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As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana - Evidence from the Tamale Metropolis

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Abstract The world continues to battle food insecurity due to persisting constraints with food production, distribution, storage, processing, consumption and waste management. The recent global food crisis redirected investment in new paradigms of food research to find innovative strategies of food production including urban and peri-urban agriculture. In the urbanised regions of Ghana, uncontrolled urbanisation and non-compliance with land use plans have further worsened the potentials for food production in the urban corridors. The effectiveness of urban food systems depends on efficient spatial and infrastructure planning mechanisms for spatial allocation to various land uses including green and agricultural zones. Using qualitative data and narratives, this paper studied urban farmers' production systems in the Tamale Metropolis in Ghana. The study observed that as urbanisation increases, farmers are being pushed unto less favourable locations, farther villages or restricted to unauthorised public spaces in order to continue production. The absence of urban green belts reduces farming to flood plains and along public drains where wastewater is used for irrigation. The existing customary land ownership system makes it extremely difficult for urban planning institutions to preserve green spaces due to pressure from landowners for re-zoning into urban land infrastructure. To protect urban and peri-urban agricultural lands, there is the need for an urban agricultural policy and the mapping potential production areas.

Keywords Urbanisation · Food systems · Food security · Tamale Metropolis · Ghana

Introduction

Globally, urban agriculture, as a form of economic activity, is practiced by people of various income brackets and is particularly an essential survival strategy for urban poor

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in developing countries (Rogerson 2003; Jacobi et al. 2000 and Havorka 2005). Urban agriculture has the potential to serve as a form of employment for the poor and provide a major source of food supply for the majority of the poor. According to Gogwana (2001), the poor engage in agriculture as a form of economic activity. Already, it is believed that the poor of the poorest spend more than half of their income on food alone (Thornton 2008). Ultimately, if the urban poor are able to improve their self-containment on their food needs, it frees income to engage in other possible economic activities or to meet other essential household needs including health and education. Thornton et al. (2012) believe that urban and peri-urban agriculture is the lifeline of subsistence for urban dwellers, where government social systems are lacking. Even though the practice of urban agriculture has been linked directly with the growth of cities in the world, some authors (Armar-Klemesu and Maxwell 2000) are still doubtful about its impacts as a form of urban livelihood and a food security strategy. This notwithstanding, land and agricultural policy makers and urban planners are revisiting national food production assiduously, following the global food and oil price shocks in 2007/2008. Also, the challenges of urbanisation such as poverty, food insecurity, proliferation of informal settlements and alarming rates of unemployment are making local governments in Africa to reconsider their stance of urban agriculture (Thornton et al. 2010:616).

Africa remains food insecure notwithstanding several policy interventions at the government level. This has raised concerns regarding food security and food systems research. The link between food systems and food security remains critical in resolving the persistent global food lag in the global South. Tacoli et al. (2013) explain that food security is the product of effective food systems. Food system refers to all the processes involved in putting food on the individual's table beginning with food cultivation, processing, through distribution and acquisition until consumption (Cassidy and Patterson 2008). With regard to production, planners and planning interventions have the potential to advance changes in the quality of resources that go into food production through effective and efficient land use planning. Urbanisation is correlated with growing urban poverty, food insecurity, unemployment, rising food prices, growing dependence on food imports, increasing dominance of supermarkets and fast food chains (RUAF Foundation n.d.). Effective food acquisition comes with ensuring proximity to food production and marketing outlets. The effectiveness of the food system in urban areas is vastly dependent on efficient spatial and infrastructure planning mechanisms that allocate space to various land uses. In this context, urban agriculture can be defined as "any agricultural activities, including production, processing, distribution and marketing, occurring in built-up 'intra urban' areas and along 'peri-urban' fringes (often 'green-belts') of cities and towns" (Thornton 2008, p. 1).

Notwithstanding these difficulties of food insecurity in Africa, urbanisation in Africa is expected to continue unabated. Population growth is necessitating the creation of more informal employment opportunities for the poor especially those in urban areas. According to Yeboah and Shaw (2013), the increasing demand for land calls for effective strategies to reconcile competing claims for the use of the limited urban space, especially for purposes that do not command the highest and best use value. Urban and peri-urban lands are under immense pressure due to population growth. This

has resulted in the development of new markets for land and the conversion of property rights under customary tenure into various forms of private rights. When the land market is allowed to allocate land resources, it will by and large be tilted in favour of the politically powerful, resource-rich and the highest and best uses possible. In much of urban and peri-urban Ghana, land use allocations are shifting from hitherto agricultural lands and green belts to urban infrastructural uses. Most peri-urban areas in Ghana remain unplanned, un-surveyed and unmapped. Customary landholders in response to high demand for land are altering the available land use plans in order to create non-existent 'sellable' spaces for urban infrastructure (see Yeboah and Shaw 2013). These challenges can be attributed to the general indiscipline in the land market and also institutional weaknesses in enforcing land use plans. The continuous dissipation of urban and peri-urban agricultural lands in desperation for urban infrastructure will have dire consequences on urban agriculture and sustainable livelihoods of the urban poor if urban land consumption is left unmanaged. In fact, the efforts of governments to make cities self-sustaining in terms of producing their own local food will remain a mirage if there is no productive land available. This is because land remains a major constraint to advancing urban agriculture even when all the other factors including transportation, markets, extension services and capital are resolved.

Besides the land constrain, there are several challenges that can potentially stifle urban food production potentials such as capital, technology, water, poor storage, marketing and poor infrastructural systems. In addition, there is wide stereotyping that agriculture destroys the beauty of cities and poses a health risk (Rakodi 1988). This explains why, according to Binns and Lynch (1998), many local governments have denigrated the practice of urban agriculture and, in some cases, declared it as illegal (Rogerson 2003). With the above background, this paper studied the consumption of agricultural land and green spaces in peri-urban Ghana, which even, when they are created on paper, are non-existent on site. Urban and peri-urban agriculture is still absent from land use plans. Urbanisation is dislocating smallholder farmers to farther hinterlands where they are hardest confronted with agricultural challenges. With these challenges, smallholders are unable to meet the food needs of the urban population through informal agriculture around the city. Though smallholders remain efficient in the use of land, due to the access to labour and indigenous knowledge (Deininger et al. 2011), they will remain constrained to improve urban food security without any land to produce. As of 2009, approximately 1.2 million people, making up 5 % of the Ghanaian population were said to be food insecure (World Food Programme 2009). According to the World Food Programme (2009), 34 % of the food insecure population are in Upper West region, followed by Upper East with 15 % and Northern region with 10 %, amounting to approximately 453,000 people. About 507,000 (40 %) people are vulnerable of becoming food insecure in the rural areas of Upper West, Upper East and Northern regions of Ghana.

Even though in Boamah's (2013) view, customary land is efficiently allocated to competing uses and users under customary tenure, Whitehead and Tsikata (2003), Amanor (2006) and Quan et al. (2008) have a contrary view. They are worried that the social relations of local political power, inherent in customary land institutions, will not improve equitable land delivery to socially disadvantaged groups. Customary land

institutions remain essential in Ghana's land administration system since they are estimated to control 80 % of the total landholding (see Kasanga and Kotey 2001; Sarpong 2006; Agbosu et al. 2007). Market-led forces of customary land allocation and land commodification especially in urban Ghana are further dissipating urban agricultural lands and green belts. As urbanisation increases, land for cultivation decreases considerably and peri-urban farmers are pushed unto farther and less favourable locations. Farmers keep relocating as customary land trustees zone or re-zone land into urban infrastructure. Urban poor including women, who have less secure rights to land and also lack the economic power to participate in the land market, are the most affected. In our view if the status quo persists, then agricultural land will continue to be dissipated. The consumption of agricultural land in urban areas reduces the potential resilience of cities to become self-sustainable and food secure. Hence, urban agricultural land management in Ghana requires considerable research attention.

In previous studies of the Kumasi Metropolis, Drechsel et al. (2001a, b) studied the adoption potential of technologies by farmers and the methodological approaches in urban agriculture. In another study, Drechsel et al. (2001a) examined the use of urban waste in agriculture as a means to closing the rural–urban nutrient cycle, as well as preserving the quality of the urban environment. Nunan et al. (2000) developed a framework to facilitate natural resource decision-making and management, particularly in areas where there are competing demands from urban development and 'rural' uses of resources. Armar-Klemesu and Maxwell (2000) distinguished different farming types and analysed it with regard to food security, household economics, health ecology and gender and how these impact on urban livelihoods, food and nutrition in Accra. Armar-Klemesu and Maxwell (2000) further studied the health risks of food from urban farms and found out that the main source of bacterial contamination is in the transportation of the crops and not the production. Drechsel and Kunze (2001) reported of how urban waste recycling into compost can be used as organic fertiliser to ameliorate soil nutrient depletion. Also, Thurman (2010) studied land use regulations and urban planning initiatives in Accra within the customary tenure regime, but did not relate these to urban agriculture. Previous studies by Boamah (2013) in the Wa Municipality focused on customary land markets with emphasis on land allocation for urban infrastructure uses, especially for residential purposes, but failed to tackle the impacts of customary land allocation on urban food security.

When farmlands or home gardens are located in the immediate vicinity of urban areas, urban farmers benefit from ready markets especially for fruits and vegetables and may also enjoy transportation, extension services and technological advantages. Thornton et al. (2010) in their study of urban agriculture in Zambia found that local governments were already providing a lot of support through the creation of urban food market centres, which helps in food distribution and sales. Notwithstanding these existing studies on urban agriculture, there is no empirical study that looked at the impact of land allocation systems on urban agricultural systems. This paper therefore assessed how urbanisation and population growth have impacted on urban farmers' production systems in Ghana within existing land use practices. The research was undertaken on the premise that rapid and uncontrolled urbanisation has dire consequences and contributes to heightening urban food insecurity in Ghana. Peri-urban land is a prime resource for agricultural production and, at the same time, a very valuable asset to urban growth and development. Due to rural–urban migration, many youth

with farming skills continue to scout for non-existent non-farm jobs in towns and cities. Urban agriculture presents a big employment opportunity for the many unemployed youth in urban areas especially for a fast urbanising city like Tamale. Urban agriculture is generally important as an employer for rural–urban migrants into the city. It serves as a means to reducing poverty and food security for the urban poor. Promoting urban agriculture also has potentials for urban tourism and environmental management.

Methodology

The study was conducted using the Tamale Metropolis as a case study and adopted both explorative and descriptive narrative research approaches. It was largely based on qualitative data collected through key stakeholder interviews at the metropolitan level. The fieldwork was undertaken from June 2013 to August 2013. Separate interviews were conducted at the regional and municipal directorates of the Ministry of Food and Agriculture (MoFA), the Town and Country Planning Department and Lands Commission. We also interviewed 48 farmers in Jakereyili, Sagnarigu, Fuo, Dungu, Jisonayili, Kanvili and Nyohini. These peri-urban communities are shown in Fig. 2. In the purposively selected study communities, we conducted transect walks and field observations. In total, 52 respondents were interviewed using interview guides. The study largely applied narratives and info-graphics to visualise qualitative data.

Study Area Description

The Northern region is the largest region in Ghana in terms of landmass. It covers an area of 70,383 km^2 making up close to 30 % of the entire land area of Ghana, and it is home to the Dagombas, Mamprusis, Nanumbas and Gonjas ethnic groups. As of the year 2010, the population of the region was reported to be 2,479,461, representing the fourth highest in the country (Ghana Statistical Service 2012). The region has the third highest population growth rate in the country at 2.9 % per annum, which is higher than the national average growth rate of 2.5 %. The region currently has 30.3 % of its population living in urban areas with the Tamale Metropolis accounting for 36.5 % of the total urban population in the region. The region consists of a total of 26 administrative areas. Tamale is the capital city of the Northern region and it is located in the Tamale Metropolis. The Tamale Metropolitan Assembly (TaMA) was set up in 2004 under the Legislative Instrument (LI) 1801. It is the only Metropolis located in the northern part of the country and has 3 sub-metros under its jurisdiction. The TaMA has a total landmass estimated at approximately 720 km^2, making up a little over 1 % of the landmass of the Northern Region (Tamale Metropolitan Assembly 2012). In the year 2000, the Tamale Metropolis recorded a total population of 293,881 people with 66 % (see Fig. 1) of its total population being urbanised compared to the regional urban population of 27 % and the national urban population of 43.8 % (Ghana Statistical Service, 2005).

In the year 2010, however, the population of the Metropolis increased to 371,351 people, with an urban population share of 73.8 % compared to the regional urban population share of 30.3 % and the national urban population share of 50.9 % (Ghana Statistical Service 2012). This implies that the Metropolis is becoming urbanised much faster than the nation (51 against 74 %). It also reflects the tendency of the region's urban

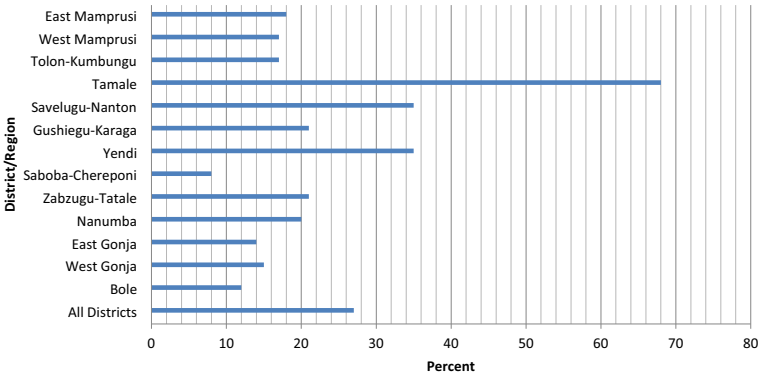

Fig. 1 Shares of urban population by district in Northern region in 2000. Source: Ghana Statistical Service (2005, p. 14)

population to be much more concentrated in a single urban location. The centrality of Tamale makes it function as a hub between the north and south of Ghana. Tamale Metropolis was found appropriate for this study because it is the third largest and the fastest growing city in Ghana, with a high potential in producing and exporting vegetables (see Al-Hassan 2009). The map of Tamale labelled Fig. 2 shows the three sub-Metros and communities.

Justification of Study

As indicated by Thornton (2008), studies on urban agriculture over the last decade have concentrated on big cities, with little attention to small and deprived cities. High levels

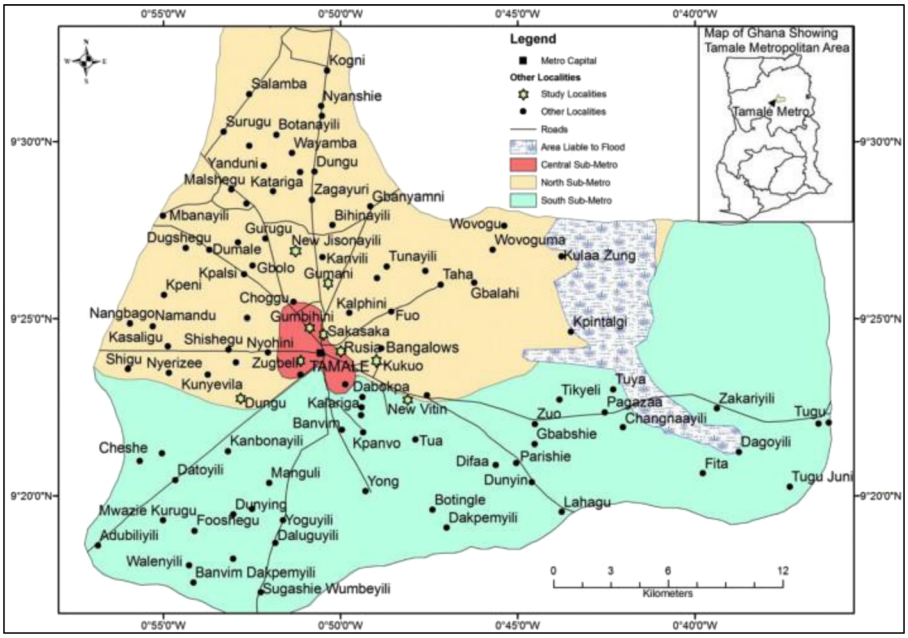

Fig. 2 Map of Tamale showing selected study communities. Source: Yakubu et al. 2014

of poverty and non-availability of employment opportunities in the cities put more attention on agriculture. According to the Northern Region Agricultural Development Unit (NRADU), 59 % of the food insecure in Ghana can be found within the three northern regions, with 10 % in the Northern region (World Food Programme 2009). Detailed studies in a Comprehensive Food Security and Vulnerability Analysis (CFSVA) revealed that 26 % of the entire population of the Tamale Metropolis experiences some form of food insecurity especially between May and July (World Food Programme 2012). It is also reported that smallholder farmers with farm sizes of about 5 acres make up 62 % of all farming households in the three northern regions, with 49 % of all smallholder farmers also classified as being poor (World Food Programme 2012). Food production in the study area is already constraint by the lack of available fertile lands. The level of food insecurity as well as the percentage of the working population engaged in agriculture, at a subsistence level, brings food production to the fore in any discussions on food systems in the area. It also implies that any interference with the resources for food production in this area (land, labour and water) invariably has serious consequences for the about 75 % of the people whose livelihood is agriculture.

Urbanisation, Land Markets and Food Systems Nexus

Urban Land Markets and Urbanisation in Ghana

Pablo et al. (2000) in their study of Mexico City emphasised that in studying the dynamics of urbanisation, one has to look at the land tenure situation and the conceptualisation of land as a commodity. In this section, the paper looks at the land market and urbanisation nexus in Ghana. The land market in Ghana has developed much more rapidly than the administrative or regulatory machinery required for a sound legal underpinning to that market and what it can handle (Kasanga et al. 1996) Urban land market complexities and demand for urban land have overwhelmed land tenure institutions into the management of customary land. As population growth in urban areas continues, demand for land in response to the increasing demand for valuable urban infrastructure increases. Thus, as cities grow and urban areas expand, adjoining rural and peri-urban lands, mainly prime agricultural lands, are converted to urban uses. The observed trend is not recent in nature though the extent of conversion is more pronounced now. According to Larbi (1996), approximately 2100 ha of agricultural land was converted into urban uses on an annual basis in Accra alone between 1990 and 1993, and these figures remain on the ascendancy. These trends are attributed to the existing customary tenure system, which allows landowners to virtually decide which uses they desire for their parcels and hence dictate the composition of land use plans.

Ghana operates a hybrid system of land tenure/administration—customary and statutory (Quan et al. 2008). The customary land tenure system operates under the customs, rules, norms and traditions of the community, and the rights of individuals to use land are embedded in the customary laws of the community. Kasanga and Kotey

(2001) state that although the customary land tenure system is not written and codified into law, the land tenure system is passed down to unborn generations through oral tradition. Customary land tenure is recognised under the 1992 Republican Constitution of Ghana. The rights to own land under the customary system are genealogical. State lands on the other hand are classified under public and vested lands. Public lands refer to lands held by the state for public purposes or acquired through the state's powers of eminent domain in the interest of the public. We also have vested lands, referring to land owned by customary authorities, but held and managed by the state for the beneficial enjoyment of the people. Ubink and Quan (2008) have accused traditional authorities especially chiefs, *Tendamba*[1] and family heads of usurping community land ownership rights and benefiting principally from customary land transactions. This observation may be attributed to the wide commoditisation of land especially in urban areas, where land markets are cash driven. Also, it may be because chiefs have generally fronted customary land transactions, led negotiations and, in many instances, with limited participation of the allodial stakeholders for whom he is custodian of land.

In Ghana, the nature of the traditional system of land ownership places powers in the hands of local chiefs and heads of families analogous to land use policies (Thurman 2010). With high land values, coupled with high demand for land in urban and peri-urban communities, most stools/skins[2], and families find it more expedient to lease their lands for urban uses rather than to retain them for agricultural purposes (Eledi and Kuusaana 2014). Some fiduciaries of customary land are engaging in land transactions as though it were an economic activity. Promising monetary gains drive these kinds of preferences and expediencies, which per se are not customarily or legally forbidden, but are undesirable because of the apparent implications on urban agricultural activities. One inadvertent outcome of this trend is that periu rban farmers are rendered landless, and without any meaningful alternative source of livelihood, they are further impoverished (Yeboah and Shaw 2013). Farmers living closer to the city centres enjoy input and out market advantages as compared to their counterparts in the hinterlands. Seasonal migration of farmers into urban centres enables them benefit from production technology and knowledge transfers, and remittances from migrants can alleviate poverty by reducing the burden on the source household (De Brauw et al. 2010). However, the mobility of agricultural labour from rural areas into urban areas has much increased the number of agro-skilled labour in urban centres desiring agricultural jobs but have none. This is further increasing the numbers of urban poor.

In 1960, a total of 61.1 % of the Ghanaian population was engaged in agriculture (Ghana Statistical Service, 2005). This reduced to 51 % by the year 2000. In 2008, the Ghana Living Standards Survey (GLSS) revealed that a total of 56 % of the working population were employed in agriculture (Ghana Statistical Service, 2008). The Ghana Statistical Service (2005) also believes that agricultural production has not kept pace

[1] The Tendaamba (singular—*Tendaana)* are the descendants of the pioneer migrants, and they are the ultimate authorities regarding land in their respective villages and towns (Kasanga 1995).

[2] The use of the terms stool and skin represents the symbols of authority of chiefs in Ghana. While the stool is the symbol of authority for chiefs in the southern part of Ghana, the skin (of an animal) is the symbol of authority for chiefs in the southern part. There is often the tendency in Ghana to refer to the chieftaincy of a particular area as the stool or skin. There are even verbal forms created: to *enskin*, to *enstool*; and derived nouns: *enskinment* and *enstoolment*.

with the growth in population that took place since the 1990s. It further attributes this phenomenon to the fact that the youth are leaving farming areas for the urban centres, and the ageing farmers are unable to increase production significantly. Urban land remains a prime resource for agricultural production and also a very valuable asset to urban growth and development. Over the years, the growth in urban population has increased the demand for land. Table 1 shows total population vis-à-vis urbanised population in Ghana between 1920 and 2011.

Urbanisation and Food Systems Debates

Growing regional populations need to be fed now and, in the future, through multiple production approaches, improved distributional networks and efficient storage and marketing techniques. Since these same approaches make up the food system, increasing concentration of people in urban areas, therefore, has implications for food systems. Shields (2013) emphasised that as population concentration increases due to urbanisation, there is a resultant decrease in the amount of agricultural land available for the cultivation of food crops to feed that concentrated population. This is inevitable to some extent, as settlements, which grow to become cities, tend to be located in areas with high soil fertility as well as the availability of freshwater resources (Satterthwaite et al. 2010). Hence, when such settlements begin to grow in size, they tend to absorb the surrounding agricultural land area. This creates a dependence on rural areas to supply enough food for the growing urban population. It is argued that urban land area happens to make up about 0.5 % of the entire global land area, though it exceeds 1 % in Europe (Schneider et al. 2009) and even up to 2.7 % with the inclusion of open land areas within the urban boundaries (McGranahan et al. 2007). It is further argued that higher densities of urban built-up areas in comparison to rural areas implies that urban populations occupy far less space (Tacoli et al. 2013). While this argument may be sound, the issue of sprawling urban developments in some urban areas falters the assumption of compact urban developments and urban densities. Sprawling urban growth itself is a characteristic of urban development failure and ought to be controlled in all respects.

Table 1 Total population and urbanised share from 1921 to 2010

Year	Total population	Percentage urbanised	Urban population	No. of urban settlements
1921	2,298,000	7.8	179,244	–
1931	3,163,000	9.4	297,322	–
1948	4,118,000	12.9	570,597	41
1960	6,727,000	23.1	1,551,174	98
1970	8,559,000	28.9	2,472,456	135
1984	12,296,000	32.0	3,938,614	203
2000	18,912,000	43.8	8,278,636	364
2007	23,000,000	49.0	11,270,000	492
2010	24,658,823	51.0	12,545,229	636

Source: GSS (2005) and GSS (2010)

The FAO (2010) believes an intensified agriculture with sustainable water, soil and pest management practices are the best way to produce enough food to meet the needs of urban dwellers. While the issue of boosting food production remains critical, there also appear to be some concerns about the environmental impact of urban agriculture resulting from intensification through the use of chemical fertilisers, pesticides as well as irrigation technologies (Pinstrup-Andersen and Pandya-Lorch 1994; Shields 2013). However, the reverse is also problematic in which case urban industrial activities could pollute soil and water, thus making urban agricultural produce unsafe food for consumption. The FAO (2011), therefore, advocates a strong connection between rural and urban areas as a means to ensuring adequate food production by the combined forces of both rural and urban agricultural practices. It is believed that urban agriculture has the potential to contribute more to feeding the growing populations of towns and cities (Bricas et al. 2003; FAO 2010). Hence, it becomes inestimably crucial that urban agricultural lands are protected from competing urban land uses. With increasing land values in and around urban areas, there is always the tendency for vacant agricultural land to be subjected to non-agricultural uses (Satterthwaite et al. 2010).

Some other literatures have argued that urban agriculture has no future. For example, it is argued that international trade has globalised the food system, and this has ensured that a lot of the food consumed in urban centres are increasingly transported from afar or even imported (APA 2007). However, a major concern about a globalised food economy rather than a localised food system is that much fossil fuel tends to be burned for the purpose of transporting food from production areas to open town markets and super markets. This is a common phenomenon already debated as part of the broader climate change issues, yet Satterthwaite et al. (2010) believe that urban food needs in developing countries will most likely be met with a high percentage of imported food products. Thus, in ensuring the ecological sustainability of the global food chains, urban agriculture comes handy. Another major aspect of the urbanisation and food system debate is the change in diets pertaining to growing urban populations towards more readymade food products (Popkin 2001; de Haen et al. 2003) and not fresh foods. Though packaged readymade foods can be imported comparatively cheaper, it disrupts healthy food lifestyles and ultimately impact on food sovereignty especially of the urban poor (Rockefeller Foundation 2013). Such urban foods supplied through these channels are traded at prices beyond the reach of most urban poor, who still depend heavily on local staples for their major food needs. Figure 3 illustrates all the issues in the discussion on urbanisation, land allocations and the food systems interrelationships.

Findings and Discussion

Urban Structure and Housing Characteristics

Tamale is said to be the third largest urban settlement in Ghana, and this has remained so since 1970 with much of this growth accruing to low-density residential developments. Much of the growth in Tamale has been recorded in the northern part of the Central Business District (CBD), but also considerably to the western and south-eastern sections of the city. Buildings are predominantly privately owned single storeys developed largely on piece-meal arrangements from private financing. The inner city

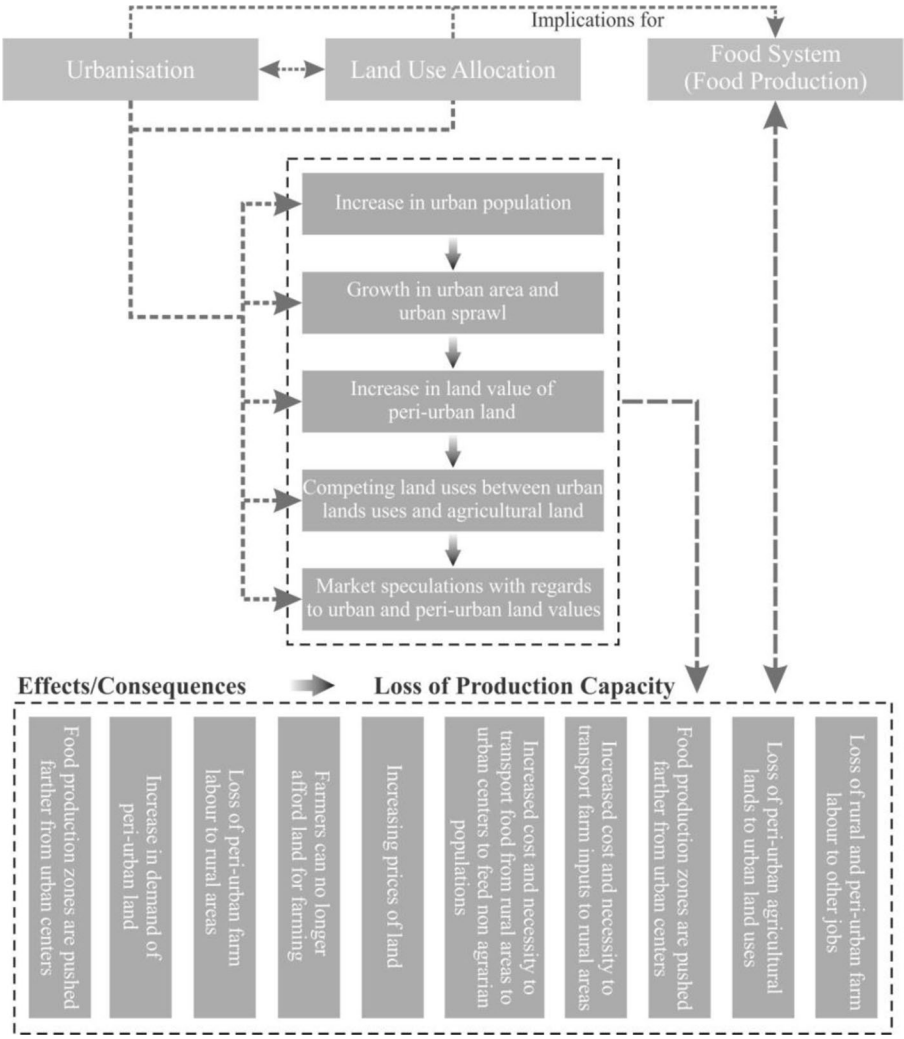

Fig. 3 Conceptual framework. Source: authors' illustration

residential areas such as Ward A, Ward B, Sakasaka, Dohinayili, Gumbehini, Zugbeli, Gumbihini, Dabokpa, Aboabo, Moshie Zongo, Nyanshegu and Lamashigu are characterised by dense and compact compound houses with courtyards. Compound houses typically house multiple families and in rental arrangement. Recent residential developments on the outskirts are, however, predominantly single-family detached dwellings over plot sizes averaging 100 ft×100 ft (0.23 acres). Generally, the level of compactness declines towards the outskirts from the Central Business District (CBD). Also, old government residential areas such as the Watherson, SSNIT flats, Russian Bungalows, Kalpohin Estates, Airport Residential Areas, Education Ridge and Sakasaka quarters that were built for civil servants typically have low densities and well-defined plots showing clear boundaries. They are also widely spaced out, and these have existed unchanged

over the last decade. Figure 4 gives a representation of density distributions within the city.

The north-western part of the city such as Choggu, Education Ridge and Yipalsi is characterised by single storey detached residential developments as well as student hostel accommodation facilities for the School of Hygiene and University for Development Studies (UDS). These facilities are developed either for self-occupancy, for rent or for both. Some of these institutions in the area also typically have residential facilities for their workers in the form of single storey buildings. The western part of Tamale such as Jakeriyili, Sagnerigu and Shishegu is characterised by predominantly individual family residential developments put up by private individuals both for self-occupation and rental purposes. Similar development patterns were observed to the southern and eastern parts of the city such as New Vitin, Fuo, Taha, Kpambego and Kpanvo. The central part of the city witnessed a rather commercially driven development pattern characterised by many hotels, restaurants, supermarkets, kiosks and other commercial business entities along the Tamale-Bolgatanga highway. These development characteristics can be seen in Fig. 5.

Figure 6 illustrates the nature of urban growth in Tamale at different times in history as visible from Google Earth satellite imagery and available city maps. As shown in the illustration, urban area growth has taken place in all directions with the northern and western parts of the city exhibiting more growth over the last two decades as compared to the other surrounding areas. There has also been much growth to the south-eastern and south-western corners such as Vitim, Gbewa, Zujung, Dungu and Kakpagayili spanning along major road infrastructure networks. It was also evident that much

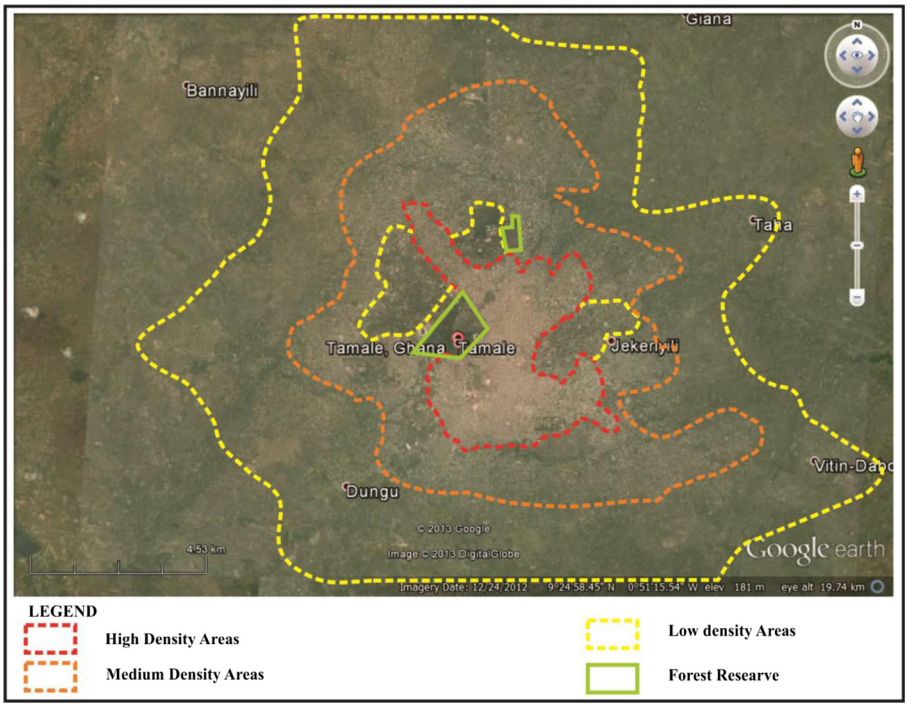

Fig. 4 General distributions of densities in Tamale. Source: Google Earth with illustrations by authors

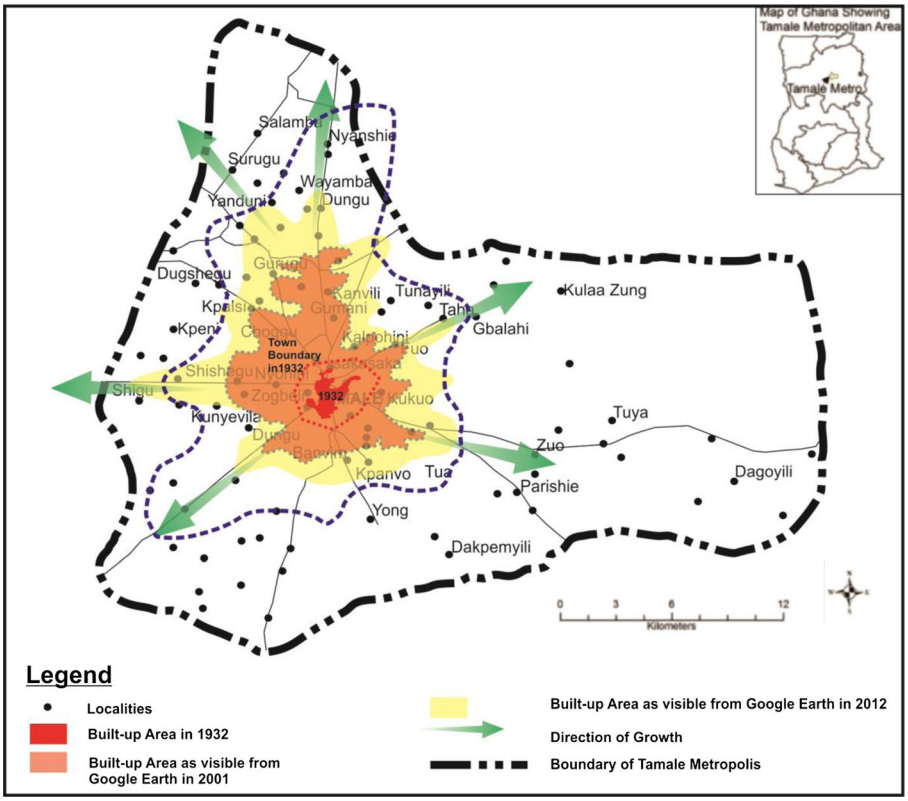

Fig. 5 Map of Tamale Metropolis with built-up areas and direction of growth. Authors' illustration

growth has been experienced in the period between 2001 and 2012 (see displayed in Fig. 6). Growth of the built-up area of the inner city also exhibits different levels of compactness. The old traditional settlement of Tamale typically inhabited by natives of the area exhibits a very compact arrangement of buildings. Areas such as Lamashigu, Kaladan, Ward A, Ward B, Sakasaka, Gumbehini, Dohinayili, Lamshegu, Nyohini and Gumani, as shown in the picture labelled C in Fig. 6, are predominantly residential with rows of small shops springing up in alignment with the streets. Government residential facilities, which were also put up several decades ago in some areas such as Watherson, Russian Bangalows, Airport residential areas, Sakasaka quarters and old airport residential areas, are relatively sparsely distributed over the landscape.

Buildings in the government residential areas, as shown in label B of Fig. 6, have huge surplus parcels of land at their disposal and can be used for rain fed or irrigated backyard gardening. In these neighbourhoods, no form of urban infill development can take place, as the occupants of these structures have no legal right to do so. The occupants are mostly civil servants in transition and often have to leave the premises when transferred to other parts of the country. Suburban settlements that eventually become part of the built-up area of the city maintain their rural character and are inhabited by natives. On the farther periphery of the city, as shown in picture D of Fig. 6, the built-up area is relatively sparsely distributed over the landscape with some possibilities for urban food cultivation. Such areas, however, tend to witness a lot of

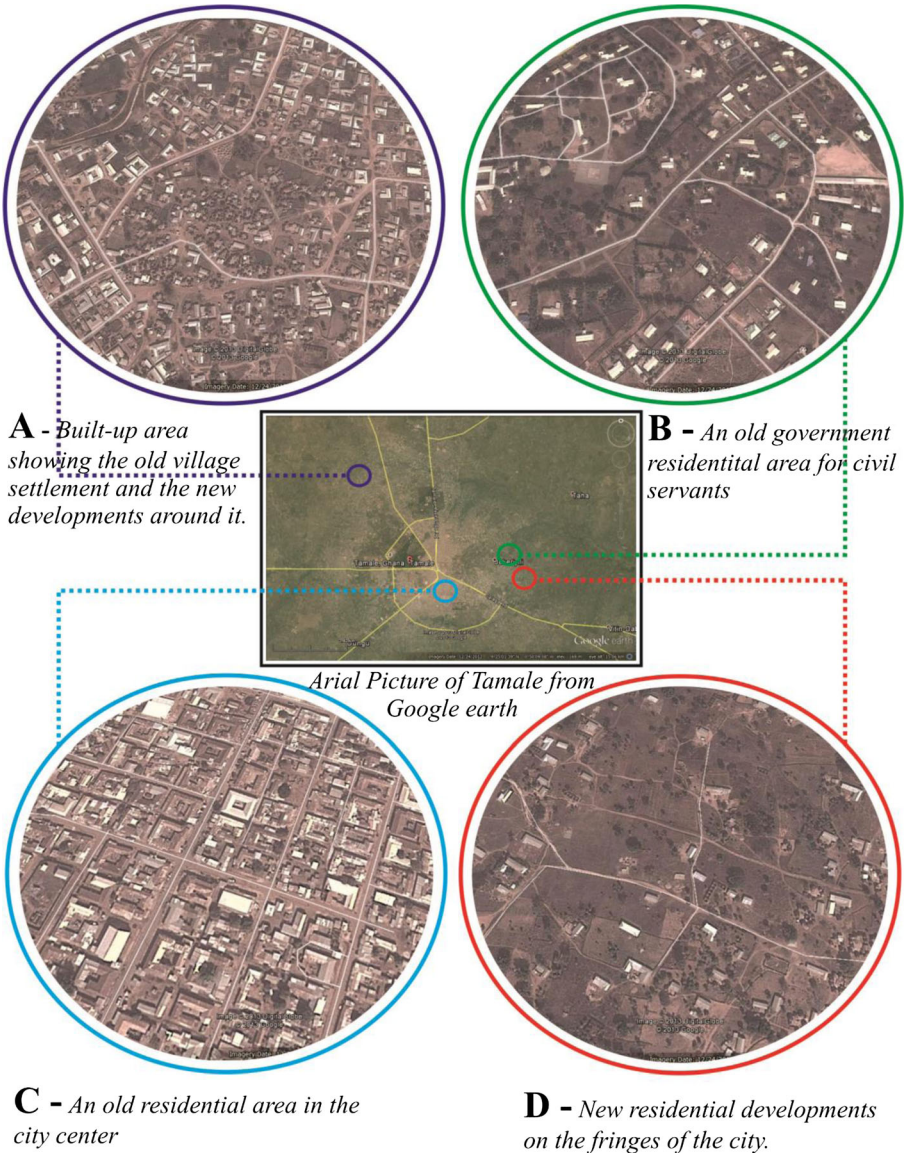

Fig. 6 Google image views of Tamale showing different compactness levels in 2011. Source: authors' illustration

gradual infill developments over time until they are completely built up. This is because these parcels are acquired and privately owned by individuals and developed on piecemeal basis. Lands belonging to at least 37 rural farming communities in the Tamale Metropolis have been gradually converted to urban uses over the last 20 years, with several other communities in the process of being converted (interview with MoFA, 2013). Many of these communities still exhibit their original rural character at the core, but are engulfed by privately constructed new buildings (as shown in label A in Fig. 6). In many of these instances, the study observed that no land allocation is

made for crop or animal production in the land use plans prepared by the Department of Town and Country Planning (DTCP).

Area Cultivated for Major Food Crops in the Study Area

Food production data from the Ministry of Food and Agriculture (MOFA, 2013) revealed a general trend of growth in food production in the Tamale Metropolis and also at the regional level with some years recording intermittent decline. In the Northern region, the period between 1994 and 2003 recorded a steady trend of increase in the total area cultivated, with 2004 registering a decline. The area cultivated increased again in 2005 and 2006, while in 2007 area cultivated registered a significant decline. The period between 2008 and 2012 registered an increasing trend again, rising up to over 1 million hectares in 2012. Between 1991 and 2012, the region has recorded a more than double increment in total area cultivated over the figure for 1991. The Tamale Metropolis on the other hand registered a general decline in the total area cultivated in the period between 1991 and 2007. The total hectares of land cultivated, however, rose sharply in 2008 and then steadily to almost 60,000 ha in 2012 (see Figs. 7 and 8). The trend of increase recorded between 2007 and 2012 is a clear indication that farming within the Metropolis continued to thrive (see Fig. 7).

Since a large number of the working population in the Metropolis is agrarian and subsistent, growth in cultivated areas may imply a large section of the total population is depending on farming not only for food but also for income. This nature of increment observed in the graph may also be as a result of farming undertaken in nearby villages and not in Tamale per se. The revealed trend could also be attributable to recent agricultural policies such as the fertiliser subsidies and block farming systems under the Ministry of Food and Agriculture (MoFA), which encouraged more people to get into farming or expand existing farms. The trend could also be attributable to the introduction of the Youth in Agriculture Programme (YiAP) in 2009 by the Government of Ghana (GoG). The programme sought to change the negative perception of the youth towards agriculture as the preserve for the uneducated, unskilled and physical labourers with extremely low economic return. In 2010, total production plots for the entire Northern region and Tamale Metropolis recorded a slight decline. This

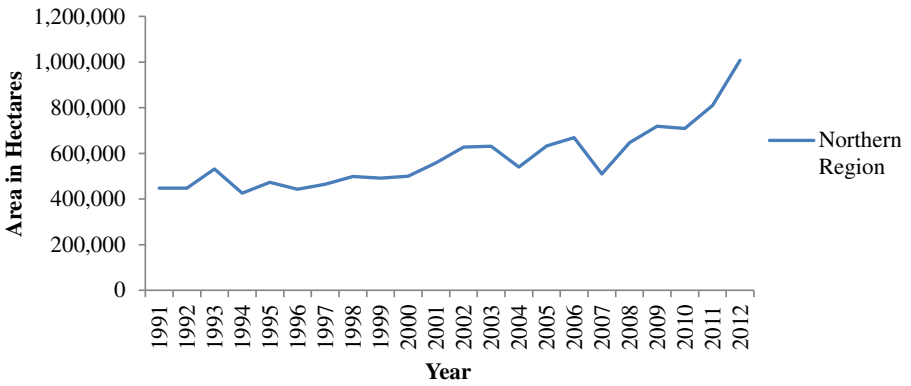

Fig. 7 Area cultivated for major food crops in the Northern region (1991–2012). Source: Data from MOFA (2013)

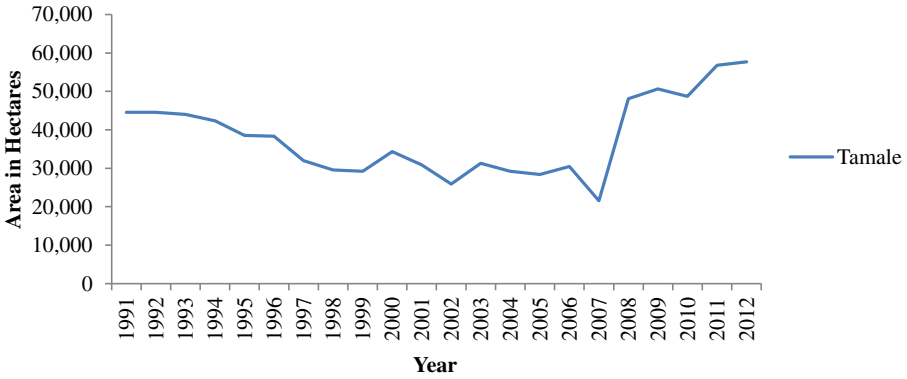

Fig. 8 Total area cultivated for major food crops in Tamale (1991 to 2012). Source: Data from MOFA (2013)

could be attributable to the re-demarcation of administrative and political boundaries as part of the preparations for the 2012 presidential and parliamentary elections.

Agriculture in the Tamale Metropolis

Farming is traditionally and predominantly the main source of rural livelihood in Ghana and has been practiced over several generations. In the rural areas, farming is viewed as a means of survival and is practiced by almost all households mostly on a subsistence basis. As such, crops are cultivated together with animal rearing purposely for the family consumption and upkeep. However, data from the 2010 population and housing census reveals that households in urban areas are engaged in agriculture as well (Ghana Statistical Service 2012). The 2010 population and housing census reported that 45.8 % of all households in Ghana are agricultural households with 95.1 % engaged in crop farming, while an additional 40.5 % of this share is into livestock (Ghana Statistical Service, 2012). In the Northern region, 71.2 % of the population in the region in the year 2000 were into some form of agriculture. In 2010, 73.1 % of the population in the region were reported to be employed in agriculture. These households are into crop production or animal rearing or both.

Rural households in Ghana typically cultivate a bit of everything. Staple foods are cultivated both on the fields and around the home, while backyard gardens close to the home provide rich vegetable dietary source. About 40 % of vegetable farmers in the Tamale Metropolis are engaged in all year round farming, whereas 52 % depend on polluted water sources (Zibrila and Salifu 2004). Animals are reared on a semi-free range system. Since crop production is primarily rain-fed, there is only one farming season for crop cultivation in the Northern region. The early part of the dry season is used for processing and storage of farm produce. Some farmers also engage in the cultivation of some dry season vegetables through home-based irrigation schemes or along wet valleys. In the rural areas, compound farming systems enable houses and farmlands to co-exist. However, farmlands are dynamic with varying phases of landscape as the rains come and go. Settlements in the Tamale Metropolis exist in clusters of family compounds. Houses, however, tend to possess different geometries but typical of the traditional round buildings in the Northern region. Figure 9 shows a typical example of main and compound farms in rural areas of northern Ghana.

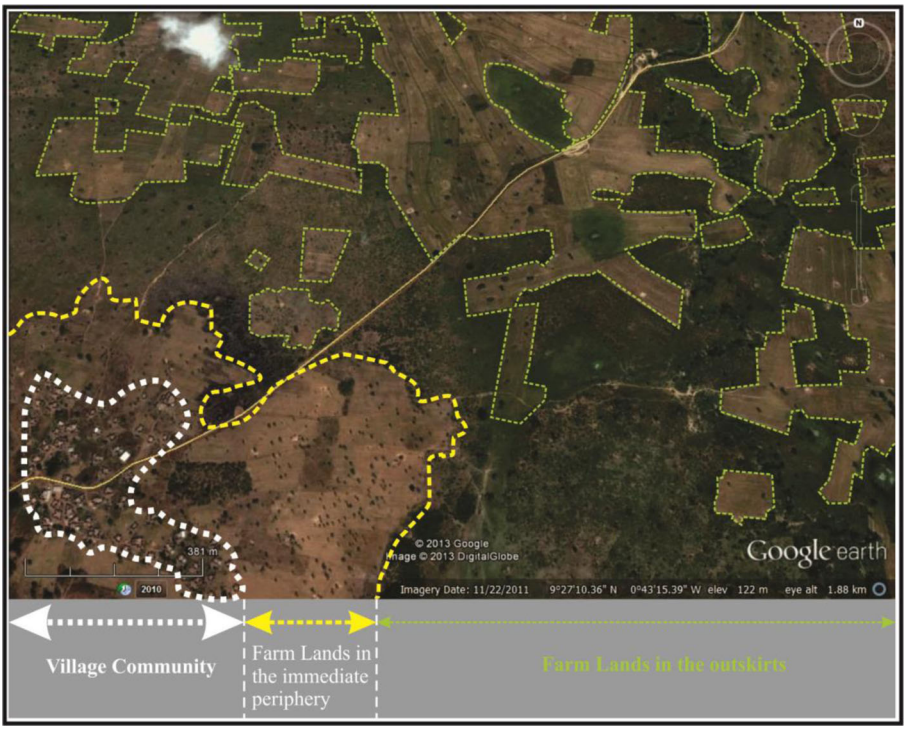

Fig. 9 Farming in Kulaa Zung in the Northern region, east of Tamale. Source: picture from Google Earth with illustrations by Authors

Urban Agriculture in the Tamale Metropolis

Urban area expansion has resulted in many former rural settlements becoming a part and parcel of the wider urban community. Land belonging to these communities that were formerly cultivated by the local folk is converted to urban land uses—infrastructure and services. It was, however, found from our interviews with farmers that this did not change their occupation since farming remains their main source of livelihood. Farming is still practiced in many areas within the city but on small parcels of land mostly in the form of vegetable gardens interspersed with maize. Heavily built-up neighbourhoods such as Choggu, Gumani, Kanvili and New Vitin afford little space for farming or even backyard gardening. In such areas, few people who are persistent with farming fenced up unused alleyways between houses and vacant plots close to their homes for cultivation. Besides urban farming in unused alleyways, it may also be undertaken on vacant spaces along roads, banks of rivers and streams and on wetlands (see UNDP 1996). From the interviews with farmers, crops cultivated in such areas are mostly maize, beans, groundnuts and assorted vegetables. The peri-urban interface presents another twist to the dynamics of urban agriculture. Settlements on the periphery become urbanised in a gradual process since houses are developed privately on piecemeal bases.

Our interviews with farmers revealed that the local people who cultivate these lands do not always know the owners of newly demarcated housing plots. Mostly, village chiefs and family heads with limited consultations with the users of the land undertake

land allocations. As such, the local people typically continue to farm on these parcels until the private owners begin developing them. Urban agriculture in the Tamale metropolis is also seasonal in nature. However, it was observed that some farmers have taken up public spaces especially along road corridors and under high-tension cable ways for cultivation and relying on wastewater or water from leaking public water mains for irrigation. Figure 10 is used to show some of the identified parcels of lands used for urban agriculture in Tamale during our fieldwork. However, these areas were not originally designated on the land use plans for agricultural purposes. Such areas as indicated in green include urban open spaces or building allies which are fenced and used for production. The urban farmer is very resilient and innovative in finding productive space, as long as production potential is limited by the absence of designated agricultural lands. Urban farmers were found invading public spaces for production because their previous farmlands were consumed by urban infrastructure.

Agricultural Land Acquisition and Land Values

It is always insisted that agricultural land is not sold in the Northern region and in many parts of Ghana. As such, natives of a particular community obtain parcels of land for free from their community heads and chiefs as customary usufructs. One only needs to approach the chief to request it for farming or housing and it will be granted. If it is confirmed that another person has not already appropriated the parcel in question at the time, one is required to perform some customary rituals, after which he can proceed to use the land. Since land is not sold in the area, a non-indigene is required to pay a token for the land including the presentation of kola or 'kola money'[3] before he begins to use the land. A non-indigene may also acquire land as a gift from the allodial owners. Although it was observed that there were no contractual agreements over these oral land transactions, tenure was deemed secure and only a gross misdemeanour may result in the forfeiture of the right to use the land for farming or housing or both. This practice still applies to some peri-urban areas of the Tamale Metropolis. However, increasing pressure over land in urban areas such as in the Tamale Township and the resultant increase in the value of land has highlighted the need for security in land tenure. This has brought about a shift from communal or family landholdings to individual land ownership rights in urban areas or from usufruct holdings to leaseholds. This shift in land tenure has also impacted on the duration of land fallow by smallholders around peri-urban communities. Smallholders in the peri-urban interface, who have lost substantive portions of their farmlands to urbanisation, have now resorted to fewer years of fallowing since most farmers have plots limited to one or two. More than 70 % of our respondents have no fallow periods at all and now resort to fertiliser application to improve agricultural production. In order to boost production all year round, some

[3] The term 'kola money' is used to refer to the lump sum payment made for the allocation of customary land in Ghana. In the past, acquiring land required greeting the chief or family head with kola. However, over the years as the demand for land increased, it became a practice that money was preferable to kola. Subsequently, the practice metamorphosed into presenting kola money to chiefs. These amounts vary across space and time in Ghana and may amount to cash payment equivalent to the economic value of land (see Delville et al. 2002). However, chiefs still maintain that this does not amount to a sale price or even a rent for land but a gift to use agricultural land or build a house. The story may be different from urban estates, where land market activities are quite brisk. It is common to have both the drink and drink money paid these days as well.

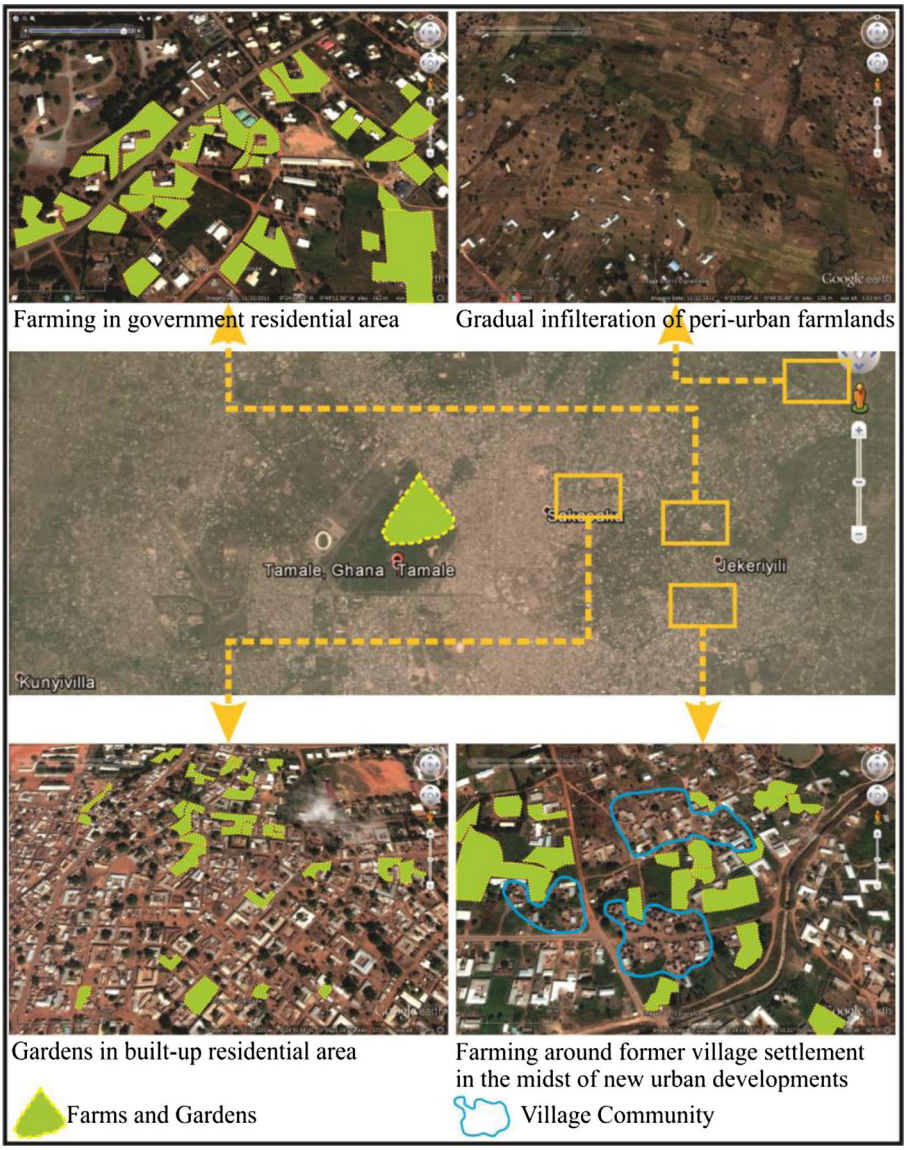

Fig. 10 Farming within the city of Tamale. Source: authors' illustration

farmers continue to produce vegetables using stagnant water in drains or community reservoirs. We find these to be farmers who are determined to pursue urban agriculture as a livelihood source. A majority of other farmers migrate to distant villages or commute between distant farms and homes in peri-urban communities.

Land values are higher in the Central Business District (CBD) and reduce towards the periphery into nearby rural communities. From our interviews with the Lands Commission (2013) and some peri-urban farmers, it was apparent that land values in the Tamale Metropolis have increased tremendously over the last decade due to increased demand from higher populations. In a previous study by Naab et al.

(2013), they found that in 2002, a plot of land (100 ft×100 ft/ 0.23 acres) in Kanvili was between Gh¢ 30 and Gh¢ 80. As of 2012, the same plot in Kanvili was between Gh¢ 3,500[4] and Gh¢ 6000. In Kpalsi and Kakpagayili, it was observed that plots (0.23 acres) that cost between Gh¢ 25 and Gh¢ 75 10 years ago were in 2012 between Gh¢ 2000 and Gh¢ 3500 and Gh¢ 2500 and Gh¢ 4000 respectively. For the 300 building parcels studied, 40 % of lands acquired 10 years ago were acquired at prices below Gh¢ 200. From the same data set, 56 % of all recent land acquisitions were quoted above Gh¢ 2000 (Naab et al. 2013). Since these land price changes are largely, demand-driven, landowners are converting farmlands into building plots to meet urban demand and to benefit from the booming urban land market in the Tamale Metropolis.

Conclusion and Recommendations

Land access remains a major constraint to urban agriculture. We observed that as urbanisation increases, farmers are being pushed unto less favourable lands, farther villages or restricted to unauthorised public spaces in order to continue production. The absence of urban green belts reduces farming to flood plains and along public drains where wastewater is used for irrigation. The existing customary land ownership system makes it extremely difficult for urban planning institutions to preserve green spaces due to pressure from landowners for re-zoning into urban land infrastructure. The demands for residential, civic and commercial uses have consumed agricultural land uses in peri-urban Ghana. In many a time, the dominance of urban land uses over agricultural land uses has deprived farmers of productive lands in close proximity to the city where markets, credits, storage facilities and road infrastructure are the most accessible. This invariably infringes on farmers productive capacities. Acknowledging that the agricultural sector employs about 54 % of the labour force in Ghana and is the largest employer in the informal sector, depriving farmers in the urban corridors of arable land will impact negatively on the livelihoods of the urban poor. Available formal planning standards and regulations in Ghana have failed to control informal development, and giving room for the informal planning sector to circumvent these regulations and run an undesirable alternative parallel system with no regard for agriculture in land use plans. To resolve these challenges, there will be the need to improve the technical and human resource capacity of the local planning authorities in Ghana. Higher prices offered by other land uses are a major motivation for land use change and discrimination. While the implementation of land use policies in many ways conflict with customary land tenure systems in many areas in Ghana, there exist many opportunities for customary land tenure systems and land use policies to co-exist. For example, land use policies should incorporate the unique characteristics of customary land tenure and greenbelts or agricultural zones should be created on land use maps. To protect urban and peri-urban agricultural lands, there is the need for an urban agricultural policy, and the mapping potential production areas. The use of GIS mapping systems will enable stakeholders to identify and monitor urban land use changes and hence protect agricultural lands from 'concrete' invasion. To enable urban farmers invest heavily in urban production and soil fertility measures, there is the need for a policy that protects urban

[4] As of 4th June 2012, UD$ 1 was quoted at Gh¢1.8777

lands under current production and offer tenure security through informal leasing approaches.

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