban residents either on urban or rural plots are found to be a livelihood mechanism adopted to stabilize or improve the household's food security. For households who engaged in both urban and rural production, cash income from agriculture was found to be their single most important source of income. The paper concludes that the contribution of agriculture to urban food security should not be narrowed to considering urban agriculture only but be placed in the wider context of the different food production arrangements including rural agriculture and the linkages that exist with other production spaces outside the city.

Research question two is answered in article 2 which seeks to answer the question on the effects of own food production on household food security in small and medium sized cities in Ghana. Parts of research question 4 (determinants of food security along the urban household food (in) security continuum) are also analyzed and answered in this article. The aim of the article is to quantitatively examine the potential effect of urban households' food production in urban and rural spaces on urban food security. The article applies econometric estimations to determine the effects of own food

production on urban household food security. It begins by highlighting the research debate on the contribution of urban agriculture on food security and the corresponding oppositions in the literature. The research context and conceptual considerations relating to urban food production (i.e. urban agriculture, food production in rural areas by urban residents) are also discussed.

To position the findings in relation to appropriate literature, a review of the determinants of food security is done which guides the selection of variables into the model. In the analytical framework and following on household categorization in article 1, households are classified by the type of activity whether they engage in urban agriculture, rural agriculture or both, or no production at all. The effects of participation in own food production on food security are estimated. Two main types of analysis are conducted in this paper. First, households are classified as either food secure or otherwise using the Household Food Insecurity Access Prevalence (HFAP). At the second level, the household food security status which is calculated as a graduated continuum (food secure, mildly food insecure, moderately food insecure and severely food insecure) serves as the dependent variable which allows for calculation of the effect of agricultural production on food security.

Analyzing food security by the type of household along the different food (in) security indicators brings a new perspective to the debate in the literature by helping to identify which particular type of agricultural production activity brings the most food security related benefits to urban households in the context of intermediate sized cities.

Furthermore, the paper shows overwhelming evidence that own food production impacts on household food security. However, the findings, ought to be interpreted in context. Some important predictors of household food security include household and individual level characteristics such as number of years of schooling of mother(s), income, education and the marital status of household head. Female headed households were generally found to be less likely to be food secure. The main conclusion of the paper is that, while there is some merit in the research debate, urban agriculture or rural agriculture alone is not enough to guarantee food security among own food producers in urban areas. Rather, the evidence suggests that households that participate in food production in both urban and rural areas have better food security outlook relative to the other household categories, all things being equal.

Additionally, the paper demonstrates that city context is important in the debate on impact of urban agriculture on household food security. For example, whereas UA has no effects on household food security in Techiman, the practice shows strong effect on household food security in Tamale. It concludes by recommending that policies and discussion aimed at addressing urban poverty through agriculture should be placed in city context. Also, policies related to urban and rural agriculture should be complementary to another as the paper demonstrates a clear link between engagement in urban and rural agriculture by urban residents.

Following the estimations in article 2, article 3 responds to the third and fourth research questions by contributing to the discussions on an emerging body of knowledge in the literature -multi-spatial livelihoods. The aim of the article was to analyze the determinants of food transfer receipts (both rural and urban) among receiving households and how transfers are connected to own production of food whether in rural or urban areas. The article links multi-spatiality in relation to rural agriculture by urban residents with rural-urban food transfer and intra-urban food transfer phenomena which have been treated in isolation in previous literature.

Applying econometric techniques, the article hypothesizes that, participation in agriculture reduces the likelihood of receiving food transfers. The results suggest that participation in agriculture does not influence the likelihood of a household receiving food transfer, at least for the total sample. However, presence of working age males decreases the chances of food transfer receipt. Female headed households, ageing household heads and household cash remittance expenditure were all found to increase the likelihood of household food transfer receipt. City specific effects suggest that participation in urban agriculture, age of household head, being a female headed household (sex), attainment of higher education by household head and spouse as well as household remittance expenditure jointly determine food transfer receipts in Techiman. In Tamale on the other hand, food transfer receipt is determined by age of household head and gender (females). The determinants along the types of food transfer receipts are also estimated.

The paper concludes by applying qualitative insights in providing explanations about the causes of the identified determinants but questions the non-existence of social insurance policy for the aged and the limitations in property rights of female heads in Ghana. These aspects, the paper argues, makes the aged and female headed households vulnerable and raises food security concerns, impinging on the basic human right of all persons to food.

7. CONCLUSIONS

Insofar as unequal development continues to exist in developing countries such as Ghana, movement of people in search of better living conditions will persist. The increasing rate of urbanization brings several benefits to urban dwellers but at the same time may pose as a threat to food and livelihood security especially for the urban poor. Farm households whose livelihoods are lost to infrastructure development have a task to adopt new livelihood strategies including farming open spaces. However, the lack of enforcement of laws governing the practice of urban agriculture places the tenure security in question and dampens interest in investing in such lands. Increasingly, households with rural connections prefer to move away from farming in and around the city to neighboring rural areas as part of the urban livelihood strategy. Maintenance of kinship ties with rural relatives serves as insurance mechanisms that could be relied on as a buffer in the events of failed entitlements in urban areas.

The concept where cities are defined based on population figures places expectations on both traditional and city authorities as to what an ideal city should look like. In the process, critical sectors of the economy such as agriculture that relate to the livelihood needs of the citizenry are abandoned in exchange for merchandize where cheap imported commodities are sold. This raises several food and nutrition security concerns and livelihood threats for the urban poor.

The entry point of this thesis is whether producing food in urban area or in the rural area can have any role in improving the food security needs of the households in question. Even though the thesis demonstrates the important contributions of own food production on food and livelihood security among urban households, I submit that, the potential effects could be higher and impact greater depending on the lenses with which stakeholders, especially city authorities and owners of land see urban and rural agriculture and how these relate to food and nutrition security. At present, there is very little interaction and lack of extension support services to urban farmers. In Techiman for example, where city authorities are still planning their 'ideal' city, agriculture

in the city is considered alien to modern day city development and this notion of city development prevents appropriate policies and investments in such sectors which ultimately affect both urban farmers and urban residents of the potential economic and nutritional benefits associated with farming in the city.

In returning to the debate in the literature, and especially the lack of adequate empirical evidence on the effects of urban agriculture on household food security, my conclusion after analyzing the data is that, such debates cannot be made without accounting for contextual factors that might be driving the results. I submit therefore that, as much as it will be a good policy directive to have a national food security policy, local authorities must be empowered to model their own food security policies that take into account the contextual factors such as socio-cultural and geographical variables that could best be explained from a local context.

On the research debate on whether urban agriculture should be promoted as a poverty alleviation strategy for its nutritional and economic benefit or not, I submit based on evidence from this thesis that, over concentration on urban agriculture only presents part of the argument but not the whole. Expanding the scope to encompass rural food production opportunities of the households paints a brighter picture and also informs what kinds of policies needed in support of the practice.

As alluded to earlier, the disproportional development and the lack of decent and basic infrastructure mostly in the countryside would always make living in urban areas more attractive than rural areas. This is primarily because, the urban centers are perceived to have better opportunities than the rural area. However, the uncertainties regarding access to food, which is a basic human right creates an incentive among some urban households to maintain strong reciprocal ties with kinship relations in rural areas. This serves as an insurance for urban households either by cultivating food on rural plots or relying on food transfer receipt from the rural area to supplement food purchases in the urban area.

In connecting the conclusions to the conceptual underpinnings, there is the need to understand what type of resources are available to households in addressing their food security needs. As indicated in Chapter 4, household asset ownership helps to command resources, including production resources. What is seen in this study however is that, access to land is critical in making households food secure! In Tamale for instance where urban agriculture is a celebrated enterprise, household access to agricultural plot means an opportunity to cultivate high value crops (mainly vegetables) for the market

and own consumption. Similarly, access to agricultural land in peri-urban and rural areas, both in Techiman and Tamale, provides opportunity to households to produce grains and tubers which could last several months and make the household more food secure.

Nonetheless, access to land for rural agriculture is not available to all, neither is urban agriculture, nor social relations that permit food transfers. For a household to be able to command land largely depends on their ability to make claims on their social networks. This is because, most open space lands in the cities belong to the state and it is the ability of the household to leverage and make claim on government that gives them access. Similarly, households' rural networks, based on family ties or friendship gives them the opportunity to make claim to rural and community lands which are used for production, and thereby making them food secure.

Contextually, apart from state lands, ownership of land is vested in the hands of chiefs in Tamale whereas ownership of land is vested in family heads and chiefs in Techiman. The question of who is able to appropriate the land for production relates to the household's ability to make claims based on kinship ties. From a socio-cultural perspective, women in Tamale do not have access to agricultural lands. They however are able to cultivate portions of farmland belonging to their husband's family. In the event that the husband dies, access to the agricultural land becomes problematic and highly dependent on the relationship that exist between the woman and her in-laws. In contrast, women in Techiman can make claims to agricultural lands, even on behalf of their spouses. With rapid urbanization comes the demand for land by private real estate companies, making land sales a lucrative venture in recent times. In the event that agricultural lands have to make way for city expansion, the family head usually demarcates portions of the land to all members of the family (mainly the original members) either to keep for housing or sell to raise capital to start a new line of business. In some respect, there is equality in accessing urban and rural lands in Techiman than Tamale.

Can urban agriculture be expected to feed the cities? This question has often come up in my discussion on urban agriculture and its potential benefits to food security in the household and the cities in general. Based on empirical evidence presented so far in this thesis, I submit that, the response to this question will vary across cities. Increasingly, as cities become cosmopolitan and income levels improve, dietary patterns also change in favor of healthier and nutritious meals. This increases the demand for vegetables which are mostly supplied to urban consumers through urban agriculture. This trend however is weakened

when the rural areas are easily accessible for food production. My response to the question of whether urban agriculture can feed the cities therefore relates to the kind of systems including legislations, infrastructure and support systems local and city authorities put in place to produce food in the city. With this in place, urban agriculture, especially in Tamale could potentially feed the city with the requisite vegetables needed for a healthy life. The same can however not be said for Techiman because of the general lack of appreciation of farming in the city by the stakeholders including the traditional institutions headed by the chiefs who also double as owners of land.

Planting to feed the city therefore is connected to the interplay that exist in urban food provisioning systems and how to they various production and non-production arrangements can be harnessed for urban food security. This will require the involvement of all the relevant stakeholders in the formulation of appropriate city level legislations and enforcement. In addition, urban based policies relating to food security must account for the increasing multi-spatial activities of urban residents, including farming in rural areas and rural-urban food transfers and how they are connected to food security.

In conclusion, this thesis makes a unique contribution to the discussion on urban food security by expanding the scope from the concentration on urban agriculture and its contribution to household food security to include agricultural productions opportunities available to urban households and how these are appropriated for food. In addition, the focus on small and intermediate sized cities brings a new perspective that departs from the urban bias that has characterized urban agriculture studies in Ghana. The research also fills in an important gap that relates to the lack of empirical data in the policy debate.

Connecting urban households to rural livelihoods also brings a new perspective on the nature of urban-rural interactions and how these multi-locality engagements contribute to the urban food security discussions. Another important contribution of the thesis is the ability to disaggregate urban households by the type of agricultural engagements and how these specific types of activities contribute to household food security.

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Paper I





Urban households' engagement in agriculture: implications for household food security in Ghana's medium sized cities

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Abstract

Urban and peri-urban agriculture plays an important role in meeting the food and nutrition needs of those living in the increasingly urbanised cities in Africa. The extent and scope of the practise of urban and peri-urban agriculture differs from one city to another depending on the economic, environmental, socio-political, and contextual conditions at play. Using household data drawn from urban Techiman and Tamale in the Brong Ahafo and Northern regions of Ghana respectively, this paper descriptively analyses the contribution of households' engagement in agriculture on urban households' food security. The results show that, nearly half (43%) of urban residents are involved in the production of food either in the urban or rural areas or both, primarily for household consumption and sale of surplus produce. Households who do not engage in agriculture raise their cash incomes through engagement in informal businesses. The picture is however different for households that engage in urban and rural agriculture. For such households, income raised from agriculture (rural and urban combined) is the highest in both cities contributing nearly half (43%) and about a third (33%) of total cash incomes in Techiman and Tamale respectively. The results underscore the need to place the discussion on the contribution of urban agriculture to urban food security in the broader context of the different food production arrangements available to urban households, both in urban and rural areas.

Keywords *food security; urban agriculture; rural agriculture; Ghana; medium sized city; Techiman; Tamale*

Introduction

Proponents of urban agriculture argue that it presents an innovative way of optimising access, quantity, and quality of food for the urban poor (FAO, 2012; Kosciwa, 2014; Mkwambisi *et al.*, 2011). Increasing urbanisation in sub-Saharan Africa brings additional challenges for how to feed the growing population in a sustainable way and as such makes the discussion on urban agriculture even more timely (Gupta & Gangopadhyay, 2013).

The nutritional health and economic benefits accruing to households practising urban agriculture has received considerable attention in the literature (Armar-Klimesu, 2000; Badami & Ramankutty, 2015; Chagomoka *et al.*, 2015; 2016; Coffie & Drechsel, 2007; Maxwell *et al.*, 1998; 2000; Mougeot, 2011) although the actual number of people engaged in the practice globally remains debatable (Crush *et al.*, 2011; Frayne *et al.*, 2014; Lee-Smith, 2013; Stewart *et al.*, 2013; Zezza & Tasciotti, 2010). This issue notwithstanding there

remains a knowledge gap as to the importance of urban agriculture across different types of urban settings. Its role differs from one city to another depending on the economic and contextual conditions at play. Thus, initiatives or policies aimed at addressing urban poverty through urban agriculture need to be city specific.

In this paper urban agriculture is contextualised in relation to households' own food provisioning in two medium-sized cities in Ghana: Techiman and Tamale in the Brong Ahafo and Northern regions, respectively. The aim is to quantitatively measure and analytically assess the ways in which urban agriculture is placed in the wider context of market-procured and other self-produced, non-market sources of food. This perspective has not been systematically generated from previous research (but see Andersson, 2002). Thus, this paper addresses the knowledge gap about the actual and potential contributions of urban agriculture to food security by considering emerging cities in Ghana, and the role that own food provisioning and the market economy play in helping people to meet the food and nutrition needs of households.

Research objectives, rationale, and conceptual background

Urbanisation has grown rapidly in Ghana in recent years, with Techiman and Tamale identified as being among the fastest growing cities in the country (GSS, 2013). As urbanisation continues to proceed, access to safe and nutritious food to feed the growing urban population continue to receive attention from all stakeholders. The capacity of urban agriculture to meet these challenges is a key issue for the government and population.

This paper makes three contributions: to quantify and analyse various sources of self-produced and purchased food in small and medium sized cities; to discuss the food security contribution of all of these sources in the cities in question; and to discuss the income earning opportunities tied to agricultural production in the cities and surrounding rural areas and ask how such opportunities relate to food and nutrition security. Most empirical research performed in Ghana in the past has focused on the largest cities of Accra and Kumasi, with little or no work in small and medium cities. Yet as Ghana urbanises, what is happening in these cities becomes of greater interest, not least because they represent the places where rural-urban transformations would appear to be more clearly identifiable. Householders in small and medium sized cities in sub-Saharan Africa potentially derive food from

multiple sources: urban agriculture, rural agriculture (where households may farm areas of land outside the city), food transfers from relatives and friends, and market purchases. This paper provides quantitative data to unravel the contribution of urban agriculture in medium sized cities, while placing these in the broader spatial and social context of other self-produced food and food transfers. While some quantitative case studies exist these are piecemeal and do not cover small and medium sized cities (for example, Ellis & Sumberg, 1998 and van Veenhuizen, 2006).

Fulfilling the paper's objectives first requires clarification of the concepts of urban agriculture and food and nutrition security, and consideration of how they link together. Urban agriculture is growing crops and/or raising livestock in an urban space for one's own consumption and/or sale to other city dwellers. Urban agriculture and backyard gardening may be a response to inadequate or costly food (crops and livestock) in contexts of increased urban food demand because of population expansion (Cofie *et al.*, 2003). Urban agriculture serves locally grown, fresh fruits and vegetables to over 22 million people in Africa's cities, playing an important role in food supply and income opportunities according to the Food and Agriculture Organization's (FAO) first status report on urban and peri-urban horticulture (FAO, 2012).

Urban agriculture can potentially contribute to the food requirements of urban households while enhancing access to cash incomes from the sale of surplus food produced (Warren *et al.*, 2015), thereby increasing dietary diversity and food security. This process allows producers to reduce their reliance on purchased food (Badami & Ramankutty, 2015) and, when surplus is sold, potentially it serves as a source of income that can help meet other pressing household needs (Armar-Klimesu, 2000; Zezza & Tasciotti, 2010). It can also allay food access problems during periods of price spikes or seasonal shocks (Warren *et al.*, 2015). The practise of growing food crops and livestock has persisted over time as part of the urban landscape (McClintock, 2010; Steel, 2008), enhancing more ecologically sound and resilient urban food systems (Viljoen, 2005). Estimates of the extent of impact and the contribution of urban agriculture to household food security have received criticism because there is a lack of uniform continent-wide empirical data on the extent and scope of urban agriculture. An exception is the work of Zezza and Tasciotti (2010) who, after analysing nationally representative data from 15 countries, conclude that, with

the exception of Ghana, Madagascar, Malawi and Nigeria, participation in urban agriculture has been generally overestimated and that urban agriculture is not necessarily practised by the very poor. The study further concludes that urban residents' participation in crop and livestock agriculture in Ghana in 1998 was 41 per cent. The shares of income accruing to urban residents from agriculture was 18 per cent, but when only households engaged in urban agriculture are taken into consideration, average shares of income from agriculture are more substantial (44%).

Food and nutrition security, sometimes known by its briefer variation *food security*, is the situation where 'all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO, 2012). This definition emphasises that food security is not just about the physical availability of food, but includes social and economic access, food safety, and the nutritional utilisation of food for a healthy life.

Urban agriculture can have a positive impact on household food security as it generates direct income for the household concerned, and provides direct access to the food produced. Especially in situations where markets are inefficient, urban agriculture households may have access to a wide variety of relatively inexpensive nutritious foods, such as vegetables and products of animal origin (milk, eggs, meat, and so on). Yet, gaining these benefits can be challenging. Farmers engaged in urban agriculture in Ghana, like those in most developing countries, are faced with several challenges including but not limited to input costs, theft, and lack of extension support services (Hillbruner & Egan, 2008). Other challenges concern the use of land and the legal issues informing the practise of urban agriculture. The government of Ghana, unlike its counterparts in many other African countries, has formulated a policy on urban agriculture. This policy is contained in the Medium Term Agriculture Development Plan 2011–2015 of the Ministry of Food and Agriculture (MoFA). In the Plan, urban and peri-urban agriculture has been acknowledged as a major contributor to national food security. The Plan further acknowledges the practise of urban and peri-urban agriculture to be a year-round activity that takes place in open spaces, on government reserved lands, and on non-habitable areas in and around high tension poles, and contributes to the supply of vegetables to city dwellers which also constitutes one of the many important urban

agriculture crops in Tamale and Techiman. Amoah *et al.* (2007), for example, conclude that about 95 per cent of all lettuce consumed in Accra and Kumasi is produced from urban agriculture activities. This kind of production also contributes to employment, livelihoods and poverty alleviation (MoFA, 2010). Indeed, the Ministry of Food and Agriculture projects a 20 per cent increase in the output obtained from urban and peri-urban areas across the country from 2011 to 2015.

These considerations are important in light of the fact that urban and rural populations are increasingly connected to one another. Cash remittances from urban to rural households have often been described as vital to address the problem of poverty in rural areas. Little or no attention has been given to social linkages; to reverse rural-urban flow of resources (Moorsom, 1995; Potts & Mutambirwa, 1998); or to establish why—in spite of increasing unemployment—migration to urban areas persists. In Ghana, very little is known about how rural–urban linkages affect much-needed food and nutrition requirements through food transfers and, in some cases, rural farming to urban residents. What is important, argues Frayne (2005), is the socio-economic relationship between the rural and urban components of the same household. It is noteworthy that food transfers from rural areas are not restricted to migrants but form an important part of the urban food security situation (de Haan & Zoomers, 2003; Kaag *et al.*, 2004). This point underscores the fact that rural and urban areas should not be viewed as mutually exclusive entities (Foeken & Owuor, 2008). As will be shown in this paper, there is a dynamic interaction between the two populations that impacts on the food security needs of each other.

Methodology

This paper forms part of a broader collaborative research project between Lund University in Sweden, the University of Ghana, and University of Nairobi, which is being carried out in Ghana and Kenya to understand the social, economic, and environmental challenges and prospects of urban agriculture under changing global and demographic realities. In Ghana, according to the Ghana Living Standards Survey Six, rural and urban poverty has fallen rapidly to an urban poverty level of around 11 per cent as at 2013 (GSS, 2014; World Bank, 2012). Techiman municipality and Tamale metropolitan assemblies in the Brong Ahafo and Northern regions respectively were purposively selected for the study in Ghana, breaking

away from the metropolitan bias that has characterised earlier studies on urban agriculture.

The choice of Techiman and Tamale for this study provides particular insight into the contextual nature of food and nutrition security discussion in medium sized cities insofar as the prospects of urban agriculture in both cities are different. The population size between the two cities varies, with Tamale having a population of 223,252 and Techiman 67,241 (GSS, 2014). Households in small cities could have access to food from their own production from surrounding villages; on the other hand, households in medium sized cities may not have the same opportunity—and even if they do, it may come at a higher cost. In addition, Techiman and Tamale have been identified as major supply centres for the national food basket. The two cities also fall within two different agricultural ecological zones, the transition belt (Techiman) and the northern savannah belt (Tamale).

Data sources and sampling techniques

Data for this paper come in two forms. First, a quantitative questionnaire on several food security indicators (the main source of data for the paper) was administered to the head of household (or an available and willing adult) in October 2013. The second source of data comprised follow-up qualitative interviews with representatives of the institutions that control the use of land in urban settlements (the local authorities which have the mandate to plan the city, the chiefs who are the owners of land, representatives of the MoFA and non-governmental organisations). A total of 21 interviews was undertaken in August 2015.

For the first stage of the questionnaire, each city was divided into four quadrants with the centre serving as the epicentre to allow for proportional spread of households in all four quadrants (250 households in each). The second stage involved identifying the number of communities in each quadrant and proportionately stratifying the number of communities for equal representation. In the third stage, the sample size was determined on the basis of the estimated population sizes of communities. In the final phase, enumerators were divided into teams of four with each team responsible for a community. Each community was further divided into four quadrants with each team member surveying a quadrant, starting at the centre of the community and moving in a serpentine path. Enumerators surveyed and interviewed one household in every third dwelling, except for

densely populated communities, where two households out of three were selected.

An important implication of this sampling method is that the data identify the location of the household and not where any farming activity takes place. Urban agriculture in this paper therefore refers to the agricultural activities that take place in each of the urban centres. Following from this definition, the sample can be divided by the type of agriculture that the household is engaged in the following: households engaging solely in urban agriculture; households combining urban and rural agriculture; households involved only in rural agriculture but resident in urban centres; and households that have no participation in agriculture at all. A total of 2,020 households were surveyed as follows: Techiman (1,019) and Tamale (1,001).

Classification of variables

Household respondents who reported some engagement in food production for their own consumption in the 12 months preceding the survey either on urban or rural plots were asked to give their opinion about the importance of the food they produced to their household from the different plots and to describe the use to which such foods were put by the households.

The Household Food Insecurity Access Scale (HFIAS) developed by the Food and Nutrition Technical Assistance under the auspices of the Academy for Educational Development was used to classify households as food secure or not. The HFIAS is a set of nine questions that allows for classification of a household as food secure or not. Each question is asked with a recall period of four weeks (30 days) with the respondent first answering to the occurrence—that is, whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks (Coates *et al.*, 2007). This scale is used to classify the prevalence status of a household. It is noteworthy that the HFIAS measures the access component of food security but does not provide an indicator of food utilisation which also concerns nutrition.

Results and discussions

Demographic characteristics of respondents

Demographic characteristics of the sample are described in Table 1. On the whole, men dominate the headship of surveyed households (77.6%) across groups and cities with higher proportions

Table 1 Demographic characteristics of household members across groups and cities

	Techiman				Tamale				Total sample	
	RA		UARA		RA		UARA		No agric	
	UA	n	UA	n	UA	n	UA	n	UA	n
Sex of HH heads	n = 268	n = 154	n = 24	n = 512	n = 141	n = 199	n = 79	n = 487	n = 1,991	
Female	25.8	23.4	25.0	35.0	9.2	4.0	1.3	22.2	22.4	
Male	74.3	76.6	75.0	65.0	90.8	96.0	98.7	77.8	77.6	
Mean HH age	45.1	44.0	53.0	36.1	44.5	45.0	45.0	41.8	41.6	
Average HH sizes										
Average HH size	5.1	5.3	5.1	4.1	5.4	6.0	6.4	4.1	4.8	
Average HH size (18+)	3.0	2.9	3.1	2.2	3.1	3.7	3.8	2.5	2.8	
Min HH size	1	1	1	1	1	1	1	1	1	
Max HH size	17	11	11	15	13	24	24	17	24	
HH housing structure										
Female centred	20.5	19.9	20.8	31.3	8.1	2.0	1.3	16.4	18.4	
Male centred	8.2	7.7	8.3	10.5	2.7	6.5	12.5	10.0	8.8	
Nuclear	49.3	53.2	62.5	46.6	70.5	67.3	53.8	60.3	56.0	
Extended	22.0	17.3	8.3	11.1	18.8	24.1	32.5	13.0	16.3	
Under 18 male centred HH	-	-	-	0.2	-	-	-	-	0.1	
Under 18 female centred HH	-	-	-	-	-	-	-	-	0.1	
Other	-	1.9	-	0.4	-	-	-	0.2	0.4	
Education of HH head										
Number	189	101	18	399	106	166	59	457	1,495	
No formal schooling	25.9	32.7	27.8	18.6	55.7	59.6	62.7	37.4	35.3	
Some primary school	20.6	15.8	16.7	18.6	8.5	6.0	8.5	4.2	11.7	
Primary completed	28.0	24.8	27.8	30.8	12.3	10.2	11.9	14.7	20.7	
Some high school	5.3	5.0	5.6	3.5	0.9	3.6	5.1	3.1	3.6	
High school completed	10.6	12.9	11.1	15.5	7.6	12.1	3.4	14.7	13.0	
Post-secondary (not univ)	6.4	4.0	5.6	1.0	9.4	4.8	6.8	18.6	10.4	
Some university	0.5	1.0	-	1.0	-	0.6	-	1.5	0.9	
University completed	2.7	4.0	5.6	3.8	4.7	1.8	1.7	4.6	3.7	
Postgraduate	-	-	-	0.3	0.9	1.2	-	1.3	0.7	

Agric, agriculture; HH, household; RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

reported across groups in Tamale. In Techiman however, nearly a third (27.3%) of household heads are women. An average household size of 4.8 is observed for the overall sample. Larger household sizes are observed in Tamale. In Techiman, the minimum household size is found among households whose members do not engage in agriculture (4.1) while the maximum is found among households engaged only in rural agriculture. Similar patterns are observed for households in Tamale. Those who do not engage in agriculture have the smallest household size of 4.1, while households engaged in urban and rural agriculture have the largest households, consisting of 6.4 members on average. This finding is consistent with those generated in the Ghana Statistical Service's Population and Housing Census of 2010 (GSS, 2014). The households are mostly nuclear in composition across cities and groups (56.0%).

Household food production

Table 2 presents household participation in the production of food either in urban or rural areas. Overall, 20.6 per cent of households were involved in the production of food in the cities in which they live. Another 17.6 per cent grew food in rural areas but resided in urban centres, while about six per cent of the sample was involved in both urban and rural agriculture. Significant differences were found in the proportions of households engaged in urban agriculture in Techiman (26.3%) and Tamale (14.9%). More than half of the sample (56%) did not produce any food either in urban or rural areas and relied on other sources of food to meet their food requirements. A noteworthy difference between the two cities is that a sizable number of people in Techiman are actively involved in agriculture in and around their immediate communities because of agricultural lands at their disposal which, while now sold for infrastructure, await development. The practise of urban agriculture in Tamale is seen as a cultural

phenomenon where traditionally, the people of Dagbon in the Northern region generally farm in and around their houses in both rural and urban areas. This practise has remained with them and been passed on from one generation to another. Additionally, as a regional capital Tamale continues to witness rapid expansion in infrastructure making it difficult for farm households to have access to land to grow crops.

Cropping patterns

The food groups grown by urban agriculture households in Techiman and Tamale are described in Table 3. Among households in Techiman, production of roots and tubers, and grains are the mostly cultivated crops (88.1% and 67.4%, respectively). In Tamale however, production of grains and vegetables are the crops mostly cultivated. Among urban agriculture households in both cities, vegetable production constitutes a very important part of their farming activities, with more than half of households in Techiman (59%) and nearly half (42%) of households in Tamale cultivating it, and by extension improving the dietary diversity of households. Similar patterns are observed for rural food production in Techiman and Tamale with nearly all (97.5%) of rural farming households in Tamale producing grains/cereals and less of vegetables and fruits. While information on the different types of meat production would have been able to shed more light on the access to animal source of foods found among households, unfortunately the dataset poses limitations to this type of analysis because it does not contain this data. Follow-up qualitative interviews reveal that cereal and grains traditionally constitute much of the household diet because they can be stored over longer periods to cover the six months' lean/no production season experienced by farm households in northern regions of Ghana. These crops are also relatively easy to cultivate, compared, for

Table 2 Household's participation in different type of agriculture in Techiman and Tamale

Type of production	Techiman		Tamale		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Urban_Only	268	26.3	149	14.9	417	20.6
Rural_Only	156	15.3	199	19.9	355	17.6
Urban_Rural	24	2.4	80	8.0	104	5.2
No_Prod	571	56.0	573	57.2	1,144	56.6
Total	1,019	100	1,001	100	2,020	100

Table 3 Types of food grown among urban households in Techiman and Tamale

Type of food produced	UA		RA		UARA		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Techiman								
Cereal and grain products	176	67.4	111	71.2	13	54.2	300	68.0
Starchy, roots, tubers, and legumes	230	88.1	144	92.3	24	100.0	398	90.3
Vegetables	153	58.6	66	42.3	19	79.2	238	54.0
Fruits	45	17.2	27	17.3	8	33.3	80	18.1
Others (including meat and eggs)	47	18.0	23	14.7	6	25.0	76	17.2
Tamale								
Cereal and grain products	105	76.1	192	97.5	79	100.0	376	90.8
Starchy, roots, tubers, and legumes	38	27.5	91	46.2	34	43.0	163	39.4
Vegetables	58	42.0	30	15.2	44	55.7	132	31.9
Fruits	8	5.8	3	1.5	5	6.3	16	3.9
Others (including meat and eggs)	27	19.6	18	9.1	8	10.1	53	12.8

RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

Table 4 Importance of own food production to urban households in Techiman and Tamale

	Techiman		Tamale		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Importance of food from UA						
Not important at all	2	0.8	–	–	2	0.5
Somewhat important	32	11.9	30	20.1	62	14.9
Important	51	19.0	39	26.2	90	21.6
Very important	101	37.7	66	44.3	167	40.1
Critical to our survival	75	28.0	14	9.4	89	21.3
Don't know	7	2.6	–	–	7	1.7
Importance of food from RA						
Not important at all	1	0.6	–	–	1	0.3
Somewhat important	12	7.7	7	3.5	19	5.4
Important	39	25.0	25	12.6	64	18.0
Very important	77	49.4	135	67.8	212	59.7
Critical to our survival	27	17.3	32	16.1	59	16.6

RA, rural agriculture; UA, urban agriculture.

example, to livestock, and their production is favoured.

Consumption of foods cultivated by households

Table 4 shows that one fifth of households in Tamale and Techiman consider that food from urban agriculture is critical to their survival. An additional 40 per cent and 60 per cent of households in Techiman and Tamale respectively consider own food production as very important to meeting the food requirements of their households. Nearly a third (28%) of the sample in Techiman regards food from urban agriculture activities as critical to survival

compared with only nine per cent in Tamale. A possible reason is the basic characteristics of the local economy in Techiman, which hinges on the main weekly food market. Tamale on the other hand has a vibrant local economy and relatively developed market systems, which enable residents to engage in some form of trading activities at least six days a week. The consideration by households to participate in urban agriculture is thus influenced greatly by the potential contribution the practise can make to the consumption needs of their households. Rural agriculture was considered comparatively more important in Tamale; however, with 16 per cent of households engaged

Table 5 Use of own food production from different sources

	Techiman		Tamale		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Food produced from UA HHs						
Eat it	261	100.0	147	98.7	408	99.5
Sell it	150	57.5	82	55.0	232	56.6
Give it away to friends and relatives	183	70.1	65	43.6	248	60.5
Feed it to livestock	36	13.8	20	13.4	56	13.7
Other	0	0.0	1	0.7	1	0.2
Food produced from RA HHs						
Eat it	155	99.4	197	99.0	352	99.2
Sell it	103	66.0	141	70.9	244	68.7
Give it away to friends and relatives	88	56.4	101	50.8	189	53.2
Feed it to livestock	25	16.0	43	21.6	68	19.2
Other	0	0.0	2	1.0	2	0.6
UA food produced from UARA HHs						
Eat it	24	100.0	78	97.5	102	98.1
Sell it	13	54.2	46	57.5	59	56.7
Give it away to friends and relatives	8	33.3	24	30.0	32	30.8
Feed it to livestock	2	8.3	11	13.8	13	12.5
Other	0	0.0	1	1.3	1	1.0
RA food produced from UARA HHs						
Eat it	22	91.7	79	98.8	101	97.1
Sell it	21	87.5	60	75.0	81	77.9
Give it away to friends and relatives	17	70.8	42	52.5	59	56.7
Feed it to livestock	4	16.7	20	25.0	24	23.1
Other	0	0.0	5	6.3	5	4.8

HH, household; RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

in rural agriculture reported that it was critical to their survival and a further 68 per cent stated that it was very important.

As illustrated in Table 5, almost all (99.5%) crops produced from urban agriculture in the sample are consumed by members of the producing households and another 60.5 per cent and 56.6 per cent, respectively are given out as gifts to families and friends or sold. While consumption remains the primary use of foodstuff produced through urban agriculture in both Tamale and Techiman, the secondary uses varies between the two towns. For households engaged in rural agriculture or both urban and rural agriculture, consumption remains the primary motivation followed by commercialisation and food remittance motives. The primary role of food produced in both urban and rural areas, hence, is related to consumption rather than commercialisation. This finding establishes the relative importance of agriculture to urban households as measured by its contribution to household food provision in the two cities. A point noteworthy is the fact that more than half of all households give part of their

produce to other urban households as gifts to families and friends.

Food security and domestic production

According to the FAO (FAO, 2012), 'a household is considered food insecure when people lack secure access to sufficient amounts of safe and nutritious food for a normal growth and development and an active and healthy life'. The food security situation of urban households correlates closely with own food-provisioning arrangements, the rural-urban linkages that exists among households, and households' abilities to command food from the market to meet their nutritional and dietary needs (Table 6). Overall, nearly half of the total sample is food secure in both Techiman (48%) and Tamale (47%). The proportions of households considered severely food insecure in Techiman are found among households practising only urban agriculture (21%) and those with no agriculture (20%), while severe food insecurity is found among households practising only rural agriculture (13%). The qualitative data suggest that the

Table 7 Urban households cash income sources from all activities in Techiman

Sources of HH income	UA		RA		UARA		No agric		Total	
	n	%	n	%	n	%	n	%	n	%
Wage work	88	17.2	50	18.0	7	14.3	204	23.8	349	20.6
Casual work	39	7.6	15	5.4	1	2.0	44	5.1	99	5.8
Remittances – money	44	8.6	24	8.6	3	6.1	97	11.3	168	9.9
Remittances – goods	7	1.4	2	0.7	0	0.0	16	1.9	25	1.5
Remittances – food	20	3.9	13	4.7	1	2.0	65	7.6	99	5.8
Income from rural farm	0	0.0	63	22.7	14	28.6	3	0.4	80	4.7
Income from urban farm	115	22.4	0	0.0	7	14.3	2	0.2	124	7.3
Income from formal business	10	2.0	11	4.0	1	2.0	44	5.1	66	3.9
Income from informal business	164	32.0	89	32.0	12	24.5	344	40.1	609	35.9
Income from renting dwelling	6	1.2	3	1.1	1	2.0	4	0.5	14	0.8
Income from aid – food	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Income from aid – cash	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Income from aid – vouchers	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pension/disability/other social grants	6	1.2	3	1.1	1	2.0	7	0.8	17	1.0
Gifts	2	0.4	1	0.4	0	0.0	15	1.8	18	1.1
Other	12	2.3	4	1.4	1	2.0	11	1.3	28	1.7

Agric, agriculture; HH, household; RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

Table 8 Urban households cash income sources from all activities in Tamale

Sources of HH income	UA		RA		UARA		No agric		Total	
	n	%	n	%	n	%	n	%	n	%
Wage work	61	19.9	43	12.0	14	8.6	214	23.8	332	19.2
Casual work	44	14.3	39	10.9	39	24.1	116	12.9	238	13.8
Remittances – money	25	8.1	16	4.5	11	6.8	100	11.1	152	8.8
Remittances – goods	4	1.3	4	1.1	1	0.6	12	1.3	21	1.2
Remittances – food	14	4.6	14	3.9	2	1.2	50	5.6	80	4.6
Income from rural farm	0	0.0	116	32.4	28	17.3	3	0.3	147	8.5
Income from urban farm	53	17.3	0	0.0	25	15.4	0	0.0	78	4.5
Income from formal business	3	1.0	6	1.7	0	0.0	32	3.6	41	2.4
Income from informal business	79	25.7	103	28.8	36	22.2	278	30.9	496	28.7
Income from renting dwelling	5	1.6	4	1.1	0	0.0	5	0.6	14	0.8
Income from aid – food	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Income from aid – cash	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Income from aid – vouchers	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pension/disability/other social grants	3	1.0	0	0.0	0	0.0	23	2.6	26	1.5
Gifts	9	2.9	3	0.8	3	1.9	27	3.0	42	2.4
Other	7	2.3	10	2.8	3	1.9	40	4.4	60	3.5

Agric, agriculture; HH, household; RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

Table 9 Average household cash income sizes

HH type	Obs	Mean	Obs	Mean
	Techiman		Tamale	
UA	238	642.5	147	916.1**
RA	121	736.6	186	729.5
UARA	23	792.4	76	905.7
No production	464	540.6**	522	696.8**
City average	846	604.1***	931	755.0***
Overall sample				683.2

HH, household; RA, rural agriculture; UA, urban agriculture; UARA, urban agriculture and rural agriculture.

**($P = 0.05$).

***($P = 0.01$).

related work constitute the two main sources of income available to households in Techiman contributing more than half (52%) of total cash income. Households whose members do not engage in agriculture raise their incomes primarily through engagement in informal businesses, with income from this source constituting about 40 per cent in Techiman and 31 per cent in Tamale.

For households that engage in agricultural production, however, the picture is different. For households engaged in urban and rural agriculture, the combined income raised is the highest in both cities, contributing about 43 per cent and 33 per cent of total cash incomes in Techiman and Tamale, respectively (see Table 9).

In Techiman, households whose members engage in urban agriculture generate nearly a quarter (22%) of their cash income from urban agriculture, even if income from informal business is the largest individual source of income (32%). The importance of urban agriculture in income terms is slightly lower in Tamale, where incomes from such productive activities are the third most important source of income to households, contributing nearly a fifth to household income (17.3%) after incomes from informal businesses (25.7%) and wage income (19.9%). For households engaged in rural agriculture in Tamale, income from rural agriculture is the highest, contributing 32 per cent of the total household cash incomes. The importance of rural agriculture in income terms is slightly lower in Techiman. Income generated from rural agriculture is the second most important source of income contributing nearly a quarter (23%) of the total household cash incomes in Techiman.

Cash income from agriculture—whether rural or urban—serves as an important complement to agricultural production used for own consumption

for agricultural households in Techiman and Tamale, underscoring the important role agriculture plays both as a source of food and income.

Size of cash incomes

The gross mean monthly income for the sample shows that in Techiman higher incomes are observed for households that engage in both urban and rural agriculture (GHS 792), followed by households that practise only rural agriculture (GHS 734), and urban agriculture households (GHS 643). Non-agricultural households in Techiman are found to have the lowest gross monthly income (Table 9). In Tamale, households that practise only urban agriculture are found to have the highest average monthly incomes (GHS 916), followed by those engaged in both urban and rural agriculture (GHS 906), and only rural agriculture (GHS 730). While household participation in rural agriculture records the highest monthly cash income in Techiman, households who participate in urban agriculture tend to have the highest average monthly incomes in Tamale. A point noteworthy is the fact that participation in both urban and rural agriculture in Techiman and Tamale contributes significantly to household incomes. A test of means shows that gross monthly income from households involved only in urban agriculture is higher and significantly different from all other household categories in Tamale. Similarly, the average monthly income observed for non-agricultural households is found to be the lowest and significantly different from other household categories in Techiman. The result corroborates the relative importance of both urban and rural agriculture to livelihoods of urban households involved in such cultivation and further underscores the importance of rural-

urban linkages in the discussion of food and nutrition security.

Coda

This paper makes an important contribution to existing research on urban agriculture, by contextualising this agricultural practice in terms of its effects on different classes of households in medium sized urban landscapes in Ghana. The paper emphasises the point that urban agriculture should not be treated in isolation from other mechanisms that households employ to meet their food and nutrition needs. The contribution of urban agriculture to household food security should be viewed in the context of understanding the values that households involved in urban agriculture place on produce and considering how produce is utilised. In effect, food and nutrition security in small and medium sized cities should be studied in the context of broader arrangements, entitlements and linkages available to the households in question and mindful of the extent to which they supplement household food and nutrition needs.

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Note

US\$1 = GHS 4.2075 as at 28 November 2016.

Conflict of interest

None declared.

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Paper II



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To whom it may concern

The authors hereby certify that the paper entitled **Effects of own food production on household food security in a small and medium-sized city in Ghana** is based on 75%/20%/5% contributions by the respective authors Ayerakwa/Dzanku/ Sarpong



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Effects of food production on household food security in a small and medium-sized city in Ghana

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Abstract

The debate on the contribution of urban agriculture to food security seems to over concentrate on the effects of urban agriculture on household food security alone without considering the fact that, there are farmers living in urban areas who have other farming engagements in peri-urban and rural areas. Using data collected on 2,000 urban households in two intermediate-sized cities in Ghana, we examine the effects of urban households' food production in urban and rural spaces on urban food security. The results demonstrate that, overall, urban residents who produce food in both urban and rural space achieve better food security outcomes.

Key words: urban agriculture, rural agriculture, own food production, intermediate sized cities, household food security, Ghana

Introduction

Urban and peri-urban agriculture (UPA) has in recent times received considerable attention for its importance in the provision of food both to producing households and also to city dwellers. UPA also serves as a source of income to a chain of beneficiaries including farmers, market sellers, input suppliers and invariably contributing to the livelihoods of people (Armar-Klimesu 2000; Danso et al. 2002; Drechsel et al. 2006; Henn 2000; Obosu-Mensah 1999; Sabates et al. 2001; Sanyal 1985; Smit et al. 1996). Probably due to the relative ease of access to water for irrigation in cities UPA is usually an all year round activity that takes place in open spaces, government reserved lands, and on non-habitable areas in and around high tension poles, contributing to the supply of food to city dwellers, and to poverty alleviation among producers (MoFA 2010).

The practice of agriculture by urban residents in Ghana dates back to the colonial days with the arrival of Europeans. The practice then focused on cultivation of crops, especially vegetables in and around the castles and forts in the 16th century (Anyane 1963; Danso et al. 2014). A government supported initiative of own food production called Operation Feed Yourself (OFY) in the 1970s brought a general acceptance of agriculture in urban areas where citizens were encouraged to grow food in their backyards (Girdner et al. 1980). This was possible at the time because the cities had lower population pressures to deal with, but also because the practice received executive approval. However, Ghana's urban population has been growing much faster than the rural population – averaging 4.2 % and 1.7 % annual growth between 1960 and 2014, respectively (Fig. 1). At such a pace, more than half of Ghana's population were living in urban areas before 2010, with the urban population share having risen from just 23.1 % in 1960 to about 53.4 % in 2014¹ (Fig. 2). Increasing urbanization coupled with rapid expansion of infrastructure places extra demand on agricultural lands to be converted for other uses including housing and the provision of essential social amenities.

Urban agriculture has been promoted by activists including Civil Society Organizations (CSOs), researchers, government agencies, NGOs and development agencies as a positive pro-poor initiative to be encouraged in the poverty alleviation agenda in developing countries (Cofie and Drechsel 2007; FAO 2012; Lee-Smith 2010; Lee-Smith 2013; Mougeot 2011; Smit et al. 1996; Gockowski, et al., 2003). Available evidence suggests that urban agriculture provides an important source of food in most developing countries and serves as a critical food security strategy among the urban poor (Armar-Klimesu 2000; Maxwell 2001; Mougeot 2000; Nugent 2000) while improving nutritional status of practicing households (Maxwell 2001; Mwangi and Foeken 1996). Recent evidence suggests that the importance of urban agriculture far exceeds what has been previously understood. For example, Thebo et al. (2014) shows that approximately 11% and 5% of all irrigated and rainfed cropland, respectively are situated in urban areas. If the urban boarder radius is extended by 20km the share rises to 60% and 35% respectively.

While there is no outright condemnation of urban agriculture, its relative importance in meeting urban household food requirements has been questioned by several researchers (Crush et al. 2011; Frayne et al. 2014; Lee-Smith 2013; Stewart et al. 2013; Zezza and Tasciotti 2010). The lack of comparable data on the scale as well as the impact of urban agriculture on food security seems to further validate the scepticism (Stewart et al. 2013). Zezza and Tasciotti (2010), for example, believe the potential impact of urban agriculture has been exaggerated by activists. They also question what has been widely cited in the literature as the estimated number of people involved in urban agriculture globally (about 800 million). What is missing from their analysis is failure to provide alternative estimates of what numbers are engaged in urban agriculture worldwide.

¹ The inter-census population growth and the 2015 urban-rural population share figures are estimates from World Bank 2016.

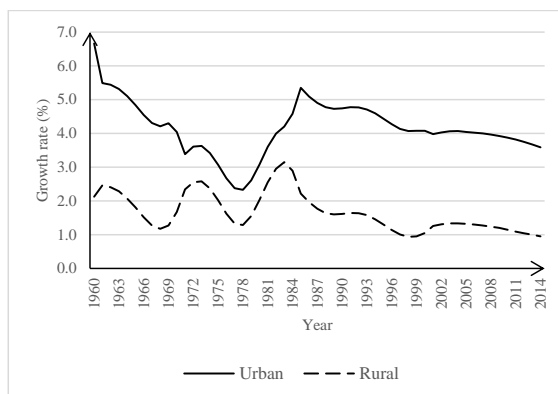


Fig. 1
Ghana's urban-rural population growth, 1960-2014

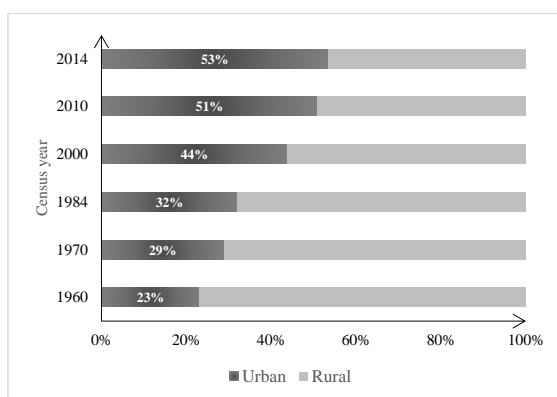


Fig. 2
Ghana's urban-rural population share

Although the literature on urban agriculture and its contribution to household food security has received considerable attention, little is known about urban households' participation in agricultural production (both urban and rural) and how these engagements contribute to their food security. More so, while studies on urban agriculture exist in Ghana, with the exception of a few (Chagomoka et al. 2015; Chagomoka et al. 2016) most of the literature focus on Accra and Kumasi (the two largest cities). In this study however, we analyse the contribution of own food production in both urban and rural areas to urban household food security from the perspective of a small and an intermediate sized city.

The rest of the paper is structured as follows: The study context is presented in the next section. This is followed by a discussion on the conceptual linkages that exist between urban and rural space in the

production of food. Section four presents the methodology. The results from our empirical model is presented and discussed in section five. The conclusions are presented in section six.

Study context

As could be expected, both polity and broader institutional contexts matter for agricultural production in general and urban agriculture in particular. The government of Ghana, unlike their counterparts in many other African countries, has a policy on urban agriculture. This is contained in Ghana's Medium Term Agriculture Development Plan (METASIP) 2011-2015 (MoFA 2010). In the METASIP policy document, urban and peri-urban agriculture have been acknowledged as major contributors to national food security.

METASIP does not consider the interplay between agricultural production by urban dwellers in urban space on the one hand and production by urban dwellers in rural space on the other, and how this relates to urban household food security. In this sense, the policy does not contextualise urban agriculture in small and intermediate sized cities (Ayerakwa 2017). Studying this gap is an important contribution of this paper.

We use empirical data to show that context matters in discussing the contribution of own food production to household food security. In addition, we show that own food production contributes to urban households food security and that, urban residents' participation in agriculture could be used as an effective poverty reduction strategy in specific contexts. To put the research in context, we discuss some differences between the two cities where this study is sited (Techiman and Tamale). The discussion is based on qualitative interviews with key informants (including Chiefs, Assembly Members, Officers from the Ministry of Food and Agriculture (MoFA), and other agencies working in the field of urban agriculture).

The two cities demonstrate some contextual differences that shape the results of the study. First, an assessment of the land ownership structure reveals that whereas Techiman lands are mostly vested in the paramount chief (stool lands) a significant share of lands in Tamale is under state control. The situation in Tamale is mainly as a result of the city being the administrative capital of the Northern region. As has become the convention in Techiman, agricultural lands revert to the chief once urban development reaches a particular sub-community. Whoever cultivated the parcel prior to the reversal receives a portion of the land as compensation. The beneficiary has the opportunity to continue cultivating the land or use it for other purposes including the option of outright sale. In Tamale, state lands are sometimes leased out to private developers whereas those remaining undeveloped are cultivated by the original families until such a time that the government decides to develop it.

As a result of the different land ownership structures, the nature of urban agriculture in the two cities are also different. The qualitative interviews show that farming in urban spaces in Techiman is an important strategy for ensuring land tenure security. The rule is that, if purchased land is left undeveloped over a two year period, the chiefs reserve the right to resell the land to other interested persons who are ready to develop the land. This is done to avoid weeds growing on plots in the city center. In Tamale on the other hand, urban farming is part of the livelihoods of several families who devote substantial amount of resources to the production of high value crops for consumption and sale to other city dwellers through market intermediaries. This takes place mostly in open spaces belonging to the state. Due to the relatively high population of public servants and expatriates in Tamale, there is higher demand for freshly produced exotic vegetables in Tamale than Techiman. Farmers take advantage of the high demand for exotic vegetables and the availability of open spaces within the city to grow such vegetables, especially during the dry season when rainfed agriculture is impossible in rural and peri-urban areas.

Apart from the rule guiding the purchase and development of land in Techiman, it is easy to access peri-urban and rural lands for own food production. As a result, farming in the city remains generally

unattractive. Farmers in Tamale on the other hand tend to spend several hours commuting to peri-urban and rural areas to access land for farming. As a result, where possible, every available space is utilised for farming. Additionally, farmers in Tamale tend to benefit from extension support systems which makes them more efficient in their production activities. It is thus expected that, the impact of urban agriculture on household food security in Tamale would be stronger than in Techiman.

Since it could be argued that discussions of urban food security from the perspective of household own food production should be done in the context of access to the most valuable resource (i.e. land), the context provided above helps shape our understanding of possible differences in the effect of urban agriculture on food security.

Determinants of food (in) security

The Food and Agriculture Organization (FAO 1996) defines food Security as the situation in which all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The multidimensional nature of food (in) security makes measurement complex with a lack of agreement across disciplines. In the 1980s, food security was perceived as a problem of food shortage that required increased production. This view resulted in investments in food aid to developing countries like Africa and in Green Revolution technologies in Asia. In that era, food availability was tracked using food balance sheets which provided estimates of available food (Hendriks 2015; Pinstrup-Andersen 2009; Webb et al. 2006). However, increased food production only addressed the challenge of food availability but did not guarantee access by individuals and households who needed food the most. For example, the Food and Agriculture Organization (FAO, 2002) suggests nearly a third (33%) of people living in Sub-Saharan Africa (SSA) are undernourished.

With Ghana's current urban population share already in excess of the continent's projected growth by 2030, the concerns on urban food security and poverty alleviation is further heightened (Haddad et al., 1998; Armar-Klimesu, 2000; Frayne, 2005; United Nations, 2005; UN Habitat, 2007). The recent food hikes in some African cities is an indication of the extent of the problem of urban food security and why urgent solutions are needed to address them, especially in the area of distribution. As noted by Sen (1981) people experience food deprivation due to their difficulty in accessing food and not necessarily because of the non-availability of it. Measurement of food security has since evolved with different interests and foci across disciplines (Barrett 2010).

A household's food security is affected by their purchasing power and other resources such as production possibilities, transfers and gifts, market conditions (including market integration), and policies (Sen 1981; Hendriks, 2015). Household and household head characteristics such as age, education and household size are also important because they influence the income earning opportunities of households (Ibekwe 2010; Talukder 2014). Dzanku and Sarpong (2011) used data from rural Ghana to show that resource allocation to staple crop production, household characteristics such as sex, age, household composition and education; physical asset wealth, remittances, other non-farm income and distance to main market outside the village are important predictors of rural household food security. Some studies have found that female headed households are more likely to be food insecure than male headed households (e.g., Bashir et al. 2012; Dzanku and Sarpong 2010)

Evidence from Mozambique show that household food access depends on income, access to land and resources for own food production (Garrett and Ruel 1999). The presence of small children or the elderly, education of household members, and location were all found to influence the food security situation of households. Additionally, household income from participation in non-farm activity was found to lower the likelihood of household food stock decline during critical moments of food shortages (Aidoo et al. 2013; Owusu et al. 2011) as well as reduce the prevalence of child stunting, underweight

and wasting (Babatunde and Qaim 2010). Feleke et al. (2005) group the determinants of household food security in Ethiopia into demand and supply side factors and conclude that supply side variables including technology adoption, farming system, farm size and land quality better explain household food security than demand side variables such as household size, per capita aggregate production and market access (Feleke et al. 2005).

Other variables found to influence household food security include credit access and marital status (Aidoo et al., 2013); fertilizer application, cattle ownership and access to irrigation (Sikwela, 2008). The determinants of food security therefore vary across geographical, cultural, sociopolitical contexts.

Methodology

Sample

This paper is part of a broader multidisciplinary research project carried out in Ghana, Kenya and Uganda with the aim of understanding the social, economic and environmental challenges and prospects of urban agriculture under changing global and demographic realities. For the Ghana case study, Techiman municipality and Tamale metropolitan area in the Brong Ahafo and Northern regions, respectively, were purposively selected for the study. The rationale was to break away from the metro bias that has characterised earlier research on urban agriculture in Ghana. The two cities have a population of 67,241 and 223,252 inhabitants respectively (GSS 2014b, 2014a), and have been identified as major supply blocks to the national food basket. Techiman is located within the transition belt whereas Tamale is in the northern savanna zone. The choice of Techiman and Tamale also provides insight into the contextual nature of food security since the prospects for participation in urban and rural agriculture in the two cities are different. For example while households in small cities like Techiman could have access to own-produced food from surrounding villages, households in intermediate sized cities such as Tamale may not have the same opportunity.

Surveys were conducted in the two cities in October 2013. This was complemented by qualitative interviews used to elicit city specific contexts. The quantitative surveys on the other hand aimed at a representative sample of households in each city. Overall, about 1,000 households in each city were interviewed as part of the quantitative survey in addition to 21 key informant interviews.

The food security measure

The outcome variable of interest to this article is a food (in) security indicator. Following Coates et al., (2007), we use the 'Household Food Insecurity Access Scale' (HFIAS) to classify households as food secure or not based on a set of nine questions. The questions take into account a thought reflection on several indicators including hunger, anxiety (about household food access, satisfaction of food preferences) worry and wellbeing (Headey and Ecker, 2013). The information generated by the HFIAS can be used to assess the prevalence of household food insecurity and to detect changes in the household food insecurity situation of a population over time (Coates et al. 2007, p. 2).

Respondents are asked each of the questions with a recall period of four weeks and allowed to assess first an occurrence of food insecurity and then a frequency of different types of food insecurity occurrence question is asked to determine whether the condition occurred rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks (Headey and Ecker, 2013; Coates et al. 2007). It is noteworthy that, the HFIAS measures the access component of food security but does not provide an indicator of food utilization which relates to nutrition.

Following the classification of Coates et al., (2007), we classify as food secure any household that does not experience anxiety about food access, satisfaction of food preferences, or shortages of food in daily

lives, or just experiences worry, but rarely. Households that are found to worry about inadequate food for consumption sometimes or on a more frequent basis, or without the ability to eat preferred foods, and/or eats a more monotonous diet than desired are classified as mildly food insecure. The households in this category do not reduce the quantities of food consumed nor run out of food, going to bed on an empty stomach or going a whole day without food. For the moderately food insecure households, they turn to sacrifice quality on a regular basis and also eat monotonous or undesirable foods sometimes or often. In some instances, they have started to reduce the size or number of meals. A severely food insecure household runs out of food, have members going to bed hungry, or going a whole day and night without eating on a regular basis. They turn to cut back on meal size or number of meals often. (Coates et al. 2007). Using the HFIAS we are able to reclassify households into the different household food insecurity access prevalence (HFIAP).

Based on the above, let FSS_i denote the food security severity status of household i . A household belongs to one of four food security groups: Severely Food Insecure ($FSS_i = 1$), Moderately Food Insecure ($FSS_i = 2$), Mildly Food Insecure ($FSS_i = 3$), and Food Secure ($FSS_i = 4$). Aside this food security scale, we also define two broad categories of food security status, where a household is either food secure ($FSS_i = 4$) or food insecure ($FSS_i = 1, 2, 3$).

Validity and limitations of the food security measure

As indicated earlier, the HFIAS measures only the access component of food (in) security. The validity of the scale has been tested to have several advantages including the ability of the scale to capture psychological dimensions of food insecurity which also has the ability to elicit expectations that potentially can impart on the food security status of households. The scale has also been seen as fairly easy to measure relative to other food insecurity measures. This also makes it possible to account for seasons based on the reference category identified. Several other literature on the veracity of the scale suggests it is a simple and valid tool for measuring the access component of food security (Becquey et al. 2010; Gebreyesus et al. 2015; Salarkia et al. 2014). In all the studies cited above, the HFIAS showed a good internal consistency.

The above notwithstanding, Headey and Ecker (2013) found that the ordering of the questions in the scale affects the reported food insecurity situation in China. He argues further that, there is a lack of comparability across wealth and education groups such that there is a general lack of a common reference point. The next weakness associated with the HFIAS relates to the lack of cross cultural comparability across the set of questions. For example, literature on the test of cultural comparability of the HFIAS in six countries reveal only three out of the nine questions demonstrate cross country comparability (Deitchler et al. 2010). Headey and Ecker (2013) argue that HFIAS has the tendency to underestimate food insecurity situation due to feelings of shame associated with admission of hunger. Similarly, expectations of public transfers and other material incentives has the potential to overestimate food insecurity situation.

Furthermore, the period of interview could possibly cloud the true food security situation of the household. Periods prior to harvesting seasons are usually characterised by shortages compared to periods during and immediately after harvest. As a result, conducting an interview at a particular time of the year may skew responses in favour of a particular indicator. For this last case, we attempt judging how this could influence our results and conclusions by doing the analysis using alternative indicators that sought to assess household food (in) security over a 12 month period. The drawback with this is the length of the recall period. Using multiple indicators, however, helps us check the robustness of our estimates.

Empirical Model specification

We first specify a binary food security equation as

$$FS_i^* = \alpha + \sum_{k=1}^K \delta_k ownproduction_{ik} + \beta' X_i + \varepsilon_i, \quad i = 1, 2, \dots, N \quad (1)$$

$$FS_i = 1 \text{ if } FS_i^* > 0; \quad FS_i = 0 \text{ otherwise,}$$

where FS_i^* is the latent unobserved food security level of urban household i ; FS_i is the food security level which is only observed as a binary response variable which takes on the value 1 for a household that does not experience any of the food insecurity episodes (i.e. $FSS_i = 4$), 0 otherwise (i.e. for $FSS_i = 1, 2, 3$); *ownproduction*, the main explanatory variable of interest, is the categorical variable which defines the four types of food producing urban households (*ownproduction* = 1 if household does not produce any food, *ownproduction* = 2 if the household produces food in urban space only, *ownproduction* = 3 if household produces food in rural space only, and *ownproduction* = 4 if household produces food in both urban and rural space); the vector X contains all other explanatory variables (mainly individual and household characteristics); α , the β s and δ_k ($k=1,2,3,4$) are the unknown parameters to be estimated; ε_i is the idiosyncratic error term. Assuming a standard normal distribution for ε_i leads us to fit a probit model to equation (1).

The food security severity indicator, FSS_i , is amenable to an ordered choice regression. We thus specify

$$FSS_i^* = \sum_{k=1}^K \delta_k ownproduction_{ik} + \beta' X_i + \varepsilon_i, \quad FSS_i = J \text{ if } \kappa_{j-1} < FSS_i^* < \kappa_j, \quad i = 1, 2, \dots, N \quad (2)$$

where κ is the threshold parameter, and all other variables and parameters are as defined in equation (1). An ordered probit model is estimated for equation (2) assuming a standard normal CDF of the unobserved.

Our hypothesis in both equation (1) and (2) is that, on average, urban households who produce food in both urban and rural space have better food security status than urban households who either do not engage in agriculture at all or engage in food production in urban space only or rural space only. Thus, relative to δ_4 , we expect δ_1, δ_2 and δ_3 to all be negative and statistically different from zero at the 5% level.

Equations (1) and (2) are also estimated replacing *ownproduction* with an urban household food production dummy (*ownprod*), that is, a variable that takes on the value 1 if an urban household produces their own food irrespective of the spatial location where the food is produced, and 0 otherwise. In this instance, the models are:

$$FS_i^* = \alpha + \gamma ownprod_i + \beta' X_i + \varepsilon_i, \quad i = 1, 2, \dots, N$$

$$FS_i = 1 \text{ if } FS_i^* > 0; \quad FS_i = 0 \text{ otherwise,} \quad (3)$$

and

$$FSS_i^* = \gamma ownprod_i + \beta' X_i + \varepsilon_i, \quad FSS_i = J \text{ if } \kappa_{j-1} < FSS_i^* < \kappa_j, \quad i = 1, 2, \dots, N \quad (4)$$

A priori, we expect urban households who produce their own food to be more food secure than those who rely solely on the market for food, after controlling for other determinants of households food (in) security. Thus, we expect γ to be positive and statistically different from zero.

As mentioned earlier we attempt gauging the possible sensitivity of the estimates to survey dates. First, equation (1) is re-estimated using as dependent variable the response to the survey question 'Over the past year, how often, if ever, have you or your household gone without enough food to eat?' Here, a household is defined as food secure ($FSS_i = 1$) if the answer to this question is *never*; the household is food insecure otherwise. Similarly, equation (2) is re-estimated with the dependent variable being the full set of responses to the same question above, where the choice possibilities are: *always* ($FSS_i = 1$), *many times* ($FSS_i = 2$), *several times* ($FSS_i = 3$), *just once or twice* ($FSS_i = 4$), and *never* ($FSS_i = 5$). However, in the actual estimation FSS_i took on only the last three values because 98 % of observations were in this range.

Results and Discussion

Descriptive statistics

Figure 3 provides a distribution of the food insecurity prevalence indicator (i.e. the HFIAP) among the sample in the two cities. In both cities, more than half of all households (52% for Techiman and 53% for Tamale) fell in one of three food insecurity states, the rest had secure access to food. Table 1 presents the descriptive statistics for the models in equations 1 and 2. The four categories of urban households based on participation in food production are *ownproduction_none*, *ownproduction_urban*, *ownproduction_rural*, and *ownproduction_urban_rural*. By our main hypothesis, one would expect the proportion of *ownproduction_urban_rural* households to be increasing significantly as one moves from the severely food insecure state (*Severe*) to the food secure state (*Secure*). Conversely, it is expected that the proportion of *ownproduction_none* households would increase across the scale. Indeed, the results show that the proportion of *ownproduction_none* households is decreasing across the three food insecurity states (*Severe*, *Moderate*, and *Mild*), approximately 60 %, 57 % and 49 % respectively. A similar pattern is not observed for *ownproduction_urban_rural* households, but we see that a greater proportion of them are food secure (about 6 %) than are severely food insecure (3 %). Overall, there is a statistically significant difference in food (in) security status by type of participation in food production ($\chi^2 = 27.69, p = 0.001$).

Nearly half (49%) of the other variables show statistically significant differences across the food security scale at the 5 % level. For example, household head's years of schooling (*years_schooling_hh_head*) is significantly increasing as one moves from *Severe* to *Secure* on the scale. Similarly, the proportion of educated mothers is increasing across the scale. For instance, only about 11 % of mothers are educated among the severely food insecure whereas among the food secure about 20 % are educated.² As could be expected, there are significant wealth differences by the HFIAS scale. For example, monthly per capita income is increasing significantly as one moves from the *Severe* status (USD 51.23) to *Secure* status (USD 107.39).³

² We define an educated mother here as one who has attained secondary education or higher.

³ At the time of the survey the US dollar was exchanging for about 2.03 GH¢ (the GH¢ is the local currency unit of Ghana).

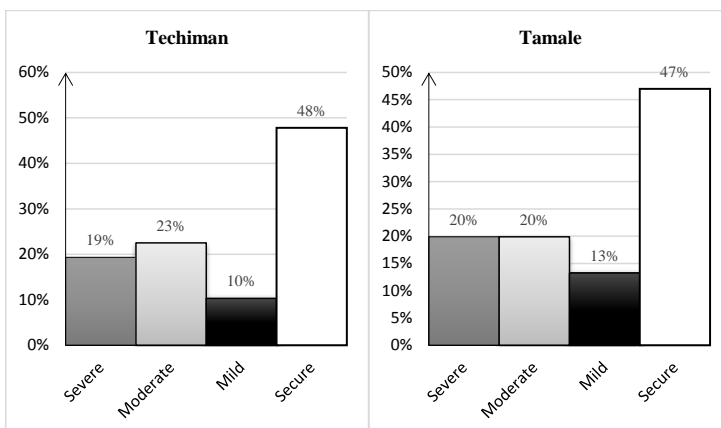


Fig. 3
Food insecurity severity scale across the two cities

variable	Food security scale								p-val.
	Severe (n = 393)		Moderate (n = 425)		Mild (n = 236)		Secure (n = 950)		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Participation in agriculture:									
ownproduction_none	59.5%		57.4%		49.2%		56.4%		0.08
ownproduction_urban	20.9%		17.9%		22.5%		21.7%		0.38
ownproduction_rural	16.5%		21.9%		21.2%		15.4%		0.01
ownproduction_urban_rural	3.1%		2.8%		7.2%		6.5%		0.00
female_headed_hh	29.8%		24.2%		17.8%		19.2%		0.00
age_of_hh_head	45.2	15.5	44.6	14.1	45.8	14.5	44.1	13.9	0.31
married_hh_head	68.4%		76.2%		83.1%		76.4%		0.00
years_schooling_hh_head	4.4	4.7	5.3	4.9	5.7	5.4	6.4	5.3	0.00
years_schooling_mother	3.4	3.2	4.5	3.7	3.5	3.6	5.3	4.2	0.00
other_educated_adult_present	46.8%		45.9%		46.6%		45.5%		0.97
age_of_mothers	39.7	12.8	38.5	11.2	37.3	11.7	37.9	12.1	0.04
educated_mother	11.2%		13.2%		14.4%		19.7%		0.00
hh_size	4.7	2.6	4.9	2.3	4.8	2.3	4.7	2.6	0.59
members_under15	1.7	1.6	1.8	1.5	1.6	1.4	1.7	1.5	0.37
members_above64	0.2	0.5	0.2	0.4	0.2	0.4	0.2	0.4	0.47
working_age_members	2.7	1.8	2.8	1.5	2.9	1.6	2.8	1.6	0.44
dependant_proportion	37.1%	25.6%	37.6%	23.8%	34.8%	22.9%	35.1%	24.5%	0.22
under5_child_present	43.5%		49.6%		43.2%		44.9%		0.24
nuclear_hh	56.0%		57.6%		60.2%		54.6%		0.42
cash_transfer_dummy	19.6%		21.2%		11.8%		47.4%		0.06
Food transfers:									
no_food_transfer	71.0%		72.0%		67.8%		67.3%		0.26
food_transfer_from_urban	12.5%		11.3%		14.4%		12.9%		0.69
food_transfer_from_rural	14.8%		14.8%		15.7%		16.8%		0.71
food_transfer_from_both	1.8%		1.9%		2.1%		2.9%		0.49
nonfarm_income_earners	1.4	0.9	1.6	1.1	1.6	1.0	1.6	1.0	0.00
livestock_index	0.5	0.9	0.4	0.8	0.6	1.0	0.5	0.9	0.05
household_income_pc	104	116	105	122	147	202	218	282	0.00
own_house	28.5%		27.3%		30.9%		34.1%		0.04
Shocks:									
chronically_sick_head	22.9%		14.4%		20.8%		12.3%		0.00
chronically_sick_partner	12.0%		10.1%		7.6%		8.6%		0.19
chronically_sick_hh_member	14.0%		14.6%		17.4%		10.7%		0.02
Indepthedness	8.9%		9.4%		12.3%		11.6%		0.33
unemployed_head	10.2%		7.1%		2.5%		3.6%		0.00
unemployed_spouse	10.2%		7.5%		6.8%		6.7%		0.17
unemployed_adult	23.2%		16.2%		16.9%		13.3%		0.00
City:									
Techiman	19.4		22.5		10.3		47.8		0.14
Tamale	19.9		19.9		13.3		47.0		

Note: The p -values are based on chi-squared tests for discrete variables, and ANOVA for the roughly continuous variables.

Table 1

Sample descriptive statistics, by food (in) security scale

Discussion of regression results

Fitting one model for both cities assumes that all coefficients do not vary between the two cities. This is a strong assumption given the differing characteristics of the two cities in terms of size and agroecology, for instance. We employed a likelihood-ratio test to formally test the null hypothesis that the coefficients of our models do not differ significantly across the two cities. The null hypothesis is rejected in all cases at the 1 % level, so for each case we fit a model to the full sample as well as city-specific models.

VARIABLES	Combined		Techiman		Tamale	
	Coef.	AME	Coef.	AME	Coef.	AME
Participation in agriculture (ref. is ownproduction_urban_rural):						
ownproduction_none	-0.424***	-0.153	0.010	0.004	-0.546***	-0.190
ownproduction_urban	-0.355**	-0.128	-0.024	-0.008	-0.354*	-0.123
ownproduction_rural	-0.503***	-0.181	-0.070	-0.025	-0.688***	-0.239
female_headed_hh	-0.399***	-0.144	-0.740***	-0.260	-0.192	-0.066
age_of_hh_head	0.003	0.001	0.014**	0.005	-0.005	-0.002
married_hh_head	0.050	0.018	0.034	0.012	0.084	0.029
age_of_mother	-0.002	-0.001	-0.010	-0.003	0.002	0.001
years_schooling_hh_head	-0.006	-0.002	-0.014	-0.005	-0.002	-0.001
years_schooling_mother	0.064***	0.023	0.134***	0.047	0.023*	0.008
other_educated_adult_present	0.045	0.016	-0.038	-0.013	0.168	0.058
hh_size	-0.059	-0.021	0.091	0.032	-0.155	-0.054
members_under15	0.091	0.033	-0.078	-0.028	0.204	0.071
members_above64	0.165	0.059	0.064	0.022	0.265	0.092
working_age_members	0.078	0.028	-0.015	-0.005	0.135	0.047
unders_child_present	0.003	0.001	0.042	0.015	-0.015	-0.005
nuclear_hh	-0.216***	-0.078	-0.121	-0.043	-0.319***	-0.111
cash_transfer_dummy	0.024	0.009	0.122	0.043	-0.107	-0.037
Food transfers (ref. is food_transfer_from_both):						
no_food_transfer	-0.430**	-0.155	-0.307	-0.108	-0.492*	-0.170
food_transfer_from_urban	-0.403*	-0.145	-0.246	-0.086	-0.640**	-0.222
food_transfer_from_rural	-0.321	-0.116	-0.194	-0.068	-0.425	-0.147
nonfarm_income_earners	0.023	0.008	-0.055	-0.019	0.096*	0.033
livestock_index	-0.046	-0.016	-0.045	-0.016	-0.067	-0.023
own_house	0.130**	0.047	0.030	0.011	0.183*	0.063
household_income_pc_100	0.153***	0.055	0.126***	0.044	0.202***	0.070
chronically_sick_head	-0.216**	-0.078	-0.176	-0.062	-0.237*	-0.082
chronically_sick_partner	-0.086	-0.031	-0.178	-0.063	0.046	0.016
chronically_sick_hh_member	-0.185**	-0.066	-0.191	-0.067	-0.165	-0.057
Indepedtness	-0.065	-0.024	-0.279**	-0.098	0.268	0.093
unemployed_head	-0.354**	-0.127	-0.534***	-0.188	-0.241	-0.084
unemployed_spouse	-0.174	-0.063	-0.397**	-0.140	0.015	0.005
unemployed_adult	-0.204**	-0.074	-0.061	-0.022	-0.329**	-0.114
Techiman (ref. is Tamale)	0.010	0.004				
Intercept	0.281		-0.581		0.654	
Observations	2,004		1,008		996	
Pseudo R-squared	0.093		0.114		0.125	
Log-likelihood value	-1.257		-618.1		-602.4	

Note: AME denotes Average Marginal Effect

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2

Probit estimates of urban household participation in different types of agriculture and the probability of being food secure

Table 2 reports parameter estimates from the probit model (equation 1). With *ownproduction_urban_rural* being the reference category for the main explanatory variable of interest, we expect *ownproduction_none*, *ownproduction_urban*, and *ownproduction_rural* to be negative and statistically different from zero, based on our hypothesis. *Ceteris paribus*, our null hypothesis is at the 1% level of

significance for *ownproduction_none* and *ownproduction_rural* and at the 5% level for *ownproduction_urban*, implying that, households who participate in both types of agriculture (urban and rural) have better food security outlook relative to all the other three types of households. Other important determinants of food security include female headed households who are found to be less food secure relative to male headed households and the number of years of schooling of mothers which is found to positively correlate with household food security level. That is, an additional year of schooling of mothers increased the likelihood of households being food secure. Generally, women provide care to members of the household as well as manage the home. As such, a sizeable proportion of decisions are made by them regarding dietary and food requirements of household members. In addition, additional year of schooling is generally tied to increased income earning opportunities. This tied to the roles of women in the home explains why education of mothers can improve the food security situation of household members.

A priori, it was expected that, income, which is an important determinant of food security, at least in the cities would have a positive effect on our food security indicator. Our parameter estimates suggests that, average monthly income per capita has a positive effect on household food security. In other words, increases in income has the potential of improving the food security status of the household.

VARIABLES	Combined		Techiman		Tamale	
	Coef.	AME	Coef.	AME	Coef.	AME
Participation in agriculture (ref. is <i>ownproduction_urban_rural</i>):						
<i>ownproduction_none</i>	-0.405**	-0.100	-0.358	-0.087	-0.306	-0.074
<i>ownproduction_urban</i>	-0.408**	-0.100	-0.385	-0.095	-0.360	-0.088
<i>ownproduction_rural</i>	-0.334*	-0.080	-0.321	-0.077	-0.320	-0.077
<i>female_headed_hh</i>	-0.254**	-0.071	-0.348**	-0.097	-0.229	-0.061
<i>age_of_hh_head</i>	0.009*	0.002	0.019***	0.005	-0.001	-0.000
<i>married_hh_head</i>	0.166	0.047	0.155	0.043	0.240	0.064
<i>age_of_mother</i>	-0.009	-0.002	-0.016**	-0.005	-0.003	-0.001
<i>years_schooling_hh_head</i>	-0.012	-0.003	-0.016	-0.005	-0.009	-0.002
<i>years_schooling_mother</i>	0.064***	0.018	0.107***	0.030	0.033**	0.009
<i>other_educated_adult_present</i>	-0.032	-0.009	-0.026	-0.007	-0.037	-0.010
<i>hh_size</i>	-0.116	-0.032	0.163	0.045	-0.436***	-0.116
<i>members_under15</i>	0.168*	0.047	-0.131	-0.036	0.514***	0.137
<i>members_above64</i>	0.243**	0.068	-0.019	-0.005	0.616***	0.164
<i>working_age_members</i>	0.142*	0.040	-0.055	-0.015	0.421***	0.112
<i>under5_child_present</i>	-0.101	-0.028	-0.119	-0.033	-0.033	-0.009
<i>nuclear_hh</i>	-0.175**	-0.049	-0.057	-0.016	-0.275**	-0.073
<i>cash_transfer_dummy</i>	-0.015	-0.004	-0.057	-0.016	0.055	0.015
Food transfers (ref. is <i>food_transfer_from_both</i>):						
<i>no_food_transfer</i>	-0.565**	-0.158	-0.319	-0.088	-0.686**	-0.182
<i>food_transfer_from_urban</i>	-0.480**	-0.134	-0.169	-0.047	-0.754**	-0.201
<i>food_transfer_from_rural</i>	-0.533**	-0.149	-0.374	-0.103	-0.566	-0.151
<i>nonfarm_income_earners</i>	0.015	0.004	-0.079	-0.022	0.089	0.024
<i>livestock_index</i>	0.060	0.017	-0.041	-0.011	0.148**	0.039
<i>own_house</i>	0.102	0.028	-0.078	-0.022	0.278**	0.074
<i>household_income_pc_100</i>	0.121***	0.034	0.077**	0.021	0.200***	0.053
<i>chronically_sick_head</i>	-0.087	-0.024	-0.233*	-0.064	0.073	0.019
<i>chronically_sick_partner</i>	-0.113	-0.032	-0.191	-0.053	-0.064	-0.017
<i>chronically_sick_hh_member</i>	-0.209**	-0.058	-0.181	-0.050	-0.227	-0.060
<i>Indepedtness</i>	0.016	0.005	0.141	0.039	-0.166	-0.044
<i>unemployed_head</i>	-0.359***	-0.100	-0.617***	-0.171	-0.191	-0.051
<i>unemployed_spouse</i>	-0.199**	-0.056	-0.431**	-0.119	0.047	0.013
<i>unemployed_adult</i>	-0.198**	-0.055	-0.157	-0.043	-0.213	-0.057
Techiman (ref. is Tamale)	0.008	0.002				
Intercept	1.209***		0.713		1.251**	
Observations	2,004	2,004	1,008	1,008	996	996
Pseudo R-squared	0.073		0.086		0.113	
Log-likelihood value	-995.4		-496.0		-470.7	

Note: AME denotes Average Marginal Effect

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3

Probit estimates of urban household participation in agriculture and the probability of being food secure

Fitting the model with the same covariates at the city level shows similar pattern in terms of effects of agricultural production on food security for Tamale city but not Techiman. City-specific effects matter in the sense that, as alluded to early on, Tamale metropolitan serves as the regional capital of the northern region of Ghana, and home to several type of businesses and individuals who have the taste and preference for exotic vegetables and thus provide market access for the farmers. Additionally, a cultural phenomenon encourages the cultivation of crops (especially vegetables that are central in the preparation of traditional diets) around homes. This practice potentially explains why urban agriculture is more pronounced in Tamale apart from other contextual variables such as access to market, the general lack of space for other forms of agricultural production around the city, and the harsh climatic conditions that allows for only one season of production. In Techiman on the other hand, proximity to rural areas where land for farming abounds makes farming in urban space unattractive in addition to the fact that, urban agriculture is a relatively new concept in the city. Qualitative interviews on the institutional frameworks guiding the practice of urban agriculture in both cities suggest that, urban agriculture in Tamale is considered an integral source of vegetables to the city and thus receives extension support from the Metropolitan Assembly's Department of Agriculture. On the contrast, urban agriculture, though exist in Techiman, is considered alien to modern city development by both municipal authorities and local opinion leaders.

To check for the robustness of our results, we estimate equation 1 again using as the dependent variable *ownprod* (a variable that takes the value of 1 if the household produces their own food irrespective of locality (either in urban or rural space) (Table 3). Whereas the combined effect of participation in both urban and rural agriculture remains unchanged for the sample, the city level effects are lost. That is, reclassifying households as agricultural or otherwise has no effect on household food security at least at the city level. This further corroborate the need to consider effect of own production in specific contexts.

Our ordered choice regression estimates which uses the food security severity indicator as dependent variable (equation 2) shows that, households engaged in both urban and rural agriculture have better food security status relative to those who have no production at all and those who engage in only UA or only rural agriculture (Table 4). This we find to be consistent with our *a priori* expectations and significant at the 1% level. The city specific models show similar results for Tamale with households engaged in both urban and rural agriculture having better food security status relative to the other household types. Per contra, we find no statistically significant difference between households that practice both urban and rural agriculture and the other household types in Techiman.

VARIABLES	Combined				Techiman				Tamale					
	Average Marginal Effect				Average Marginal Effect				Average Marginal Effect					
	Coef.	FSS = 1	FSS = 2	FSS = 4	Coef.	FSS = 1	FSS = 2	FSS = 3	FSS = 4	Coef.	FSS = 1	FSS = 2	FSS = 3	FSS = 4
Participation in agriculture (ref. is ownproduction_urban_rural):														
ownproduction_none	-0.438***	0.096	0.052	0.010	-0.158	0.012	0.001	0.001	-0.039	-0.550***	0.116	0.061	0.015	-0.192
ownproduction_urban	-0.370***	0.078	0.045	0.010	-0.133	0.043	0.019	0.001	-0.063	-0.328**	0.062	0.039	0.013	-0.114
ownproduction_rural	-0.436***	0.095	0.052	0.010	-0.157	0.051	0.014	0.001	-0.046	-0.562***	0.120	0.062	0.015	-0.196
female_headed_hh	-0.340***	0.087	0.034	0.002	-0.122	0.164	0.067	0.002	-0.233	-0.126	0.031	0.011	0.001	-0.044
age_of_hh_head	0.007*	-0.002	-0.001	0.000	0.003	0.019***	-0.005	-0.002	0.007	0.000	-0.000	-0.000	0.000	0.000
married_hh_head	0.146*	-0.037	-0.015	0.001	0.053	0.133	-0.033	-0.013	0.046	0.152	-0.038	-0.014	-0.001	0.053
age_of_mother	-0.005	0.001	0.001	0.000	-0.002	-0.013*	0.003	0.001	0.000	0.046	0.001	0.000	0.000	-0.001
years_schooling_hh_head	0.001	-0.000	-0.000	-0.000	0.000	-0.010	0.002	0.001	-0.004	0.006	-0.002	-0.001	-0.000	0.002
years_schooling_mother	0.060***	-0.015	-0.006	0.000	0.022	0.141***	-0.035	-0.014	0.049	0.000	-0.004	-0.001	-0.000	0.005
other_educated_adult_present	0.035	-0.009	-0.003	-0.000	0.013	-0.003	0.001	0.000	-0.001	0.108	-0.027	-0.010	-0.001	0.038
hh_size	0.027	0.007	0.003	0.000	0.000	0.019**	-0.059	-0.016	0.055	0.201	0.050	0.018	0.001	-0.070
members_under15	0.040	-0.010	-0.004	-0.000	0.014	-0.136	0.053	0.014	0.000	0.200	-0.050	-0.018	-0.001	0.070
members_above64	0.083	-0.021	-0.008	0.000	0.030	-0.072	0.018	0.007	0.000	0.293	-0.073	-0.027	-0.002	0.102
working_age_members	0.056	-0.014	-0.006	0.000	0.020	-0.093	0.023	0.009	0.000	0.205	-0.051	-0.019	-0.001	0.071
unders_child_present	0.016	-0.004	-0.002	-0.000	0.006	0.017	-0.004	-0.002	0.006	0.053	-0.013	-0.005	-0.000	0.018
nuclear_hh	-0.231***	0.059	0.023	0.001	-0.083	-0.087	0.021	0.009	0.000	-0.372***	0.093	0.034	0.002	-0.129
cash_transfer_dummy	-0.010	0.002	0.001	0.000	-0.003	-0.018	0.004	0.002	0.000	-0.053	0.013	0.005	0.000	-0.018
Food transfers (ref. is food_transfer_from_both):														
no_food_transfer	-0.400**	0.102	0.040	0.002	-0.144	-0.188	0.046	0.019	0.001	-0.480*	0.120	0.044	0.003	-0.167
food_transfer_from_urban	-0.344**	0.088	0.034	0.002	-0.124	-0.137	0.034	0.014	0.000	-0.540**	0.135	0.049	0.003	-0.188
food_transfer_from_rural	-0.305	0.078	0.030	0.002	-0.110	-0.092	0.023	0.009	0.000	-0.407	0.102	0.037	0.003	-0.141
nonfarm_income_earners	0.016	-0.004	-0.002	-0.000	0.006	-0.038	0.009	0.004	0.000	0.077	-0.019	-0.007	-0.000	0.027
livestock_index	0.038	0.010	0.004	0.000	0.014	-0.018	0.004	0.002	0.000	0.071	0.018	0.006	0.000	0.025
own_house	0.094	-0.024	-0.009	-0.001	0.034	0.032	-0.008	-0.003	-0.000	0.099	-0.025	-0.009	-0.001	0.034
household_income_pc_100	0.147***	-0.037	-0.015	-0.001	0.053	0.122***	-0.050	-0.012	0.043	0.195***	-0.049	-0.018	-0.001	0.068
chronically_sick_head	-0.192***	0.049	0.019	0.001	-0.069	-0.155	0.038	0.015	0.001	-0.209*	0.052	0.019	0.001	-0.073
chronically_sick_partner	-0.170*	0.043	0.017	0.001	-0.061	-0.188	0.046	0.019	0.001	0.107	0.029	0.011	0.001	-0.041
chronically_sick_hh_member	-0.095	0.024	0.009	0.001	-0.034	-0.097	0.024	0.010	0.000	-0.093	0.023	0.009	0.001	-0.032
Indepndedness	-0.038	0.010	0.004	0.000	-0.014	-0.281**	0.069	0.028	0.001	0.343**	-0.086	-0.031	-0.002	0.119
unemployed_head	-0.398***	0.101	0.039	0.002	-0.143	-0.546***	0.134	0.054	0.002	-0.297*	0.074	0.027	0.002	-0.103
unemployed_spouse	-0.230***	0.059	0.023	0.001	-0.083	-0.469***	0.115	0.047	0.002	-0.007	0.002	0.001	0.000	-0.002
unemployed_adult	-0.264***	0.067	0.026	0.002	-0.095	-0.154	0.038	0.015	0.001	-0.372***	0.093	0.034	0.002	-0.129
Techiman	0.005	-0.001	-0.001	-0.000	0.002	-0.221	-0.081	0.015	0.001	-0.054	0.002	0.002	0.000	0.002
Constant cut1	-1.152***									-1.655***				
Constant cut2	-0.468									-0.992**				
Constant cut3	-0.140									-0.610				
Observations	2,004									996				
Pseudo R-squared	0.060									0.079				
Log-likelihood value	-2362									-1160				

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

Table 4
Ordered probit estimates of urban household participation in agriculture and food insecurity in Techiman and Tamale

Estimating the model using the ordered variable that we believe is less sensitive to survey dates decreases the precision of our estimates. We find household that participate in both urban and rural agriculture showing statistically significantly better food security outlook than households who do not participate and those who produce in urban space at the 10% level of significance (Table A2). No statistically significant difference is found between participation in rural agriculture and participation in both urban and rural agriculture. Thus, it appears timing of the surveys matter for the results observed.

Furthermore, we reclassify our households into agricultural and non-agricultural households and estimate the effects of participation in agriculture on household food security. The results are summarised in Appendix Table A4 (full estimates are available on request). In general, we find no statistically significant difference in the food security status among households that participate in own food production and those who do not. This finding is inconsistent with our a prior expectation but provides an indication that, own food production and food security need not be generalised but be contextualised to the specific type of agricultural production a particular household is engaged in.

As discussed earlier, some important predictors of urban household food security include household characteristics such as the number of years of schooling of mother(s), income, and the marital status of household head. Female headed households were generally found to be less likely to be food secure, a result that is consistent with other studies using Ghana data (e.g. Dzanku and Sarpong, 2011). Income as a predictor of household food security suggests ability to access food on the market. Mother's education (years) on the other hand correlates with higher socioeconomic status and incomes. Although these findings are consistent with the literature, (see for example Sen, 1981; Dzanku and Sarpong, 2011; Ibekwe et al., 2010) we argue that, food is a basic necessity that should be accessible to every person. As a result, income and education should not be important predictors of household food security, more so in urban settings. However from the policy perspective, this finding is relevant to guiding policy formulation in the food security discussions.

Compared with households who receive food remittances from both urban and rural areas, both those that do not receive food remittances and those that received food remittances from urban areas only are less likely to be food secure. The health status of the household (i.e. whether there is a chronically sick member) and the employment status of working adults, particularly, the household head and spouse also significantly predict household food (in) security.

Conclusion

This paper contributes to the debate on urban agriculture's potential contribution(s) to household food security by examining the association between urban households' agriculture production in urban and/or rural space on the one hand and food security on the other. The paper brings a new dimension to the debate by departing from the focus on urban agriculture only (i.e. agricultural production in urban space only) to include all agricultural production options available to households. Additionally, the study is contextualised within intermediate sized cities, breaking away from the metropolitan biases that has characterised urban agriculture studies in the past.

We conclude from our results that, urban households' participation in both urban and rural agriculture affects their food security situation. Neither agriculture production in urban nor rural space alone has a significant effect on urban household food security. Our robustness check further validates the result that the combined effect of participation in both urban and rural agriculture significantly affects household food security although we do not find a significant city-specific effects. Reclassifying households into agricultural and non-agricultural households, we find participation in agriculture to have no effect on household food security across survey cities. As a result, we argue that urban household food security should not be limited to food production in urban space only but be broadened to include all own production opportunities available to the household including production of food in rural areas.

The findings should be interpreted in context – city location is important in the debate on the effects of agriculture on household food security. Our results confirm, for example, that in Tamale, urban agriculture contributes substantially to household food security. This result is attributable to the cosmopolitan nature of the city of Tamale which creates ready market for freshly produced vegetables creating an incentive for urban farming. Additionally, the harsh climatic conditions makes farming impossible without irrigation and thus push farmers to pursue urban farming in a more modern manner than in Techiman. On the contrary, urban households' proximity to rural areas in Techiman makes farming in neighbouring rural communities more convenient than urban farming, hence the lack of a significant urban agriculture effect on household food security in Techiman. It is thus recommended that policies and discussion aimed at addressing urban poverty through agriculture should be city-specific. In addition, urban and rural agriculture policies should be complementary and not be treated as mutually exclusive because the synergies could be harnessed in specific contexts as an effective poverty alleviating strategy.

Conflict of interest

None

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Appendix

Notation	Description
Participation in agriculture:	
ownproduction_none	Household does not produce any food
ownproduction_urban	Household produces food in urban areas only
ownproduction_rural	Household produces food in rural areas only
ownproduction_urban_rural	Household produces food in both urban and rural areas
female_headed_hh	Female headed household
age_of_hh_head	Age of household head
married_hh_head	Marital status of household head
years_schooling_hh_head	Years of schooling of household head
years_schooling_mother	Years of schooling of mother
other_educated_adult_present	Number of educated adults in the household
age_of_mothers	Age of mother
educated_mother	Mother is educated
hh_size	Household size
members_under15	Number of household members less than 15 years
members_above64	Number of household members above 64 years
working_age_members	Number of household members 15-64 years
dependant_proportion	Dependent proportion of household members
under5_child_present	Number of children less than 5 years in the household
nuclear_hh	Household is nuclear in structure
cash_transfer_dummy	Cash transfer dummy
Food transfers:	
no_food_transfer	Household does not receive food transfer
food_transfer_from_urban	Household receives food transfers from urban areas
food_transfer_from_rural	Household receives food transfers from rural areas
food_transfer_from_both	Household receives food transfers from both urban and rural areas
nonfarm_income_earners	Household receives income from non-farm activities
livestock_index	Household livestock index
own_house	Household own the house in which they live in
household_income_pc	Household income PC
Shocks:	
chronically_sick_head	Household has a chronically sick head
chronically_sick_partner	Household has a chronically sick partner
chronically_sick_hh_member	Household has a chronically sick member
Indepbtendness	Household is indebted
unemployed_head	Household head is unemployed
unemployed_spouse	Spouse is unemployed
unemployed_adult	Number of unemployed adults in the household

Table A1

Variable notation and description

VARIABLES	Combined			Technician			Tamale			
	Coef.	Average Marginal Effect		Coef.	Average Marginal Effect		Coef.	Average Marginal Effect		
		OFS = 1	OFS = 2		OFS = 1	OFS = 2		OFS = 1	OFS = 2	OFS = 1
Participation in agriculture (<i>ref. is ownproduction_urban_rural</i>):										
ownproduction_none	-0.341*	0.047	-0.086	-0.379	0.037	-0.092	-0.209	0.026	0.027	-0.053
ownproduction_urban	-0.315*	0.043	-0.079	-0.362	0.052	-0.087	-0.244	0.031	0.032	-0.062
ownproduction_rural	-0.246	0.032	-0.070	-0.329	0.047	-0.100	-0.217	0.030	0.028	-0.042
female_headed_hh	-0.250**	0.041	-0.060	-0.363**	0.064	-0.100	-0.217	0.030	0.028	-0.058
age_of_hh_head	0.008	-0.001	0.002	0.017**	-0.003	0.005	0.000	0.000	0.000	-0.000
married_hh_head	0.196**	-0.032	0.054	0.129	-0.023	0.036	0.338**	-0.046	-0.044	0.090
age_of_mother	-0.009*	0.001	-0.003	-0.018**	0.003	-0.005	-0.002	0.000	0.000	-0.000
years_schooling_hh_head	-0.011	0.002	0.001	-0.015	0.003	-0.004	-0.008	0.001	0.001	-0.002
years_schooling_mother	0.064***	-0.010	0.018	0.113***	-0.020	0.031	0.029*	-0.004	-0.004	0.008
other_educated_adult_present	-0.012	0.002	0.001	-0.009	0.002	-0.003	0.001	-0.000	-0.000	0.000
hh_size	-0.134*	0.022	0.016	0.127	-0.022	0.035	-0.392***	0.054	0.051	-0.105
members_under15	0.182**	-0.030	0.051	-0.086	0.015	0.008	0.451***	-0.062	-0.059	0.120
members_above64	0.291**	-0.047	0.081	0.100	-0.018	0.027	0.566***	-0.078	-0.073	0.151
working_age_members	0.167**	-0.027	0.046	-0.001	0.000	-0.000	0.372***	-0.051	-0.048	0.099
unders_child_present	-0.072	0.012	0.008	-0.088	0.016	-0.024	-0.005	0.001	0.001	-0.001
nuclear_hh	-0.169**	0.027	0.020	-0.047	0.005	0.002	-0.324***	0.044	0.042	-0.086
cash_transfers_dummy	-0.035	0.006	0.004	-0.079	0.014	0.008	0.024	-0.003	-0.003	0.006
Food transfers (<i>ref. is food_transfer_from_both</i>):										
no_food_transfer	-0.548**	0.089	0.064	-0.308	0.055	-0.085	-0.657**	0.090	0.085	-0.175
food_transfer_from_urban	-0.493**	0.080	0.057	-0.199	0.035	-0.065	-0.758**	0.104	0.098	-0.202
food_transfer_from_rural	-0.504**	0.082	0.059	-0.314	0.056	-0.086	-0.567	0.078	0.073	-0.151
nonfarm_income_earners	0.009	-0.001	0.002	-0.078	0.014	0.008	0.078	-0.011	-0.010	0.021
livestock_index	0.049	-0.008	0.014	-0.057	0.010	0.006	0.135**	-0.019	-0.018	0.036
own_house	0.086	-0.014	0.024	-0.045	0.008	0.004	0.199*	-0.027	-0.028	0.053
household_income_pc_100	0.128***	-0.021	0.036	0.088***	-0.016	-0.009	0.203***	-0.028	-0.026	0.054
chronically_sick_head	-0.031	0.005	0.004	-0.098	0.017	0.010	0.055	-0.007	-0.007	0.014
chronically_sick_partner	-0.145	0.024	0.017	-0.194	0.034	0.019	-0.109	0.015	0.014	-0.029
chronically_sick_hh_member	-0.228**	0.037	0.027	-0.240*	0.043	0.024	-0.211	0.029	0.027	-0.056
indipendness	0.035	-0.006	-0.004	0.094	-0.017	-0.009	-0.058	0.008	0.008	-0.015
unemployed_head	-0.430***	0.070	0.050	-0.663***	0.118	0.065	-0.267	0.037	0.033	-0.071
unemployed_spouse	-0.215*	0.035	0.025	-0.421**	0.075	0.041	0.017	-0.002	-0.002	0.005
unemployed_adult	-0.199**	0.032	0.023	-0.164	0.029	0.016	-0.224*	0.031	0.029	-0.060
Technician	-0.043	0.007	-0.012	-1.216**						
Constant cut1	-1.719***			-0.716						
Constant cut2	-1.159***			1.006						
Observations	2.002			0.074						
Pseudo R-squared	0.063			-646.5						
Log-likelihood value	-1.294									

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A2
Ordered probit estimates of urban household participation in agriculture and food insecurity in Technician and Tamale

	Equation 3a			Equation 4a		
	Combined	Techiman	Tamale	Combined	Techiman	Tamale
Estimates	0.029	-0.050	0.061	0.062	-0.043	0.128
Std. Err.	(0.079)	(0.108)	(0.123)	(0.070)	(0.093)	(0.110)
AME	[0.011]	[-0.018]	[0.021]	[-0.016]	[0.011]	[-0.032]
				[-0.006]	[0.004]	[-0.012]
				[0.000]	[0.000]	[-0.001]
				[0.023]	[-0.015]	[0.045]
	Equation 3b			Equation 4b		
	Combined	Techiman	Tamale	Combined	Techiman	Tamale
Estimates	0.051	0.010	-0.002	0.072	0.042	0.024
Std. Err.	(0.086)	(0.116)	(0.139)	(0.084)	(0.114)	(0.133)
AME	[0.014]	[0.003]	[-0.001]	[-0.012]	[-0.007]	[-0.003]
				[-0.008]	[-0.004]	[-0.003]
				[0.020]	[0.012]	[0.007]

Table A3
Effect of urban household participation in food production on food security

Paper III



Food transfer receipts as multi-spatial livelihoods among urban households in Ghana

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Abstract

This study uses data from two intermediate sized cities in Ghana to analyze the importance and determinants of food transfer receipts among urban households in Ghana. The results show that grains and tubers are the most received food groups, usually from rural and urban relatives. All (100%) rural-urban and intra-urban food transfer receipts are found to be consumed by the receiving households while about a fifth of rural-urban transfers are giving out as gifts to other urban households. More than two-thirds of food receipts are considered as important/very important to the receiving urban household. The results further show that, female headed households and ageing household heads had an increasing likelihood of receiving food transfers. At the city level, household cash remittance expenditure strongly influenced the likelihood of food receipt from rural relatives in Techiman but not Tamale. This the paper attributes to the agglomeration of small villages around Techiman. The paper concludes that multi-spatiality and food transfer receipts are an important part of the urban household food basket that must be accounted for in the urban food security discussions, taking into account city specific contexts.

Key words: Food transfer receipt, multi-spatial livelihood, rural-urban, intra-urban, own food production, Ghana

Introduction

Global population growth and urbanization have implications for food production and household food security, especially among urban residents in Africa. Urbanization in sub-Saharan Africa, though not a new phenomenon, has received considerable interest in recent literature (Andersson Djurfeldt, 2015). While increased population growth and urbanization bring expansion in economic activities and growth, the phenomenon also raises food security concerns for the urban population as rapid urbanization may be connected to widespread urban poverty. In response to these concerns, government policies have promoted urban and peri-urban agriculture production as an efficient pro-poor activity that allows urban farm households to participate in the market economy by reducing cash expenditures on food from the market and also selling freshly produced food (mostly vegetables) to urban dwellers (Ayerakwa, 2017; Armar-Klemesu, 2000; Cofie & Drechsel, 2007; Zezza & Tasciotti, 2010; Mougeot, 2011; Chagomoka, et al., 2015; Chagomoka, et al., 2016). This assertion has however received a number of criticisms across the literature, in the sense that, the potential impacts of urban agriculture on household food security is over estimated (Zezza & Tasciotti, 2010; Crush, et al., 2011; Frayne, et al., 2014). More so, the lack of comparable data across countries to measure the potential impacts seems to support this claim. Recent evidence however suggests that, urban agriculture alone is not enough to explain food security levels of urban households. Rather, the broader contextualization of all production opportunities available to households is necessary (Ayerakwa, 2017). Other empirical literature suggests urban households in sub-Saharan Africa rely on food transfers from rural areas (Potts & Mutambirwa, 1998; Tacoli, 1998; Kamete, 1998; Rakodi, 1998; Smit, 1998; Potts, 2000) and own food production in rural areas (Andersson, 2002; Foeken & Owuor, 2008; Foeken & S., 2008) as a livelihood source and contributes significantly to urban household food security (Frayne, 2004; Owuor, 2006; Frayne, 2010).

Even though available literature suggests an active interaction between rural and urban spaces in the form of production of food in rural areas and the movement of people, goods and services as parts of livelihood strategies that cover both spheres (Tacoli, 1998; Frayne, 2005; Baker, 2005; Foeken & Owuor, 2008; Fraser *et al.*, 2008) this is not reflected in policy. Indeed, government and policy makers in developing countries and in particular sub-Saharan Africa over the years have classified urban and rural areas as mutually exclusive in the development agenda with little consideration on the linkages that exist between the two. Whereas many urban enterprises rely on raw materials from rural areas to feed their industries, households in rural areas also rely on cash incomes from the sale of their goods and services in urban centres to meet their livelihood needs (Tacoli, 1998; Mkwambisi, 2011; 2008). In most developing countries, rural and urban are described based on the population sizes. Agriculture is perceived to be the primary occupation of rural dwellers while urban dwellers engage in manufacturing and service related jobs. In reality however, the increasing interrelations that exist between urban and rural space makes the discussion more complex.

An urban centre according to the Ghana Statistical Services is any settlement with a population of 5,000 or more persons. This definition in essence classifies a number of villages as towns not because of parallel development in the provision of infrastructure or economic growth but simply on the basis of population growth. Increasing urbanization brings about shifts in land ownership in favour of infrastructure and residential development. This leads to loss of agricultural productive landscapes in urban centres and increased participation in informal activities, especially in the petty trading sub-sector (Potts & Mutambirwa, 1997; Potts, 2010; Hansen and Vaa, 2004). In other words, urban residents construct an increasingly diverse portfolio to maintain or improve their livelihoods (Ellis, 2000). For most urban residents, maintaining strong links with rural ties provides access to rural land for own food production and food transfers in addition to other livelihood sources available to the household. Increasingly, households in both urban and rural areas continue to find their livelihoods in multi-spatial settings as a livelihood diversification strategy. In instances where these activities are spatially separated, there remains a varied exchange of resources (Tacoli, 1998). 'Urban centres may provide markets as well as social and producer services for the rural population whereas, for many urban

individuals, access to rural land or produce through family or reciprocal relationships can be crucial' (Tacoli, 1998:149).

While some literature on food transfers and own food provisioning exists, the concept of food transfers, urban agriculture and rural agriculture have been treated in isolation. This study however considers the interplay that exists among these concepts and how they relate to urban households food provisioning and security. In this article, multi-spatial livelihoods are analysed through the lenses of food transfers across space and own production of food. The paper in this sense considers three types of multi-locality based on food transfers: own production of food in rural areas, rural-urban¹ food transfers and intra-urban² food transfers (food transfers among urban households within the same city). Using data from two intermediate sized urban areas in Ghana, the article aims to analyse the determinants of food transfers (both rural and urban) among receiving households and how transfers are connected to own production of food whether in rural or urban areas. A sub question of interest is to investigate whether poor and female headed households are more likely to receive food transfers than their male counterparts.

The rest of the article is structured as follows: the next section discusses the conceptual considerations underpinning multi-spatial livelihood. Section three discusses the survey methodology which highlights the source and type of data used as well the empirical model employed in the article. The results and discussions are presented in section four while the conclusions and policy recommendations are presented in section five.

Conceptual considerations

The analysis is grounded in concepts related to multi-spatial livelihood, own food production in rural and urban areas, and food transfers to urban areas which is viewed as a response to urban households food security arrangements. Insights from the sustainable livelihoods concepts based on the notion that poor households apply a portfolio of capabilities, assets and activities for a means of living are applied (Carney, 1998). The concept, though mostly applied to rural setting (Scoones, 1998), has applicability in transition urban areas (Rakodi, 2002; 1998, Ellis, 1998). The assets available to households from which livelihood decisions are made are classified into tangible (land, labour, human capital, housing, store of food) and intangible (household relations and social capital) (Rakodi, 2002, 1995; Moser, 1998). In the sections that follow, the detail conceptual descriptions are presented.

Multi-spatial livelihoods

An aspect of urban-rural multi-spatial linkages is exhibited through food remittances. Yet, as observed by Andersson (2002), the literature on urban food security exhibits a surprising neglect of foodstuffs remitted from rural to urban areas. This is in spite of the increasing awareness that urban and rural areas are generally closely linked through remittances, which serves as a risk minimizing strategy for both urban and rural households (Sarpong & Asuming-Brempong, 2004; Frayne, 2010; Andersson Djurfeldt, 2012). Multi-spatial livelihoods refer to a situation in which households have a livelihood footing in both urban and rural areas, either as a source of food or income (Foeken & Owuor, 2001). The reason for this may vary but one central theme in multi-spatial livelihoods has to do with minimizing risks associated with the household's livelihood sources. Multi-spatial livelihoods do not necessarily mean a split in the household but a demonstration of commitment to allocating resources to urban-based or rural-based households which are grounded in reciprocal support systems across space (Tacoli, 1998, Foeken & Owuor, 2008).

¹ Food transfer receipt from rural households to urban households

² Food transfer receipt from other urban households within the same city

Available literature regarding the flow of cash remittances from urban to rural households and the crucial role these transfers play in the livelihood security of rural households have been well documented (Frayne, 2010; 2004). Nonetheless, recent evidence suggests, increasingly, there is flow of resources, mostly in the form of food from rural to urban networks. This partly explains why most people maintain strong ties with their kinship networks both in urban and rural areas, in order to lay claim on resources that will guarantee access to food. As a result of this, many urban households maintain a close relationship with their families in rural areas with some keeping part of their assets in rural areas (Foeken & Owuor, 2008). Multi-spatial livelihood partly explains the cultural phenomenon where Africans in general maintain close ties with friends and family in rural areas through remittances, investments in housing and social services such as funerals. These activities continue to bond, strengthen and lubricate the social relationships that exist between households in rural and urban areas. Incoming cash remittances to rural areas can therefore be reciprocated by the transfer of food from rural dwellers to friends and families in urban areas.

The literature on rural-urban linkages shows a general decline in the frequencies and importance of remittances from urban areas to rural areas while the reverse is true for food transfers from rural to urban areas in Namibia (Frayne, 2004). Frayne (2004) also established from Namibia that, urban households with limited social connections to rural areas were the most vulnerable to hunger. Increasingly, a number of households in urban areas depend on food transfers from friends and relatives in rural areas to mitigate their food insecurity needs (Frayne, 2010; 2004). Multi-spatial livelihood is therefore tied to growing insecurity in both urban and rural areas (Andersson Djurfeldt, 2015) making the once existing division between urban and rural areas increasingly irrelevant (De Haan & Zoomers, 2005; Lerner & Eakin, 2011). As important as this may be, much attention has not been given to this social linkage in the literature (Moorsom, 1995; Potts & Mutambirwa, 1998). This notwithstanding however, it is not every household that can make claim on rural lands to produce food. Rather, it is the privilege of those who can lay claim to social networks through friendship and family ties (Tacoli, 1998; Rakodi, 1998). Households who have this social asset stand the chance of improving their food security situation compared to those with no such opportunities.

Urban residents' food production in rural areas

Rising costs of living as a result of increased urbanization and rising food prices pushes urban households to consider own food production to supplement their purchases and also raise income from surplus sales. Part of the strategy to doing this is tied to finding rural plots that are used for own food production by urban households. This is so because rural assets are associated with monetary returns and social value that can be relied upon as forms of social insurance by urban households in difficult times such as commodity price hikes. Rural farming which is part of a multi-spatial livelihood activity among urban residents is correlated to increasing economic pressure associated with livelihoods in both urban and rural areas (Andersson Djurfeldt, 2015; Lerner and Eakin, 2011; de Haan, 2005). One strategy among urban residents is to obtain rural plots for rearing animals or cultivating crops that are transported to the city for consumption or sale. These strategies can have implications for urban food systems as well as rural food production (Mkwambisi, 2011). The motivation for these arrangements sometimes is grounded on cheap rural labour (Makoka, 2005; Bryceson, 2006). In Botswana, Kruger (1998) reports that about a third of low income households in Gaborone city own cattle while half retain land in their home villages that serves as a buffer during difficult periods. In the Kenyan city of Nakuru, 95% of urban residents have access to rural land and 80% and 50% used those lands for crop cultivation and animal rearing respectively (Foeken & Owuor, 2008). Foeken and Owuor further conclude that, rural food production by urban residents was found to be more important as a livelihood source than urban farming in Nakuru, Kenya. Recent literature from Ghana suggests that during the main farming season, some urban residents in the city of Tamale migrate to rural areas (but leave their families behind in the cities) to cultivate crops and return after the main farming season (Chagomoka *et al.*, 2016; 2015).

The strong interaction between urban and rural space has affected population mobility-such that permanent migration has been replaced with seasonal migration (Potts, 2010) or counter migration (Potts, 2005, 2009). Although urbanization may bring better prospects for urban residents, compared with their rural counterparts, these prospects are not realizable for all urban residents. With most urban households having a rural or farming background, increases in food expenditure compels urban households to consider production of food as part of a livelihood diversification strategy.

Own food production in urban areas

Food production in urban areas, also referred to as urban agriculture (UA) has received considerable attention in the literature in recent decades. Households engage in own food production in urban areas for several reasons including consumption and income from surplus sales. The nutritional, health and economic benefits attributed to urban agriculture (see for example Ayerakwa, 2017; Chagomoka *et al.*, 2016; 2015; Badami and Ramankutty, 2015; Cofie & Drechsel, 2007; Maxwell *et al.*, 2000; 1998; Mougeot, 2011; 2005; Armah-Klemesu, 2000) has led to the promotion of the practice as a beneficial enterprise that can be harnessed to help the poor, especially the urban poor (Smit, *et al.*, 1996; Cofie & Drechsel, 2007; Lee-Smith, 2010; Mougeot, 2011; FAO, 2012; Lee-Smith, 2013). Recent literature suggests the scale of urban agriculture exceeds what has been understood previously. It is estimated that the share of all irrigated and rainfed croplands can be found in urban areas (11% and 4.7% respectively). Higher proportions are observed (60% and 35% respectively) when the urban boarder is extended by a 20km radius (Thebo, *et al.*, 2014). Notwithstanding these benefits, opponents of urban agriculture have questioned the potential of urban agriculture to contribute to the food requirements of the urban poor who do not own land which has been identified as a critical factor in own food production in urban areas. (Zezza & Tasciotti, 2010; Crush, *et al.*, 2011; Lee-Smith, 2013; Stewart, *et al.*, 2013; Frayne, *et al.*, 2014). Tacoli (1998) concludes that the possibility of engaging in urban agriculture was central to the decision of migrants to move to small towns. Increasingly, there is awareness that rural-urban spaces are intertwined and that the involvement in linkages between them serves as a risk minimizing strategy among households-urban or rural (Andersson Djurfeldt, 2012; Frayne, 2010).

Food transfers to urban areas

As indicated earlier, rural links and engagement in agriculture in rural areas by urban residents are vital safety nets employed by urban households in response to increasing food prices and population pressures. Although much is known about urban residents' remitting incomes to rural households, little is known about the reverse. However, there is some evidence to the effect that, food transfers from rural to urban residents is gaining prominence while cash remittance from urban residents to rural kinsmen are on the decline (Owuor 2006; Foeken and Owuor, 2001). Assessment of the importance of transfers and gifts as 'risk sharing strategy' has also received considerable interest, especially in economic literature (Andersson Djurfeldt, 2015; Rosenzweig & Stark, 1989; Fafchamps & Lund, 2003).

Central to the discussion of food transfers is the question of which types of households are the recipients of food from rural and urban areas? Moreover, the source of food transfers, either from rural or urban areas influences the frequency of transfers. Frayne (2010) conclude from a survey of 11 Southern African countries that, there is greater frequency when the food transfer comes from the urban area to other urban households than when it came from the rural area to urban households. However, the share of food transfers from rural to urban households was greater than those received from other urban households. Diversification in the form of multi-spatial livelihoods may be connected to improved household food security, especially in times of shocks and also provide a hedge against escalating food prices in the urban food economy. Increasingly, rural-to-urban food transfers have become important in understanding urban food security (Frayne, 2004).

Urban household own food provisioning arrangements in urban areas through urban and peri-urban agriculture or rural agriculture or reliance on food transfer from rural to urban or urban to urban will

continue to occupy the attention of researchers as an important urban livelihood phenomenon requiring further investigations (Andersson Djurfeldt, 2015, Andersson, 2002; Foeken and Owuor, 2008; Frayne, 2004; 2005; 2010).

The implications of multi-local food transfers provide the basis of exploring how food transfers relate to own production across space. While several studies look at food transfers, urban agriculture and rural agriculture in isolation, this study is unique in that it tries to grasp the interaction between the different components of food transfers and the interplay that exists with own food provisioning among urban households.

Methodology

Sample

The data used in this article is part of a larger survey conducted in October 2013 in Ghana as part of a collaborative and multidisciplinary research project being carried out in Ghana, Kenya and Uganda. In selecting cities for the Ghana case study, Techiman municipality and the Tamale metropolitan assemblies were purposively selected. The two cities fall within different agro ecological zones in Ghana. Techiman is located in the transition belt in the Brong Ahafo region of Ghana while Tamale falls within the northern savanna belt in the northern region of Ghana. Recent Population and Housing Census estimates the total population of urban Techiman to be about 67,241 while the population of urban Tamale is estimated at about 223,252 (GSS, 2014b, 2014a). Although Techiman is classified as a city based on census data, about a third of households in the municipality are rural and constitute about 51% of all households that participate in agriculture in the municipality. Tamale on the other hand has less than a fifth of total households belonging to rural households (17.2%). The proportion of urban agricultural households however is about 57% (GSS, 2014). In addition, Tamale is the regional capital of the northern region of Ghana, which makes it home for several government agencies and private businesses and therefore provide a huge market base for freshly produced vegetables cultivated in urban areas. A common phenomenon is the active trading sub sector in both cities although this is more pronounced and of larger scale in Tamale. By contrast, Techiman has closer proximity to rural areas which makes it convenient for urban agriculturalists to farm in rural areas or transport food from rural to urban space for consumption or sales or both.

The sampling criteria for the study involved the identification of the urban boundary, ensuring that the focus of the study (urban households only) were strictly adhered to. With the help of the District Planning Officers in each city, the urban boundary was classified into four quadrants, ensuring that there was proportional spread of households in each quadrant and the city as a whole. An average of 250 households were drawn from each quadrant adding up to 1,000 urban households in each city and 2,000 households for both Techiman and Tamale. However after data collection, the final sample is distributed as follows: Techiman-1019, Tamale-1001. The total number of households who reported receiving food transfers were about 722.

To address the research questions of determinants of multi-spatial livelihood requires household level characteristics such as household type (whether the household participates in agriculture), income and household population distribution (proportions of working adult household members, dependency proportion, etc.) and individual level characteristics such as gender, age, education etc. of household heads. Although the data allows for analysis of foods transferred, the quantities of food transferred were not captured in the dataset. This is considered to be the main limitation of the study.

Empirical Model

To determine the causal determinants of food transfers (intra-urban and rural-urban), households are classified into two groups—households that received food transfers and those that did not, and estimate a binary probit equation as follows, assuming a standard normal distribution of the error term.

$$\Pr(FT_i = 1 | X) = \Phi(X^T \beta)$$

Where Pr denotes probability, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. FT_i is the observable binary food transfer response variable which takes on the value 1 for a household that receives food transfer (i.e. $FT_i = 1$), 0 otherwise; the vector X contains all other explanatory variables (mainly individual and household characteristics). In the first level of the estimation, households are classified as agricultural households or otherwise (i.e. *ownproduction*, the main explanatory variable of interest takes on the value of 1 if the household is engaged in agricultural production, and 0, otherwise). In the second level of analysis, *ownproduction* becomes a categorical variable which defines the four types of food producing urban households (*ownproduction* = 1 if household does not produce any food, *ownproduction* = 2 if the household produces food in both urban and rural space, *ownproduction* = 3 if household produces food in rural area only, and *ownproduction* = 4 if household produces food in urban space only). This is estimated for the combined sample and also for the city specific sample for both rural-urban food recipients and intra-urban food recipients.

The hypothesis is that, on average, urban households who produce food have a less likelihood of receiving food transfers (intra-urban or rural-urban food transfer). A priori, we expect urban households who participate in agriculture to relatively be more food secure and less likely to receive intra-urban and rural urban food transfers than those who rely solely on the market, *ceteris paribus*. In addition, it is expected that female headed households and households with lower monthly cash income per capita will have an increasing likelihood of receiving food transfers, all things being equal.

Results and Discussions

Types and sources of food transfer received

Before returning to the research questions of determinants of food transfer, let us consider some contextual differences relating to food transfer receipts. To begin with, the following questions set the stage for the discussions— what are the types of food that are sent to urban households and from where do they come from? To what use are these foods put to and how relevant are they in the food security needs of the household?

To answer the first question, Table 1 presents the different types of food received by urban households. Broadly speaking, even though different foods are received, tubers remain the most food group received by urban households accounting for more than three quarters (77.6%) of all food transfers received. This is followed by grains accounting for about two-thirds (65.7%) of all food transfer receipts.

Nonetheless, there exist some contextual differences across cities and the type of transfer. Although the number one food group received in both cities remain tubers (88.0% and 66.0% respectively for Techiman and Tamale), lower proportions are observed among households receiving grains in Techiman (55.8%) compared to those in Tamale (76.5%). In contrast, the proportion of households receiving fruits in Techiman is higher (8.3%) than what is found in Tamale (1.7%). Even though fruits are generally grown in both cities, the harsh climatic conditions in Tamale and its surroundings makes the production of fruit uncondusive relative to Techiman where different types of fruits could be

cultivated. As a result, the share of fruits in the food transfers receipt in Techiman is expected to be higher than what is reported in Tamale.

Type of variable	Techima n <i>n=371</i>	Tamale e <i>n=351</i>	Rural- urban <i>n=383</i>	Intra- urban <i>n=339</i>	Total sample <i>n=722</i>
grains	55.8	76.5	68.1	63.3	65.7
tubers	88.0	66.0	76.4	78.7	77.6
vegetables	19.9	11.2	19.6	12.2	15.8
fruits	8.3	1.7	7.3	3.1	5.2
other foodstuffs (including meat and egg)	17.8	8.2	15.3	11.3	13.2
rural relatives	42.0	45.6	85.0	0.0	43.7
urban relatives	40.5	31.0	0.0	74.1	36.0
rural friends	6.1	9.5	15.1	0.0	7.7
urban friends	11.4	14.0	0.0	25.9	12.6

Table 1
Types of food received and their sources

Moreover, comparing differences by the types of food transfer received (either rural-urban or intra-urban) follow observed patterns in the dataset. That is, more than two-thirds (76.4% and 78.7%) of rural-urban and intra-urban food transfer receipts respectively come in the form of tubers (mainly yam), followed by grains. An important point noteworthy however is the proportion of households receiving vegetables which is highest among rural-urban food recipients. The general pattern in the types of food transfers received suggests that commodities with longer shelf lives constitute what are commonly received as food receipts, either from rural or urban areas across cities.

The sources of transfers to urban households broadly are categorised into four-rural relatives, urban relatives, rural friends, and urban friends. The data suggests that transfers are generally sourced from relatives (whether rural or urban) which jointly account for more than three-quarters (79.7%) of all transfer receipts in the sample. Similar patterns are observed across cities with sources from relatives accounting for about 82.5% and 76.6% for Techiman and Tamale respectively. More so, rural-urban transfers mainly come from rural relatives (85%) with only about 15% coming from rural friends. Although the pattern is similar for intra-urban transfers, a little over a quarter (25.9%) of urban transfer receipts come from friends.

Food transfers, consumption and food security

As noted in the theoretical literature, food transfers provide important safety nets that complement food needs of receiving urban households. All things being equal, households with kinship ties in rural or urban areas who receive food transfers would relatively be food secure than their counterparts without such opportunities. As observed in Table 2, food transfers received either from rural or urban areas are consumed by the household (99.7%). In addition, over a fifth (21.9%) of food receipts are given out as gifts to other urban households but this is somewhat influenced by rural-urban food transfer. With just about 4% of households selling food received from rural areas, the notion that rural-urban food transfer receipts is motivated by commercial purposes is refuted.

With all households consuming foods received from urban and rural sources, the paper attempts to understand the relative importance receiving households attach to such food receipts. With less than 2% of households suggesting food receipts are not important to them, the share of households indicating the relevance of food transfers receipts is most striking. As suggested in Table 2, about 98% of recipients consider food transfers as critical to the household's survival (5.2%); very important (38.7%); important (28.7%); or somewhat important (25.8%). Scaling down to the different cities suggest that all households in Tamale consider food transfer receipts as an important source of food to the household compared to about 97% in Techiman. The proportion of households who consider food transfer as critical to their survival in Tamale is found to be relatively higher (5.8%) compared to Techiman (4.6%). Similar importance is associated with rural-urban and intra-urban food transfers.

Type of variable	Techiman <i>n</i> =371	Tamale <i>n</i> =351	Rural-urban <i>n</i> =383	Intra-urban <i>n</i> =339	Total sample <i>n</i> =722
eat	99.8	99.7	100.0	100.0	99.7
sell	2.7	2.2	3.4	1.3	4.1
given away	19.7	18.7	20.8	17.3	21.9
feed to livestock	4.2	1.8	6.8	4.7	3.8
not important	3.1	0	0.9	2.3	1.6
somewhat important	26.7	24.8	29.8	21.6	25.8
important	26.4	31.3	30.4	26.9	28.7
very important	39.3	38.1	35.7	41.9	38.7
critical to HH survival	4.6	5.8	3.1	7.3	5.2

Table 2
Uses of food transfers and their importance to urban households

Agricultural production, gender and food transfer receipts

In this section and the sections that follow, the parameter estimates from the probit model are presented in Table 3. The variables of interest include household participation in agriculture, cash income per capita, and gender of household head as well as city dummy. The null hypothesis that participation in agriculture, either in urban or rural areas increases the food security situation of the households in question and thus have a decreasing probability of receiving intra-urban or rural-urban food transfer is tested, using households who do not engage in food production as the reference category.

Ceteris paribus, we fail to reject the null hypothesis at the 5% significance level for intra-urban food transfer. Generally, we find no statistical difference between households who do not produce food and those who produce food in relation to total food transfers receipts in the sample. Although participation in agriculture on rural-urban food transfer carries a positive sign, no statistical difference is found relative to those who do not produce their own food. In effect, urban households engaged in agriculture demonstrate a decreasing likelihood of receiving food transfers from other urban residents

Another hypothesis of interest is the probability that, female headed households are more likely to receive intra-urban and rural-urban food transfer. Relative to male headed households, we fail to reject the null hypothesis that female headed households have higher likelihood of food transfer receipt for both total food transfers and intra-urban food transfer at the 1% level of significance. Several reasons may account for this result. Generally in Ghana, the cultural phenomenon is to have males as the head of households. It is however common to find females whose spouses are deceased acting as the heads of their respective households. In such instances, the deceased husband's family have the obligation (unwritten social contract) of supporting the widow (now the female head) to have a decent livelihood,

and this can come in the form of food transfer. This is the case because, the children from the marriage are considered the assets of the husband's family.

VARIABLES	Intra-urban food transfer		Rural-urban food transfer		Total food transfer	
	Coef	AME	Coef	AME	Coef	AME
hh_produce_food	-0.183**	-0.041	0.034	0.009	-0.100	-0.036
age_of_hh_head	-0.031**	-0.007	-0.039**	0.010	-0.042***	-0.015
agesq_of_hh_head	0.038**	0.008	0.038**	0.010	0.045***	0.016
female_headed_hh	0.368***	0.091	0.090	0.024	0.272***	0.100
higher_educ_hh head	0.001	0.000	0.074	0.020	0.066	0.023
higher_educ_spouse	0.121	0.028	0.071	0.019	0.066	0.024
working_age_female	0.002	0.000	0.067**	0.018	0.036	0.013
working_age_male	-0.106**	-0.024	-0.000	-0.000	-0.071**	-0.025
members_under15	0.006	0.001	0.003	0.001	-0.007	-0.003
members_above64	-0.035	-0.008	-0.163	-0.043	-0.061	-0.022
food_secure_hh	0.064	0.014	0.120*	0.032	0.103*	0.037
log_income_pc	0.035	0.008	-0.056	-0.015	-0.007	-0.003
hh_remittance_expd	0.091	0.020	0.201***	0.052	0.203***	0.072
Techiman(ref=Tamale)	0.078	0.018	-0.140**	-0.037	-0.013	-0.005
Intercepts	-0.678*		0.011		0.351	
Observations	2,004	2,004	2,004	2,004	2,004	2,004
Pseudo R-squared	0.0414		0.0140		0.0244	
chi2	67.85		27.75		61.35	
Log-likelihood value	-814.4		-939.3		-1248	

Note: AME denotes Average Marginal Effect

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3

Probit estimates of the determinants of food transfer receipt

All things being equal, the presence of working age female adults increases the chances of a household receiving rural-urban food transfers while the presence of male working age adults decreases the likelihood of the household receiving intra-urban food transfers. This result suggest that, the presence of working age males in an urban household reduces the vulnerability level of the household while the reverse is true for the presence of female working adult members of the household. Generally, farming is a labour intensive activity in Ghana and mostly done by men while women provide care for children and the family. As alluded to from the empirical literature, as part of the multi-locality, some families prefer to keep their wives in the city together with the children while the men spent time in the villages cultivating rural land. Such households turn to depend largely on food transfer receipts as a livelihood source from their partners. On the contrary, male presence in the urban household setting provides some guarantees as men are perceived to be hardworking with the ability to providing the needs of their households.

The results of the parameter estimates on whether households remittance expenditure is a determinant of food transfer receipt suggests that households who remit cash incomes to rural areas (either to friends or relatives) have an increasing likelihood of receiving food transfer from rural areas. Generally, reciprocal exchange is part of the Ghanaian culture where rural dwellers seek to give food to anyone who voluntarily gives money to them. Since food crops are what they generally have, they find great satisfaction in giving part of their farm produce to urban dwellers whenever they got the opportunity. In fact, in some instances, a rejection of a gift from a rural kinsman is considered a rejection of the person and not the gift in question.

Cash income and food transfer receipt

In this section, we also test the hypothesis that, households with lower monthly cash income per capita have higher likelihood of receiving intra-urban and rural-urban food transfers. Based on the parameter estimates which shows no statistical effect, the null hypothesis is rejected and conclude that, contrary to the assumption that poor urban households are the recipients of intra-urban and rural-urban food transfers, income is found to not be a determinant of food transfer receipt. In other words, the poor are not necessarily the recipients of food transfers.

Other determinants of food transfer receipt in the model include age and age square of household heads which are found to be statistically significant at least at the 5% level of significance. The implication of this result is that, a unit increase in age decreases the probability of food transfers receipt. However, as household heads grow older, they become less economically active and more susceptible to receiving both intra-urban and rural-urban food transfer. This to a large extent reveals the weak social pensions system in Ghana where the elderly largely depend on the goodwill of family, friends and well-wishers for a livelihood.

Determinants of multi-locality and food transfer receipts in Techiman and Tamale

To analyse multi-spatial livelihoods specifically across cities, we turn our focus to those households who sourced their livelihoods in both rural and urban areas and, estimate the determinants of intra-urban and rural-urban food transfer using the same covariates in the model for both Techiman and Tamale. To start with, we disaggregate households into four groups namely no agricultural households, both urban and rural agricultural households, rural agricultural households and urban agricultural households (Table 4). At the city level, we test for the hypothesis that has been employed in the main model and conclude as follows:

The hypothesis that participation in both urban and rural agriculture decreases the likelihood of receiving intra-urban food transfer is rejected for Techiman but we fail to reject same for Tamale. On the contrary, participation in rural agriculture is found to decrease the likelihood of intra-urban food transfers receipt in Techiman but not Tamale. Similar to earlier findings, female headed households in both cities (Techiman and Tamale) have an increasing probability of receiving intra-urban food transfers, significant at the 1% level. The finding suggests vulnerability on the part of female headed households, especially in Tamale where females do not own land even though a sizeable proportion of women help their husbands on their farms. In the event of death of a male spouse, the farmland reverts to the clan of the deceased husband, making the woman vulnerable and dependent on family and friends for food as a means of livelihood.

The determinants of rural-urban food transfer receipt in Techiman are found to include the age of household head and cash remittance expenditure of the household. As people advance in age, their chances of depending on food transfer receipt increases. It is instructive to note however that, cash remittance expenditure is a strong determinant of rural-urban food transfer receipt but not for intra-urban food transfers suggesting that, some degree of reciprocity. In Tamale on the other hand, the determinants of rural-urban food transfer receipt are found to be participation in rural agriculture by urban residents and the sex of household head (female headed households), all other things being equal. As indicated earlier, there seems to be some correlation between rural-urban food transfer and cash remittance to rural households from relatives and friends in urban areas. In essence, rural-urban food transfer may be some form of reciprocal relationship that benefits both urban and rural households involved in this relationship. In addition, rural-urban food transfer seems to thrive on participation in rural agriculture. Households that participate in rural agriculture have the chance of receiving gifts from family and friends, especially during the harvest season when there is surplus produce available.

VARIABLES	Intra-urban food transfer			Rural-urban food transfer			Total food transfer				
	Tamele			Techiman			Tamele				
	Coef	AME	AME	Coef	AME	AME	Coef	AME	AME		
hh_produce_food_urban&rural	-0.212	-0.050	-0.655**	-0.102	0.319	0.092	0.268	0.075	-0.066	-0.031	-0.011
hh_produce_food_rural only	-0.347**	-0.077	-0.099	-0.021	0.115	0.031	0.242*	0.067	-0.189	-0.067	0.078
hh_produce_food_urban only	-0.177	-0.042	-0.186	-0.038	-0.197	-0.046	0.049	0.013	-0.211**	-0.074	-0.110
age_of_hh_head	-0.019	-0.005	-0.053**	-0.011	-0.046**	-0.011	-0.028	-0.007	-0.038**	-0.014	-0.048**
agesq_of_hh_head	0.029	0.007	0.056**	0.011	0.059*	0.010	0.034	0.009	0.041**	0.015	0.053**
female_headed_hh	0.368***	0.093	0.405***	0.095	0.012	0.003	0.294**	0.085	0.278***	0.100	0.350***
higher_educ_hh_head	0.140	0.034	-0.178	-0.035	0.168	0.043	0.038	0.010	0.233**	0.084	-0.079
higher_educ_spouse	0.321**	0.085	-0.088	-0.017	0.072	0.018	0.134	0.037	0.235**	0.085	-0.027
working_age_female	0.005	0.001	-0.009	-0.002	0.073	0.018	0.056	0.015	0.023	0.008	0.037
working_age_male	-0.097	-0.023	-0.108*	-0.022	-0.045	-0.011	0.016	0.004	-0.096*	-0.034	-0.064
members_under15	-0.049	-0.012	0.064*	0.013	-0.004	-0.001	0.005	0.001	-0.036	-0.013	0.021
members_above64	0.043	0.010	-0.127	-0.026	-0.139	-0.034	-0.208	-0.056	0.005	0.002	-0.141
food_secure_hh	0.139	0.033	0.011	0.002	0.163*	0.040	0.127	0.034	0.188**	0.066	0.044
log_income_pc	0.067	0.016	-0.004	-0.001	-0.061	-0.015	-0.053	-0.014	-0.007	-0.002	-0.006
hh_remittance_expd	0.115	0.027	0.043	0.009	0.328***	0.081	0.083	0.022	0.283***	0.100	0.120
Intercepts	-1.082**	0.153		0.167			-0.471	0.254		0.472	
Observations	1,008	1,008	996	1,008	1,008	1,008	996	996	1,008	1,008	996
Pseudo R-squared	0.058		0.0552		0.0392		0.0180		0.0467		0.0223
chi2	51.52		38.05		34.57		18.42		57.78		27.05
Log-likelihood value	-430.8		-368.1		-448.5		-476.7		-622.3		-611.4

Note: AME denotes Average Marginal Effect
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4
Probit estimates of multi-spatial livelihood and the probability to receive food transfers across cities

Conclusions

Urban food security will continue to attract attention from both researchers and policy makers, especially in sub-Saharan Africa where urbanization is on the rise above global averages. Critical to meeting the urban household food requirements include the reliance on food transfers from family and friends domiciled in either urban or rural areas or both. To this end, urban households keep very close ties with family and friends in order to keep the social support system operational. Other families resort to participation in agriculture in rural areas as a means of supplementing the household food requirements.

Although food transfers and other foods received from participating in rural agriculture play an important role in household diets, the aggregate effect are not noticeable as these activities take place outside the market channels. This article therefore had as its primary objective to identify the determinants of food transfer receipt from urban and rural areas in Ghana. Contrary to the widely held view that relatively poor households are the recipients of food transfer, the results suggest income is not a determining factor in either intra-urban or rural-urban food transfers. Additionally, the paper concludes from the results that participation in agriculture decreases the likelihood of receiving intra-urban food transfers but not rural-urban food transfers. The article further establishes that, female headed households have a positive and higher likelihood of receiving food transfers relative to their male counterparts. The weak land tenure and ownership structure in Ghana places so much power in the hands of male spouses which is a demonstration of inequality in the allocation of wealth at the local level. Access to essential resources such as land for agricultural production by women would greatly improve on the welfare and bridge the inequality levels associated with female access to productive resources. This in way will reduce the female vulnerability levels while improving on household food security outlooks.

At the city level, participation in urban agriculture, age of household head, female headed household (sex), attainment of higher education by household head and spouse as well as household remittance expenditure were all found as determinants of food transfers in Techiman. In Tamale on the other hand, food transfer is determined by age of household head and gender. Similar to the vulnerability argument concerning female headed households, there is over concentration of pension schemes to the formal sector of the economy. However, with nearly 70-80% of the Ghanaian economy being informal, most people do not have any form of pension to depend on as they age. As a result, ageing correlates with increased dependence, including relying on food transfers from friends and relatives to augment food needs of household members. It is however noteworthy that, reciprocal multi-spatial livelihoods are an important part of everyday life in urban areas in Ghana particularly in smaller and intermediate sized urban centres where it may be easier to uphold relationships with rural areas as well as engage in rural agriculture.

With all households consuming food received through intra-urban and rural-urban food transfers, the article concludes that, food transfers plays an important role in the food security needs of urban households and should therefore be accounted for in the food security discussions of urban residents. The concept of multi-locality/spatiality should be given the requisite space and attention in the quest to understanding the food security needs of urban households. With Techiman and Tamale increasingly expanding, the potential benefits associated with multi-locality as a livelihood source could be harnessed to improve on the food requirements of urban residents.

Conflict of interest

None

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Appendix

Notation	Description
Participation in agriculture:	
ownproduction_none	Household does not produce any food
ownproduction_urban	Household produces food in urban areas only
ownproduction_rural	Household produces food in rural areas only
ownproduction_urban_rural	Household produces food in both urban and rural areas
female_headed_hh	Female headed household
age_of_hh_head	Age of household head
agesq_of_hh_head	Square age of household head
higher_educ_hh_head	Head has higher education
highr_educ_spouse	Spouse has higher education
members_under15	Number of household members less than 15 years
members_above64	Number of household members above 64 years
working_age_female	Number of working age females in the household
working_age_male	Number of working age males in the household
food_secure_hh	Food secure household
log_income_pc	Log of household income PC
hh_remittance_expd	Household remittance expenditure

Table A1

Variable notation and description

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