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*THE ASSESSMENT OF URBAN AND
PERI-URBAN AGRICULTURE IN
KUMASI METROPOLIS, GHANA.*

KENNETH DARKO ANOKYE
DOUBLE DEGREE MASTER OF AGROECOLOGY

DECLARATION

I hereby declare that this submission is my own work towards the award of a Double Degree of Master of Agroecology and that to the best of my knowledge it contains no material previously published by another person nor material which has been accepted for the award of any degree of the University, except when due acknowledgement has been made in the text.

Kenneth Darko ANOKYE

Student



Signature

03/09/2019

Date

Dr. Alexander WEZEL

Supervisor

Prof.Tor Arvid Breland

Supervisor

DEDICATION

This thesis is dedicated to God Almighty, and very inspiring and wonderful individuals in my life, my girlfriend Lady Joanna, my very lovely mother, Joyce Yeboah and lastly to my niece Nana Afia Sikapa Sarpomaa Boateng.

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ABSTRACT

Presently, half of the world's population lives in urban areas and the rate of urban development is expected to remain the same in this 21st century, with most of the growth taking place in the developing world. The urbanization of African cities, like Kumasi, Ghana has brought in its wake a lot of challenges such as urban sprawl, slum proliferation, transportation challenges, growing informalisation, destruction of ecologically sensitive areas, indescribable scenes of filth and gradual extinction of urban greenery. The ability of Urban and Peri-Urban Agriculture (UPA) to sustainably contribute to livelihoods is becoming increasingly problematic as the combined effects of urban planning, insecure tenancy and diminishing land and its related stresses, create significant challenges for the farmer's livelihood in Kumasi Metropolis. In spite of its important functions, the value and nature of urban farming have not been given enough attention by researchers. This study fills this gap by focusing on identifying the characteristics and the state of incorporating urban agriculture in Kumasi. Also evaluated is how urban and peri-urban agriculture supports productivity and the possibility of its integration into urban development in Kumasi. Furthermore, the study analyzes the prospects of urban planning strategies and the actual role of land planners in the promotion and development of urban agriculture. Lastly, the existing structures that support and could reinforce urban agriculture in Kumasi is reassessed. This research is based on the mixed methods approach, by using three case study communities in the Kumasi Metropolis in Ghana. Using semi-structured interviews, qualitative data were collected from institutional representatives of urban planning-related institutions in May - June, 2019. The data were subjected to descriptive statistical analysis using the Statistical Product and Service Solutions (SPSS) software package, version 10.

Tables, figures, graphs, and percentages were used in the case of the qualitative technique with the help of the SPSS software package. The qualitative analysis was also involved in the descriptive presentation and it was used to analyze data obtained from the institutions. Qualitative data were collected during the same period from 64 urban farmers and (11) stakeholders from representatives institutions across the three selected Areas ; Afrancho in the Afigya Kwabre South District, Mamponteng in the Afigya Kwabre East and Adako-Jachie in the Ejisu Municipal. The findings indicated that urban farmers across the three selected areas, mostly produce fruits and vegetables. More so, urban farmers produce urban food for consumption, and not primarily for the market. It became evident that urban agriculture is important because it provides employment and financial resources for some urban dwellers. UPA also beautifies the environment, conserves biodiversity and also provides relatively fresh and safer produce compared to stored foods. Notwithstanding, limited access to land and tenure, high cost of inputs (fertilizer, pesticides, farm implements, seeds, etc.), pests and disease threats to crops, inadequate access to credit and market for produce are pertinent challenges that urban farmers encounter. It was very evident from the study that integration of urban agriculture cannot be accomplished by the local Assemblies alone, but rather all stakeholders are needed on board. In order to realize its full potential, urban agriculture needs to be integrated into urban development and that there should be the availability of sufficient land which must be secured for an extended period of time. Also, there should be enough funds, technical advisors, and planting materials to support UPA. Importantly, in order for urban planners to successfully incorporate urban agriculture into development, there is a need to advise landowners, especially chiefs are custodians of the majority the lands in Kumasi to permanently designate more dry areas for agricultural activities and not only swampy lands that are not suitable for development.

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ACRONYMS AND ABBREVIATION

CRI	Crops research Institute
CSIR	Council for Scientific and Industrial Research
FAO	Food and Agriculture Organization
GSS	Ghana Statistical Service
MoFA	Ministry of Food and Agriculture
NGOs	Non-Governmental Organizations
PPD	Physical and Planning Department
KNUST	Kwame Nkrumah University of Science and Technology
UPA	Urban and Peri -Urban Agriculture
UA	Urban Agriculture
UN-HABITAT	United Nations Human Settlements Programme

INTRODUCTION

General Overview of urban and Peri -urban Agriculture in Ghana

Although most of the world's poor people live in rural areas, the differences in number of urban poor from market towns and megacities are substantial and cannot be ignored. It has been projected that between 2007 and 2050, the world's population will increase from 6.7 billion to 9.2 billion and most of this growth will occur in urban areas of less developed countries (United Nations, 2008). Virtually, 2.5 billion increase will occur in developing urban areas (United Nations, 2008).

Urbanization is often a positive development, as urban areas tend to be more productive than rural areas, and therefore, a driver of economic growth and development (Overman and Venables, 2005). Rapid population growth in urban areas, however, can overstretch the capacities of cities to absorb and cater for the overgrowing number of inhabitants. It has been projected that 92% of the world's urban growth in the next two decades will be absorbed by cities of the developing world, which are least equipped to deal with rapid urbanization. This will be particularly notable in Africa and Asia where the urban population will double between 2000 and 2030, making up 81% of urban growth during that period with possibly harmful consequences if governments do not prepare now for the coming growth (United Nations, 2008). Food is becoming a very expensive commodity for the majority of poor people in developing countries due to the cost of living for households in nearly half of the developing world's largest cities who spend between 50 - 80% of their average income on food (Koc et al., 1999). People in cities have fewer coping strategies and therefore pay relatively more for food than rural inhabitants.

Some of the first evidence of urban agriculture comes from Mesopotamia, where farmers set aside small plots of land for farming within the city's walls (Holmes, 2018). Although the Hanging Gardens of Babylon, one of the seven wonders of the ancient world, have never been found, there is lots of historical evidence that elaborate gardens and irrigation systems that were integrated into several ancient Mesopotamian citadels (Holmes, 2018).

Urban farming in Ghana gained its prominence during the 1972–1979 periods when the then government under the Operation Feed Yourself program encouraged farming in cities to supplement food production from rural areas (Asomani-Boateng, 2002). This edict was in response to food shortages, occasioned by harsh economic conditions exacerbated by severe droughts in the country. Food production in cities was given increased recognition, and cities that had by-laws prohibiting the practice were ordered to relax those restrictions (Asomani-

Boateng, 2002). However, the heightened interest in urban and peri-urban agriculture (UPA) declined when the long-term drought and ensuing economic difficulties subsided in the late 1980s. In Kumasi, Ghana, the city supplies up to 90 % of the most perishable vegetables (Drechsel et al., 2007). Many of these vegetables are exotic ones and not part of local ones. But with increasing urbanization, there also diet change. In Kumasi, for example, street vendors selling fast food purchase about 60% to 83 % of the lettuce available in the vegetable market (Drechsel et al., 2007). The remaining share goes to restaurants, canteens and hotels. Private households take only about 2 % in Kumasi (Obuobie et al., 2006).

In Ghana, urban gardens have become an important source of food crops, especially vegetables, and UA activities provide supplementary sources of income for city dwellers (Abdul-Ghaniyu et al., 2002 ; Bediako et al., 2005). Urban farming provides employment and income for a chain of beneficiaries, including farmers, market sellers, suppliers of agricultural input, etc., and this, therefore, contributes to Ghana's urban economy (Obuobie et al., 2004). UPA in Ghana involves the production of food crops (mainly vegetables and indigenous vegetables like Jute mallow and amaranths) and rearing of farm animals. Fruits and ornamental plants are also produced, but on a relatively small scale. In Kumasi, UPA crop farming comprises two forms ; open-space production for the urban market and backyard gardens cultivated mostly, but not only for home consumption (Obuobie et al. 2006).

Table 1 :1 The two major categories of Urban and Peri-urban crop farming in Ghana

Farming systems	Urban areas	Peri-urban areas
Market production (cultivation on undeveloped urban land)	Irrigated vegetables (year-round or seasonal) flowers and ornamental; rain-fed cereals	Irrigated vegetables (mostly seasonal), fruits; rain-fed cereals
Subsistence production (cultivation at the house)	Backyard or front yard farming	Home gardens; farming around homestead

Source: Obuobie et al., 2006

All in all, interest in urban farming is relatively new, largely not recognized and without assistance from the public and government bodies in Ghana. Urban farming in most developing countries has been regarded as temporary. The belief is that the farmland will eventually be lost to other urban land-users. Nevertheless, urban farming is a ubiquitous feature on the Kumasi Metropolis landscape. These farms contain a wide range of staple and supplementary food crops, including fruit trees, ornamentals plants as well as poultry, livestock and fish (Obuobie

et al., 2006). The ability of UPA to sustainably contribute to livelihood is becoming increasingly problematic as the combined effects of urban planning, insecure tenancy and diminished land for UPA and its related stresses create significant challenges for the farming livelihood in the Kumasi metropolis. In spite of its importance, the value and nature of urban farming have not been given enough attention by researchers. There is very little information available on the classification, composition, structure, functions, and management practices as well as constraints hindering its development and promotion.

Problem Statement

In Kumasi supply up to 90% of the most perishable vegetables in the Metropolis (Drechsel et al., 2007). Many of these vegetables are exotic and not part of local ones. However, with increasing urbanization, diets also change. Conspicuously poorer urban households spend about 40 % of their food budget on street food due to lack of water or space for cooking. (Tornyie, 2011). It has been estimated that about 200,000 people consume uncooked vegetables from urban agriculture on a daily basis in Kumasi. If canteens and restaurants are added, another 80,000 beneficiaries of urban agriculture are possible (Obuobie et al., 2006). A recent, WFP survey conducted on 69,000 people in Kumasi indicated that 2% were food insecure while 4% were vulnerable to food insecurity. UN-HABITAT (2008) recommends that rather than applying crisis management through ad hoc responses, African governments should consider how they can strategically position themselves for changing urban food requirements. The need for supply systems and strategies should be in the short, medium and long terms, so that they will continue to be able to feed their increasing urban societies. Accordingly, policies that will protect peri-urban agricultural land, land rights and agricultural livelihoods of the poor are needed. The solutions can be found in galvanizing urban and peri-urban agricultural production, boosting infrastructure to facilitate inputs into agriculture and outputs from agriculture to cities, as well as proper water management systems to dedicate the non-productive areas of the continent to food production for internal use and future export.

Regardless of the challenges posed by urban growth and the need for activities of high economic benefits and social value, urban agriculture is neither included in urban growth strategies nor is it administered by city directions. The fertile areas of the city that have not been paved over are not limited to only community farms. Additionally, private gardens, waterways, pathways, pleasure garden, lands under high-voltage electrical towers that cannot be used for building constructions and those lands surrounding refuse dumps make up much of a city's areas that may be considered for urban agriculture. However, spatial planning for the use and manipulation

of these spaces requires the responsibilities of settlement planners and policy makers, with the use of apt management tools, to turn away any sprawl development in place of urban agriculture. Notwithstanding its significance as a major food providing sector, job generator and its values in sustaining means for the urban poor and for environmental resources, urban agriculture practice seems infrequently incorporated in land use planning processes and formations.

It is quite challenging to balance out the rapid expansion of urban population with conservation of the city surroundings in order to satisfy urban demand. There is an apparent insufficiency of institutional commitment and approaches for participatory and multi-sector planning, and for generating viable and supportive conditions for urban agricultural production with the aim of establishing sustainability (Redwood, 2009). Urban agriculture is therefore worthy of appropriate institutional recognition and direct public policy support towards its integration into urban planning and development goals (Drechsel and Dongus, 2010).

This research, as of case study of Kumasi, Ghana, is to assess urban and peri-urban agriculture. It aims at identifying the characteristics and state of incorporation of urban agriculture in Kumasi ; evaluating how urban and peri-urban agriculture supports livelihood ; and to determine if urban agriculture could be integrated into the urban development programme of Kumasi. Furthermore, the study analyses the prospects of urban planning strategies and the actual role of land planners in the promotion and development of urban agriculture. Lastly, the existing structures that support and could reinforce urban agriculture in Kumasi are reassessed.

Questions

Generally, research objectives and research questions anticipated to be answered are:

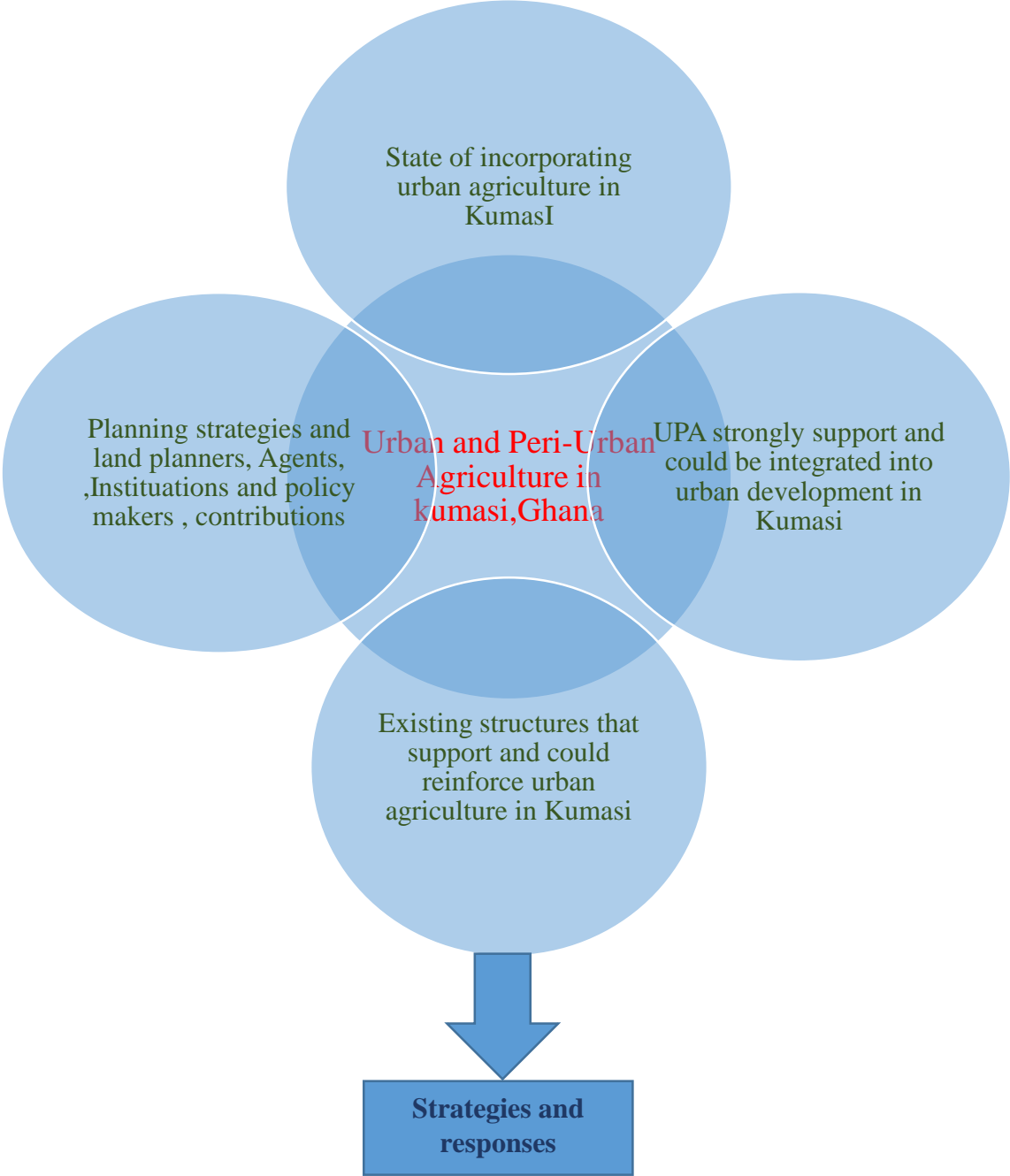
1. What is the state of integrating urban agriculture in Kumasi ?
2. What are the actual roles of urban planning strategies and land planners the prospects of these strategies in the promotion and development of urban agriculture in Kumasi ?
3. How can urban and peri-urban agriculture strongly support, and be integrated into urban development in Kumasi ?
4. What are the existing structures that support and could reinforce urban agriculture in Kumasi ?

The specific objectives will include the following

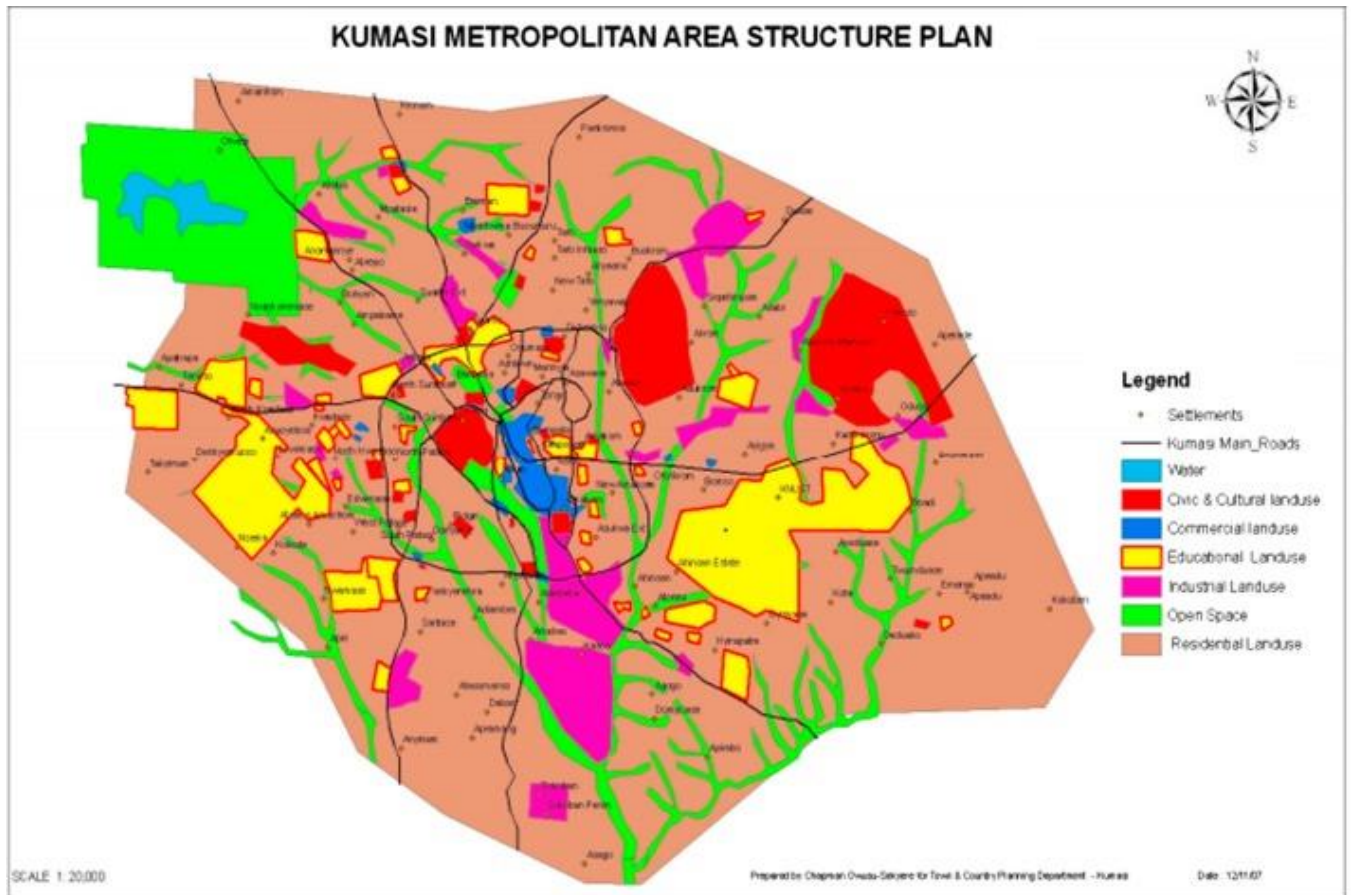
In response to the above questions. The specific objectives of the study are to see what is currently produced by UA farmers and how and where they market their produce.

Figure 1.1: Conceptual Framework

The conceptual plan demonstrates the key drivers and progression factors as well as the urban and peri-urban products and assistance. The appraisal structure as presented in the scheme below:



STUDY AREA KUMASI, GHANA



Source: Kumasi Metropolitan township and MoFA, 2010

Figure1.2 : Map of Kumasi showing Metropolitan area structure Plan

Growth in the area of Kumasi

Kumasi is the administrative capital town of the Ashanti Region of Ghana. Kumasi is the second largest city in Ghana with a population of two million and an annual growth rate of 5.9% (Ghana Statistical Service, 2003). It represents the middle belt of Ghana. Kumasi has a total area of 225 km² of which about 40% is open land. Kumasi has a semi-humid tropical climate and lies in the tropical forest zone with an annual mean rainfall of 1,420 mm and a mean monthly temperature ranging between 24°C and 27°C. Sub-Saharan Africa is the world's least urbanized region, with characteristic features of agriculture being the visible part of the landscape in most peri-urban fringes, so economic realities necessitate people's involvement in agriculture in an effort to produce food for the people therein (Nelson, 2007). About 20 million urban dwellers in West Africa practise urban and peri-urban agriculture, giving the region an increasing recognition for farmers in the sector.

Traditionally open-space urban and peri-urban agriculture has been practicable in many parts of the West African sub-region using streams passing cities, groundwater and wastewater to produce vegetables and paddy in some cases (Water Policy Briefings, 2007) to supplement other sources of food in meeting the urban challenge (Lynch et al., 2013). Between 2000 and 2010, Kumasi Metropolis contributed 20.2 % to urban growth, the highest in the country (GSS 2012b). Kumasi itself has a total area of about 250 km² of which about 40% is open land. The rainfall pattern of the town is bimodal with the major season occurring between March and July and a minor around September and October. Important streams and rivers include the Owabi river, which flows through the suburb of Anloga and Asokwa; Subin river, which passes through Kaase and Ahensan; and Wewe river, which runs through Kwame Nkrumah University of Science and Technology (KNUST) campus. The inland valley areas with low groundwater levels surrounding the streams are unsuitable for construction, but of high value for urban vegetable production. Vegetables are also produced in Peri-urban Kumasi where more than 10,000 ha was recorded under seasonal vegetable farming (Cornish and Lawrence 2001), which is twice the area under formal irrigation in the whole country. In the city, at least two out of three households have some kind of backyard farming. A much higher percentage has at least a few plantain crops or poultry (IWMI, unpublished). The peri-urban area of Kumasi has a radius of up to 40 km from the city center (Blake and Kasanga 1997; Adam 2001). It is characterized among other features by a concentration of large poultry farms (the largest farm had depended on the season up to 300,000 birds). However, the poultry industry is today under strong import pressure (Zachary 2004). In Kumasi, cassava, plantain, maize and other traditional staple food crops are dominant on upland sites, often accompanied by dry-season vegetable farming, especially along streams.

CHAPTER TWO

Literature Review

Urban and Peri-Urban Agriculture : The Concept.

In order to look at the background of urban and peri-urban agriculture its description in the broader sense needs.

Definition of urban and Peri -urban Agriculture

Whereas there is no universally agreed definition of urban and peri-urban agriculture (UPA), usage of the term generally depends on the context and operational variables (Laquinta et al, 2017). Most researchers indicate that urban and peri-urban agriculture is expected to become increasingly more important for food security and nutrition as rural land is used for building purposes (Cohen and Garrett 2009). Peri-urban areas tend to undergo dramatic changes over a given period of time. As there is an influx of people from both rural and urban areas, population density increases, land prices tend to go up and multiple land use emerges. Such changes affect the agricultural production systems, which tend to become smaller scale with more intensive production and shift from staple crops towards more perishable crops and animal production (meat, eggs, milk) (Danso, et al., 2001). In addition, in peri-urban agriculture, many cartegories may be distinguished depending on land size, capital intensity, technology used, crop mix and degree of market-orientation, among others. It is often dominated by irrigated vegetable production, for instance, in Kumasi, Ghana (Danso, 2001), Cagayan de Oro in the Philippines (Potutan et al., 2000).

Experiences in various parts of the world, including Cuba, Argentina, Lebanon, and Vietnam seem to indicate urban and peri-urban agriculture as those farm enterprises located at the fringes of the city that on average are larger than those in the city centres and more strongly market-oriented.

Peri –urban Agriculture in different Areas in the Globe

Peri-urban agriculture system is obtainable in a lot of places, but it differs with production orientations and intensities, with most having a complex mix of strategies, resource endowments and production orientations that are undertaken by individuals and collective farming households. UPA activities in Africa, Asia and Latin America provide a coping strategy of curbing urban poverty and food insecurity contributing 15-20 % of the worldwide supply of food. A common feature of UPA in the developing countries is a combination of raising

livestock with intensive cultivation of vegetables along natural water channels like streams and rivers loaded with urban municipal waste and wastewater (Abdulkadir, 2012). Many countries have a strategy subscribed to UPA as a component of national food security programs. FAO (2011) surveyed 25 countries in Africa and Latin America and found that UPA horticulture based activities are obtainable the in fringes of urban centers. The survey established that the trend is obtainable world over, citing El Alto, Bolivia 4000 m above sea level in the Andes, Libreville and Port Gentil, in Gabon, at sea level in hot and humid equatorial conditions, Cairo and Alexandria- Egypt in the Mediterranean climate, Dakar Senegal in Sub-Saharan Africa and Caracas, Venezuela, in the humid tropics of Latin America. A recent work by Maconachie et al. (2011) in Freetown, Sierra Leone suggests that self-organized and interest-driven associations help a lot in strengthening UPA, and influenced most of the farmers to join in because of its ability to generate income and improve economic well-being. The young farmers studied, indicated that their urban farming associations get the attention of NGOs and various tiers of government in attracting financial support and community development roles. In Australia, the peri-urban agricultural regions, according to studies conducted by Knowd et al (2006), suggest that 25% of total agricultural production is generated in terms of income in Australia's five mainland states. Research suggests that an estimated 35-40% of money valued agricultural products are from metropolitan areas that are actively engaged in urban and periurban agriculture (Knowd et al., 2006). In the United States of America, peri-urban farms contain most fertile soils and produce varieties of highly valued agricultural produce. US metropolitan statistical areas, according to Brinkley (2012) citing Jackson-Smith and Sharp (2008), have more total high valued agricultural soils than the rural areas, accounting for about 55% of all farm sales. Supporting the point further, according to Heimlich and Anderson (2001) as cited by Brinkley (2012), peri-urban farms produced 91% of all fruits, nuts and berries, 70% of vegetables, 67% of dairy and 54% of poultry, though the land area covered by the UPA is only 16% of the total US land area. In Asia, many studies have looked at the various stages and level of development in the UPA. The works of Razak and Roff (2007) looked at the status and potentials of urban and peri-urban agriculture in Malaysia against the backdrop of challenges of food security. On the other hand, Islam and Siwar (2012) analyzed the urban agriculture development in relation to advances in environmental biology and how the agricultural produce will be safe for human consumption. In Malaysia, Ramlan (2013) suggested following a national symposium on urban agriculture in October, 2013 that by the year 2020, 75% of Malaysians will be living in urban centers and therefore, the roles of UPA would not only be boosting food supply, but also uplift socioeconomic status and enhance environmental

sustainability. While economic benefits will affect the urban poor positively through improved food security and easy access to food income UPA will increase income and provide various opportunities in all agriculturally related businesses. Potentials of urban and peri-urban agriculture was looked into by Indraprahasta (2013). His work seems to suggest that in Indonesia, urban residents spend 30% greater than rural populations on food. He pointed to the major problems of increasing food demand, persistent growth of population and ecological degradation as the biggest challenge facing Asian cities, and Indonesia in particular. All these factors highlighted above gave a good starting to urban and peri-urban agriculture in Indonesia in the late 1990s after the economic crisis that affected the country, making people subscribe to the practice due to its yielding benefits of creating alternative jobs and better access to food. Community-based food security projects as highlighted in the works of the Provincial Health Services Authority (2008) in British Columbia;Canada discussed various strategies of community-based efforts, including UPA, as a way for boosting food security. It has been established by Olayiwola (2012) that the experiences in cities of developing countries suggest that political stability and future sustainable development of the cities will depend upon food supplies for the increasing populations through the practice of UPA as an economic activity central to the lives of hundreds of millions of people throughout the world in the north and south (Olayiwola, 2012).The opposition often comes more often from urban planners, public health workers and environmentalists (Mougeot, 2000; Birley et al., 1999). On health impacts of peri-urban natural resource development, while Dossa et al. (2011) were critical that systematic classification of peri-urban agriculture in West Africa and most developing countries are lacking, they opined that for meaningful comparisons between practices, regional studies have to be intensified to generate data that will be vital to avoid misleading generalizations on urban and peri-urban agricultural practices. The advantages of UPA as cited by Binns and Lynch (1978), are seen as maximizing combining farm and non-farm work. This point was established further by FAO (2011),whereby every opportunity to produce food and generate income from what many see as a free resource, is fully exploited by the UPA farmers.These efforts in developing countries have promoted unit-based vertical integration of smallholder farmers that will enhance reaping the benefits of economies of scale to maximize the benefits of UPA. In agitating for countries in the global south to subscribe to UPA, FAO (1999, 2001 and 2011), Brinkley (2012) and Kuuire (2012) characterized UPA to include the following :

(i) Peri-urban areas are more endowed with natural resources for agricultural practices, farmers have a full-time job all year round,

- (ii) peri-urban agricultural production is economically dependent on urban centers,
- (iii) UPA has the advantage of lower population densities that gives more land/space area availability than the urban centers,
- (iv) farm management strategies are likely to develop from medium to large scale, and readily providing access to the product due to the primary market orientation and proximity to the dwellers of urban centers.

These characteristics go a long way in agricultural development, which implies a sustained increase in output level and improvement of rural farmers' well-being coupled with sustained physical and socioeconomic improvement of Peoria-urban farmers (Medugu,2006; Peet and Hartwick, 2009; Abdulkadir et al., 2012).

Role of the Urban Planners in Urban Agriculture

Among the basic necessities of life, air, water, shelter and food, planners have traditionally addressed them all with the conspicuous exception of food. This was the puzzling omission that provoked the American Planning Association (APA) to produce its seminal Policy Guide on Community and Regional Food Planning in 2007 ; although a belated attempt to make amends for the fact that planning community, academics, and professionals alike, had failed to engage with the food system (APA, 2007). As urban agriculture becomes more prevalent in urban environments, it is emerging as a new area of concern for urban designers, planners, and architects. For instance, urban agriculture has many important roles to play in urban poverty alleviation, social inclusion, urban food security, urban waste management, and urban greening (Hempstead,2007). These are extremely important factors when looking at the design of cities and buildings. Many of the planning projects that include agriculture are located outside the United States. This is due in part to a lack of urban agriculture tradition in American cities and indeed for the perception of American designers and planners that urban agriculture is messy and incompatible with modern cities (Girardet, 2004). These are extremely important factors when looking at the design of cities and buildings, although the concept is country-dependent. However, third world cities, often welcome urban agriculture. Sometimes this is as a result of a long-standing tradition of including agriculture in the urban fabric. Other times it is a remnant of rapid industrialization, which quickly sites factories and high rises in what used to be farmland. In Africa, urban livelihood is being addressed through the acceptance of a more diverse approach to economic activities (Owusu, 2007). Many African cities need multiple labor-intensive employment programs. This has therefore led critics to call for the native urban

planning systems in Africa, where, urban agriculture has been proposed as one strategy to accomplish this (Owusu, 2007).

Integration Urban Agriculture into City Development

In today's culture and the urban environment, there is little emphasis on social interaction with neighbors. The urban farm offers spaces conducive to interaction as residents come together to produce food (Doron, 2005 ; Paxton, 1997; Hempstead, 2007). Many urban farms are located in public parks, which are social spaces (Paxton, 1997). Unused areas of parks can be turned over to farming projects like herb gardens, and members of the community taking on "pocket parks" are encouraged to grow their own food (Paxton, 1997) in cooperation with one another. Cultivating the land is an activity that promotes participation and collaboration between participants. Few people take the time to consider how the food they eat has been produced, but urban farming allows city residents to reconnect with the land and their food sources. In the process of cultivating the land, community ties are built. In this way, urban agriculture can mend not just the city's environmental fabric, but also its social fabric.

CHAPTER THREE

Research Methodology

This chapter explains the research methodology used in this study and the rationale behind the choices made.

Research Area

A qualitative study was carried out among the three towns in Kumasi, the second-largest city in Ghana after Accra, the capital. The geographical locations were Adako-Jachie in Ejisu Municipal, Mamponteng in Afigya-Kwabre East Municipal and Afrancho in Afigya-Kwabre South Municipal.

Research Approach

This chapter presents a chronological description of the research methods used to carry out this study. The underlying principles of the applied research methods, the techniques to ensure validity and reliability of data, along with the methods used for data analysis are also discussed in this chapter. The researcher also explains the methods through which the findings are used to draw conclusions and present the results of the research.

Research Design

A case study method was adopted for this research. Research restrictions, as well as the depth of the study, were taken into consideration in adopting this approach. David and Sutton (2004) describe the case study approach as an explanatory method which makes it easier to ask and seek answers to the necessary how, when and why questions related to the study. The merit of the case study method is that it allows statistical inferences to a broader population, so that results can be extrapolated as it increases the external validity through generalization (Babbie, 2007).

For the aims of this study, the city of Kumasi was selected as a case study area for the following reasons.

(1) Ashanti Region is the most populous in Ghana, with about two-thirds of its population living in Kumasi (Amoateng et al., 2013).

(2) Kumasi is a major migration destination and commercial and economic center for Ghana and the West African sub-region (Adarkwa 2011).

(3) Despite the economic potential, the city of Kumasi is faced with several urban development and management challenges, including urban sprawl, slum proliferation, transportation challenges, growing informalisation, destruction of ecologically sensitive areas, indescribable scenes of filth and gradual extinction of urban greenery (Amoako and Cobbinah, 2011).

(4) Kumasi has weak urban planning institutions which have frequently failed to ensure orderly development through planning and management interventions (Amoateng et al.,2013).

(5). There are available information settings in the Kumasi Metropolis, which give significant background data to reinforce this research.

Furthermore, three communities/ suburbs of the Kumasi Metropolis were selected as case study communities. The sampling approach and reasons for those selections, of those communities were evaluated in the Sampling Techniques section.

Data Collection Techniques

In undertaking this study, two key data collection techniques were used. These included semi-structured interviews with local government officials of selected institutions and farmer questionnaire surveys with urban residents in the three selected case study communities/ suburbs. These techniques were useful in facilitating and enhancing the data collection process and for answering the research questions. Relevant information was obtained from both primary and secondary sources. The SPSS software package was the majority statistical tool used to process and analyze data from the field while tables, figures, graphs, and percentages were used in interpreting and presenting the results. The secondary sources were reviewed documents and literature relating to urban and peri-urban agriculture in Ghana and across the globe. While on the global scale the review concentrated on books and journal articles on urban and peri-urban agriculture development, the local review studied documents such as master plans of Kumasi prepared in 1962 and the reviewed current structural plan of 2007. Using semi-structured interviews, qualitative data were collected from institutional representatives of urban planning-related institutions in May-June, 2019. The following sections examine how the data collection process was carried out :

Semi-structured interviews

The use of semi-structured interviews offer the researcher adequate flexibility in approaching the respondents in a variety of ways, while still focusing on the various aspects of the data collection (Mohd Noor, 2008). In applying this data collection technique, a list of questions (interview guide) based on the research questions and objectives was used and provided the researcher enough space to seek and investigate further into the issues. These questions were mostly opened-ended and semi-structured interviews, reasonably beginning with basic questions, including the roles of the institutions (see Appendix). The classification invigorated respondents' interests in the study, allows the researcher to seek clarifications and focus on the research questions based on the identified strengths and knowledge of respondents. The semi-structured interview data collection technique was used in the collection of institutional data. The institutional surveys were undertaken through the use of telephone and Skype conversations with relevant local government officials at the below-mentioned institutions. The interview time ranged from 50 minutes to 60 minutes, depending on the interests and knowledge of the research topic and the willingness of the local government officials.

Urban Farmers Questionnaire

The Urban Agriculture farmer questionnaire was designed based on closed-ended questions, with unrestricted multiple choice questions on the topic for the selected (64) urban farmers from the three selected communities/ suburbs in the Kumasi Metropolis farmers (see Appendix). This structure presented the farmers the freedom to respond to the questions posed merely because they require yes or no answers. The farmers answered prepared questions based on their complete knowledge, feeling, understanding and information to support their responses to the closed-ended questions. The main purpose of involving the farmers in this survey in the three selected communities/ suburbs was for the researcher to obtain enough information on the grounds regarding Urban Agriculture and other farming activities in the Kumasi Metropolis.

The questionnaire was logically structured with basic questions relating to the farming activities which outlined certain aspects of the study area including demography, socioeconomic status and growth. Additionally, the common types of UA practices, agricultural produce, public opinion on UA in terms of support, importance of UA in urban planning as well as the major constraints to UA in urban development were sought in the questionnaire. The urban farmer's survey was online and engaged respondents with the prepared questions, ensuring gender equity to avoid bias in the research to cater for non-responses due to some respondents' unwillingness to engage in the study. The average time administering the questionnaire was 15-20 minutes, depending on the interests and knowledge of the farmer.

Sampling Techniques

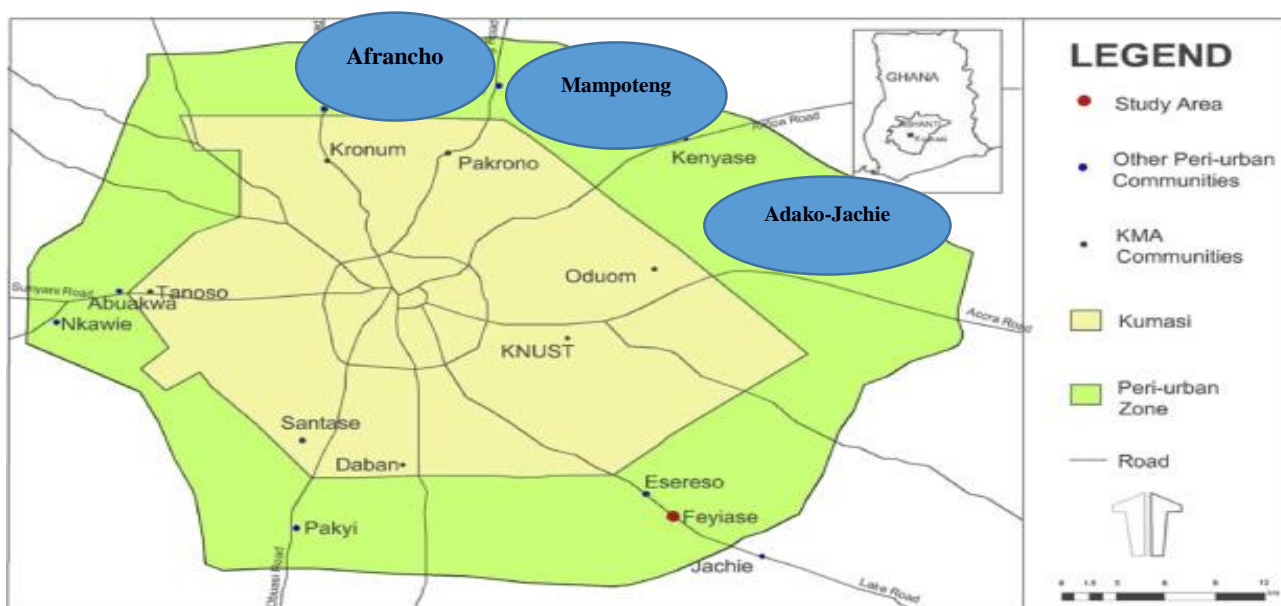
Two phases of hierarchical sampling design were followed, i.e. primary and secondary sources of data. The sampling process described below was undertaken at two levels : institutional and urban farmers.

Institutional sampling process

The institutional sampling provided in-depth data from a smaller and relevant number of respondents. Three urban planning and management institutions were purposefully sampled for this intention to provide data regarding integration of UA into urban development in the Kumasi Metropolis. The selected institutions were the Physical and Planning Department (PPD), Ministry of Food and Agriculture (MOFA) all of the Kumasi Metropolitan Assembly, Council for Scientific and Industrial Research - Crops Research Institute (CSIR-CRI). The institutional interview was carried out by researchers and the Directors in Districts and Municipalities in the selected communities/ suburbs where the urban farmer surveys were undertaken. PPD is responsible for the socioeconomic and physical development in all the Districts and Municipalities in Kumasi Metropolitan. This agency is also responsible for the physical and spatial planning in all the Districts and Municipalities in the Kumasi Metropolis. MOFA is responsible for the formulation of appropriate agricultural policies as well as planning and coordination of various development projects in the agricultural sector. CSIR-CRI is responsible for high and sustainable crop productivity and food security through development and dissemination of environmentally sound technologies (see Appendix for more information about the Institute's profile). The involvement of these institutions would be very helpful in understanding policies and issues regarding UA integration into urban development, land development, process planning strategies, the extent of stakeholder participation as well as reassessing the existing structures to make relevant suggestions on UA in Kumasi, the focus of this research.

Urban Farmers sampling process

The prepared online surveying approach was employed to determine urban farmer respondents that would participate in the urban farmer's survey. The survey was conducted with 64 selected urban farmers, who are residents in the three communities/suburbs of Adako-Jachie (Ejisu Municipal), Mampong (Afigya Kwabre East Municipal) Afrancho (Afigya Kwabre south). The reason for selecting these three towns was that they are among the peri-urban towns in the Kumasi Metropolis as is shown in figure 2.1 below



Cobbinah et al.2015

Figure 2.1: Map of Kumasi Metropolis in Ghana showing critical peri-urban zones

Table 2.1 Sample Size Determination. Table details how the sample size was determined

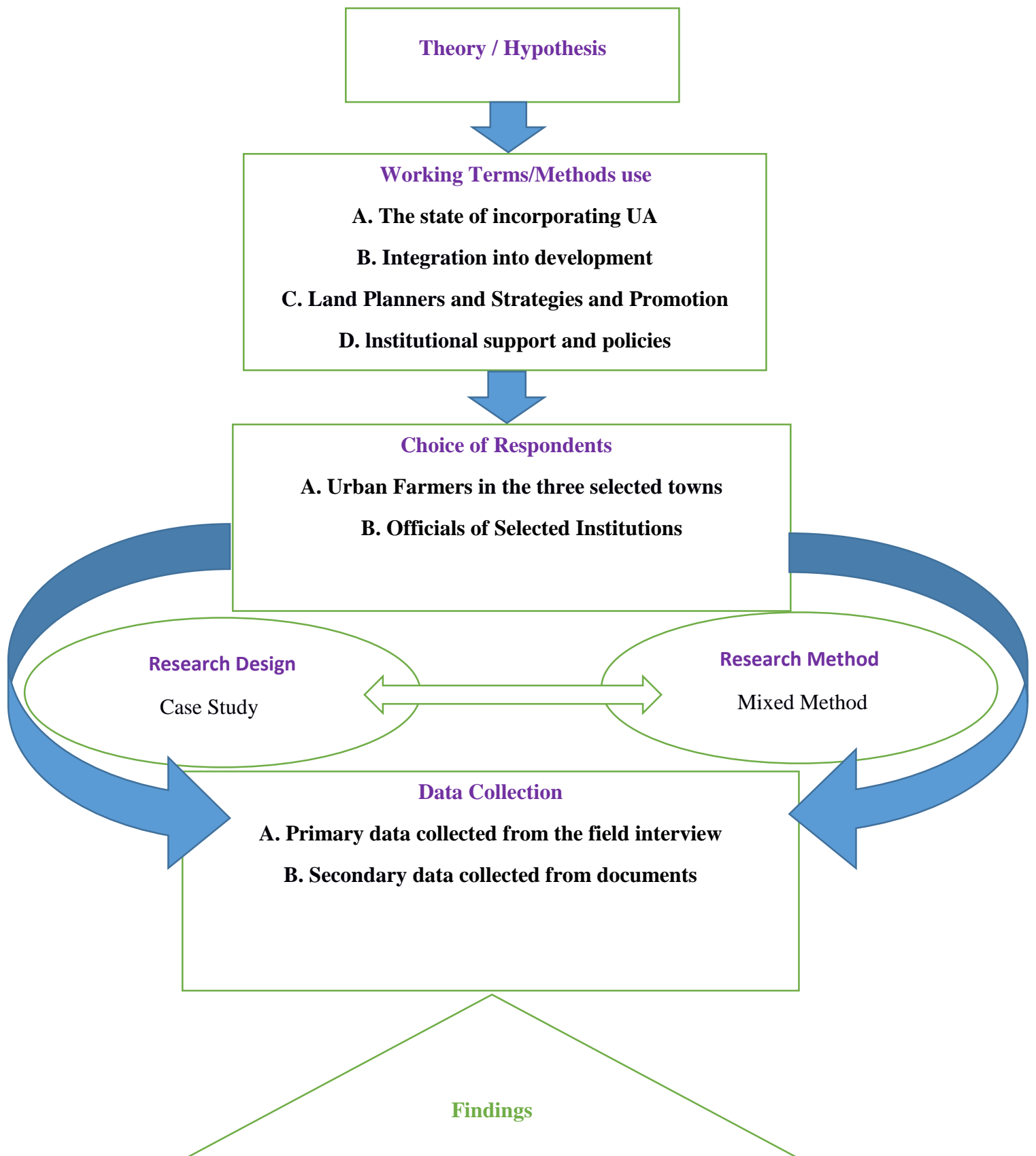
Three study Areas	Sampling Technique	Sampling Frame(N)	Sample Size (n)
Mampong-Afigya Kwabe East Municipal	Stratified Sampling Simple Random Sampling	24	22
Afrancho-Afigya Kwabe south District	Stratified Sampling Simple Random Sampling	21	19
Adako-Jachie-Ejisu Municipal	Stratified Sampling Simple Random Sampling	24	23
Total		69	64
Institutional interviewed	Interviewed Guide	10	11

Data Processing, Analysis and Interpretation

Officials of the selected institutions constituted the units of analysis at the institutional levels, while the selected (64) farmers in the three communities within the Kumasi Metropolis formed the units of analysis at the urban farmers level. The primary data collected were first processed by organizing and editing to remove any errors in the data. The data were then coded, tabulated and subjected to descriptive statistical analysis using SPSS version 10. Tables, figures, graphs, and percentages were for presentation of results in the case of the qualitative technique. The

qualitative analysis was also involved in the descriptive presentation and it was used to analyze data obtained from the institutions. The schematic representation of the data analysis process is as summarized figure 3.1 below

Figure 3.1: Data Analysis and Reporting structure



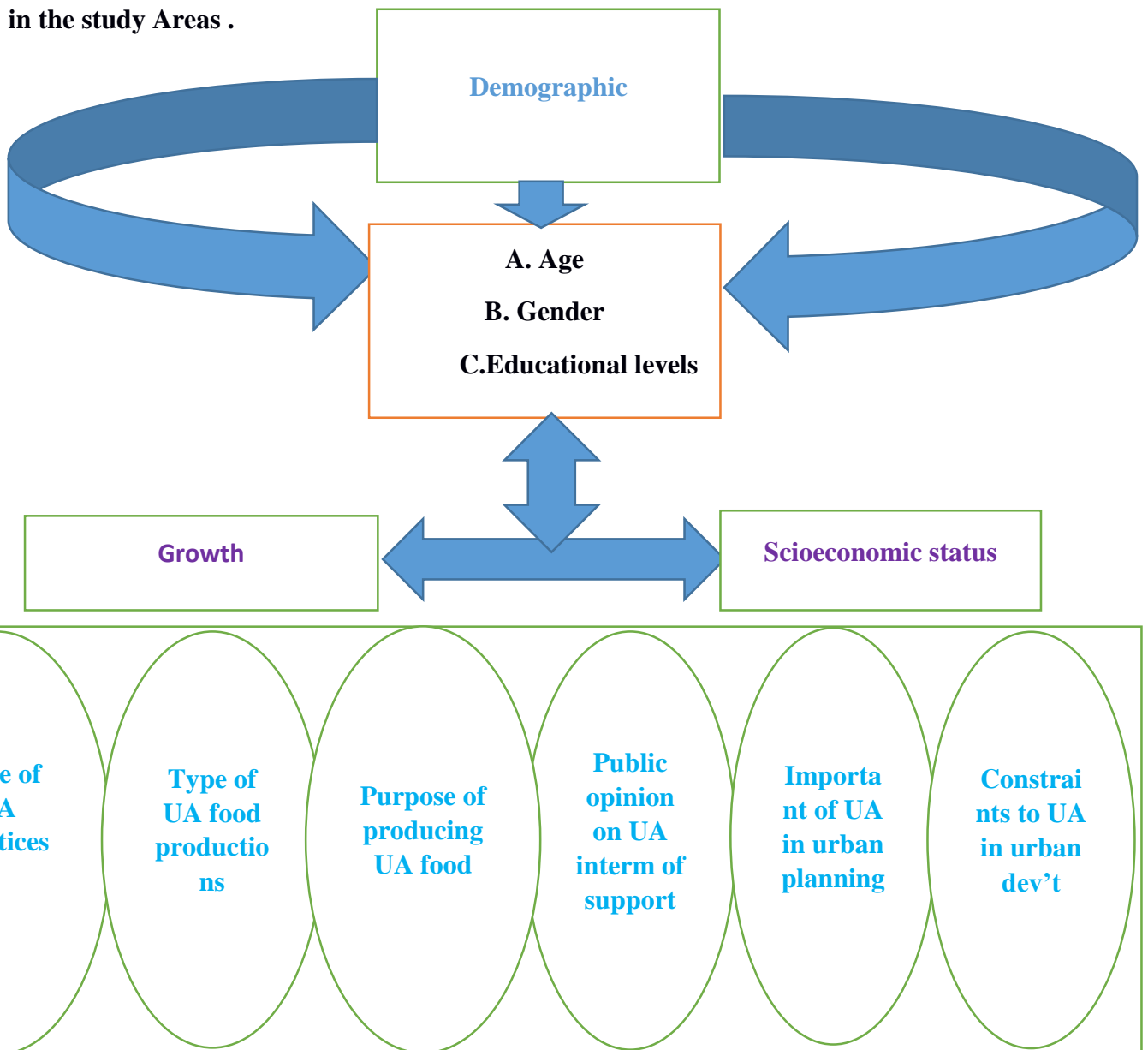
CHAPTER FOUR

RESULTS AND DISCUSSIONS

Having established the theoretical framework of the study, the findings from the farmer surveys and the institutional semi-structured interviews with the selected institutions in the three study areas were presented in this way in the figure 4.1 below:

Characteristics of Respondents

Figure 4.1: Schematic diagram showing the characteristics of respondents determined in the study Areas .



Characteristics of Respondents

Details of the three demographic characteristics determined in the three towns within the Kumasi Metropolis where the study was conducted are as presented in table 4.1 below.

Demographic characteristics of respondents

Table 4.1 Detailed gender distribution among respondents in the three study areas

Study Areas	Total Respondents	Male	% Male	Female	% Female
Mamponteng	22	12	54.5	10	45.5
Afrancho	19	10	52.6	9	47.4
Adako-Jachie	23	13	56.5	10	43.5

Out of the 22 farmers in Mamponteng in the Afigya-Kwabre East Municipality, 12 were the males, representing 54.5% and the females were 10 which also accounting for 45.5% of the total number surveyed. This clearly demonstrates the fact that in Mamponteng, males dominated in the farming activities in the Municipality. Also, for 19 farmers in Afrancho in the Afigya-Kwabre South District surveyed, 10 were males representing 52.6% and the females were 9 which also represents 47.4%. This clearly attests to the fact that in Afrancho, males slightly dominated in the farming activities. Similarly, male farmers dominated females in Adako-Jachie 13 out of 23 (56.5%) being males, and 10 females accounting for 43.5% of the total number of respondents. This clearly indicates that farming activities are dominated by males in Ejisu. Looking at the numbers for all the three areas (64) and the percentage difference in terms of gender status, it is clear that males dominate in UA in the three towns. Comparing the numbers among African countries, one can conclude that there are clear differences since women dominate in UA in other African countries like Togo, Sierra Leone and Tanzania (Tornyie, 2011).

Distribution of Respondents over age in the three study Areas

For effective planning on integrating UA, it is important that distribution of the various gender groupings by age in the District and Municipality is known. This categorization was determined for this purpose.

From table 4.2.1, out of the 22 urban farmers surveyed in Mampondeng representing the Afigya-Kwabre District, 7 female (57.1%) and 6 male farmers (46.7%) were aged between 45-60 years, followed by 6 male and 3 female farmers falling within 30-45 years, constituting 42.8% and 40.0%, respectively. Also, for the age intervals of 18-30 and over 60+ years, there were no female representative farmers but only males, which accounted for 6.7%. There were no representations for farmers aged below 18 years. This clearly demonstrates that in Mampondeng, is male-dominated in gender groupings by age in the Municipality.

Table 4.2.1: Age of Respondents in Mampondeng

AGES	Males	Females	Males (%)	Females(%)
Below 18	0	0	0	0
18-30	1	0	6.7	0
30-45	6	3	40	42.8
45-60	7	4	46.7	57.1
60+	1	0	6.7	0
Total	15	7	100	100

Table 4.2.2: Age of Respondents in the Afrancho

From table 4.2.2, out of the 20 UA farmers in Afrancho, Afigya-Kwabre South District, 4 males and 2 females each, respectively, responded for the age categories 18-30 years and 45-60 years each, representing 34.6%. For the age interval 30-45 years, there were 3 females representing about 33.3% as against 1 male (9.1%). However for the age categories of below 18 years and 60+ years, the males were the same, with only 1 farmer for each, representing 11.1% . This clearly attests to the fact that Afrancho is male-dominated in gender groupings by age in the District.

AGES	Males	Females	Males (%)	Females(%)
Below 18	1	1	9.1	11.1
18-30	4	2	36.4	22.2
30-45	1	3	9.1	33.3
45-60	4	2	36.4	22.2
60+	1	1	9.1	11.1
Total	11	9	100	100

Table 4.2.3: Age of respondents in the Adako-Jachie

Notwithstanding, on the side of females there were the same number of respondents between the age intervals of below 18 years and 60+ year, representing 11.1% for each. Furthermore, age categories of 18-30 years and 45-60 years were 22.2% of the respondents. This clearly attests to the fact that Afrancho is male-dominated in gender groupings by age categorization in the municipality.

Additionally, from the table 4.2.3, the farmers in the Adako-Jachie in the Ejisu Municipal out of 23, the 45-60 years age category constituting 5 female and 5 male farmers dominated which represented 38.5%, followed by 4 females farmers for 18-30 years category, representing 40.0% of the respondents.

AGES	Males	Females	Males (%)	Females(%)
Below 18	1	0	7.7	0
18-30	3	4	23.1	40
30-45	3	1	23.1	10

45-60	5	5	38.5	50
60+	1	0	7.7	0
Total	13	10	100	100

Table 4.2.3: Age of respondents in the Adako-Jachie

Notwithstanding, on the side of females there were the same number of respondents between the age intervals of below 18 years and 60+ year, representing 11.1% for each. Furthermore, age categories of 18-30 years and 45-60 years were 22.2% of the respondents. This clearly attests to the fact that Afrancho is male-dominated in gender groupings by age categorization in the municipality.

Additionally, from the table 4.2.3, the farmers in the Adako-Jachie in the Ejisu Municipal out of 23, the 45-60 years age category constituting 5 female and 5 male farmers dominated which represented 38.5%, followed by 4 females farmers for 18-30 years category, representing 40.0% of the respondents

Educational status of respondents in the three study Areas

The survey showed different patterns of educational status in the three study areas. For instance, from the figure, 4.2.1, 45.4% of the farmers in Mampondeng in the Afigya-Kwabre East Municipality, have had at least formal tertiary level education, followed by 22.7% of those with Middle/Junior High School education. Farmer respondents who have had primary level and senior high or vocational school level education constituted 13.6%, while the rest (4.5%) had a little formal education or none at all. This indicates that majority of the farmers engaged in UA have had formal education level in Mampondeng Municipality.

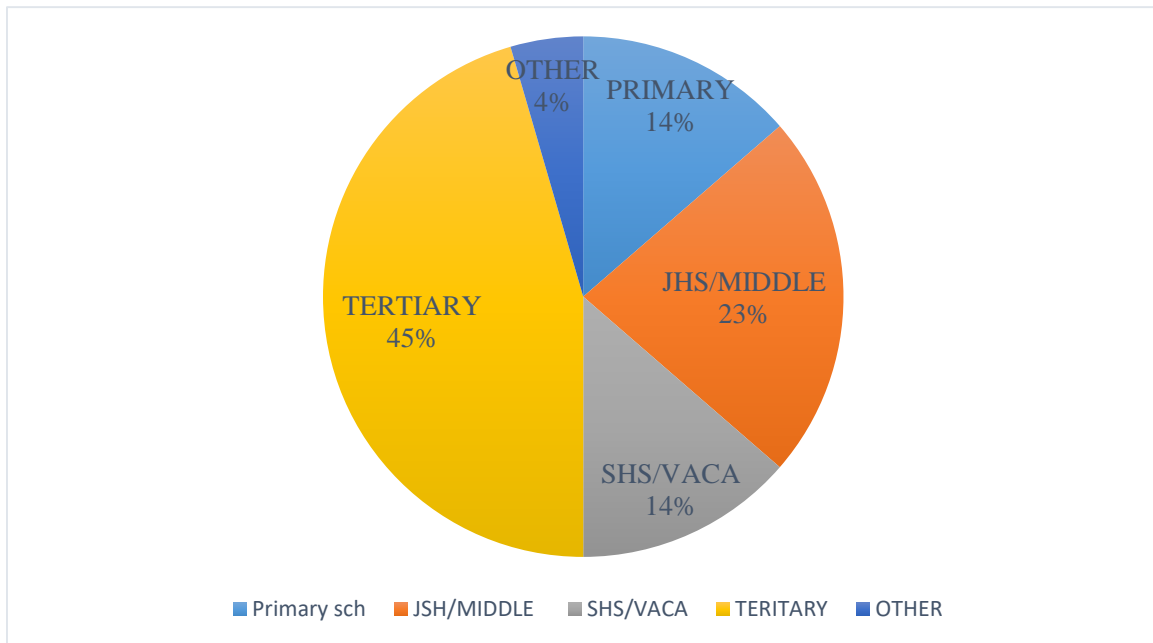


Figure 4.2.1 Educational levels of respondents in the Mampong

For the farmers in the Afrancho in the Afigya-Kwabre South District, 42.1% had tertiary level education (figure. 4.2.2), followed by 26.3% of Middle/ Junior High School, 15.8% for primary level education and 10.5% completed senior high or vocational school. Lastly, some 5.3% had no formal education at all. This indicates that the majority of the farmers has formal education level in Afrancho.

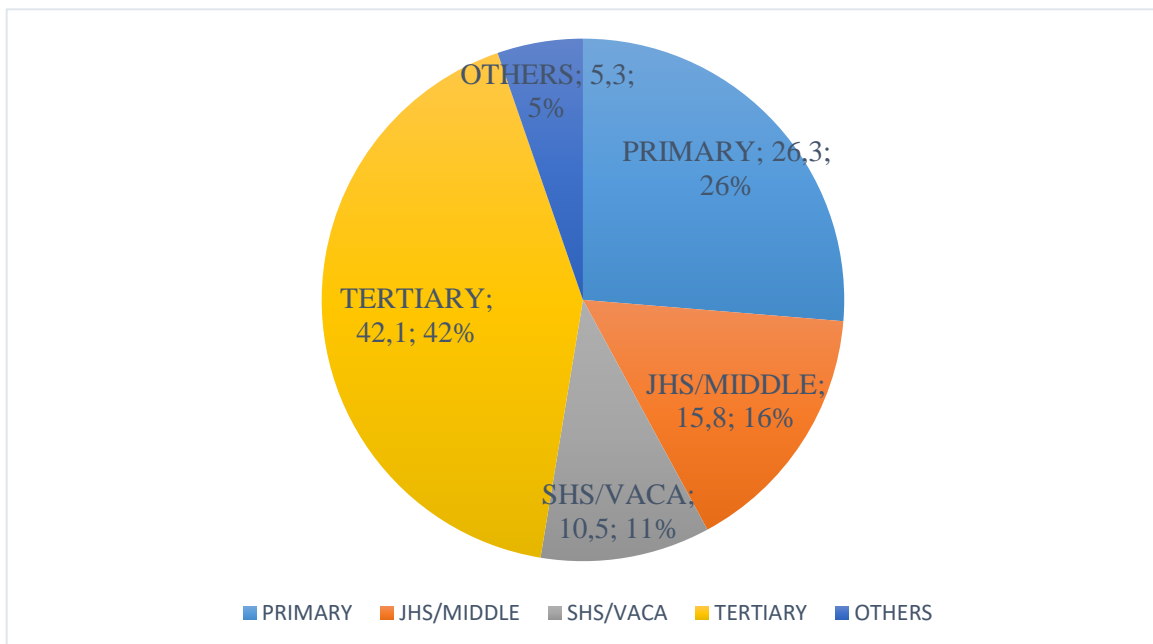


Figure 4.2.2: Educational levels of respondents in the Afrancho

Additionally, for the farmers at Adako-Jachie in the Ejisu Municipality (figure. 4.2.3), 47.8% have had tertiary education, followed by 21.7% senior high school and vocational school, 17.4% with primary level education and the middle/Junior High School constituted 13.0%. Interestingly, every farmer involved in UA in Adako-Jachie within the Ejisu Municipality has had some formal education

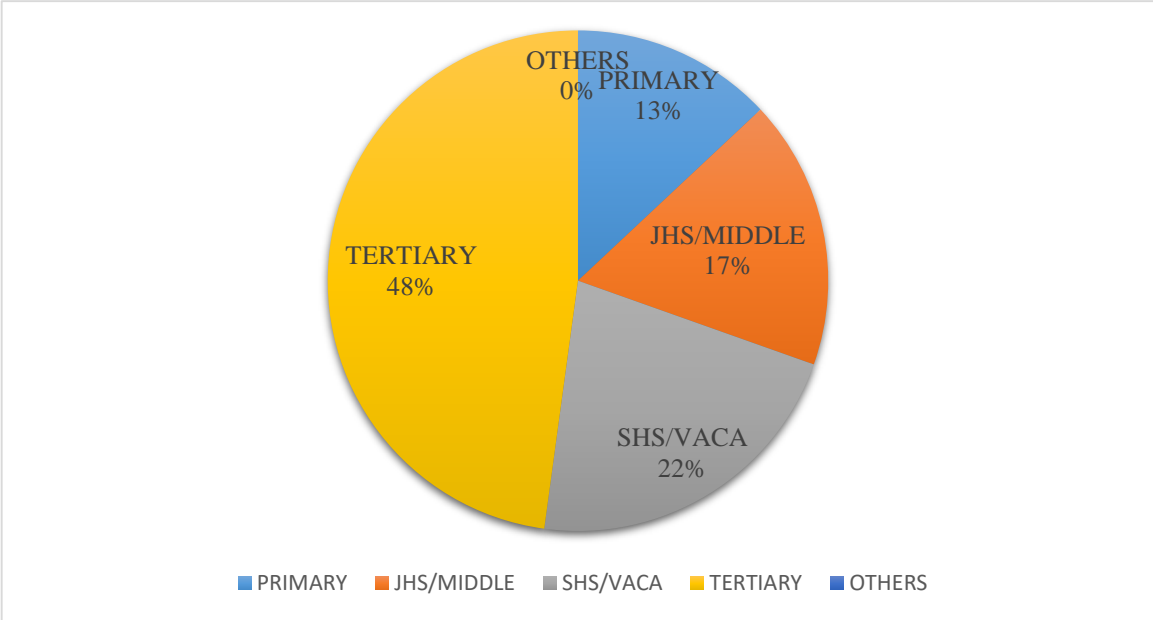


Figure 4.2.3 : Educational levels of respondents in the Adako-Jachie

Despite the fact that only 45.4%, 42.1% and 47.8% of urban farmers in the three study towns have formal tertiary education, a substantial number of the other category of farmers can read and write. The UA farmers with tertiary educational level is relatively high and quite encouraging, and that most of these farmers could benefit from the planting and rearing for food and jobs policy the current government has launched.

Table 4.3: Socioeconomic status of UA farmers in the study Area

Farmers were asked in the survey if they solely depend on farming activities for their livelihood, and the answers revealed a lot of information. The forms of engagement were subsequently grouped into socioeconomic sectors, according to the terms of employment in the Ghanaian system. The analysis indicated that 40.9 %, 57.9% and 52.2% of the farmers in Mampong, Afrancho and Adako-Jachie, respectively, also work in the private sector to earn extra income for their livelihood (table.4.3). With regards to the occupational characteristics of the study areas, for Mampong, 27.3% worked in the business sector followed by 13.6% engaged as students, while 9.1% each are either self-employed or retire. Besides, of the 19 respondents in

Afrancho (table. 4.3),15.8% were either self-employed or in the business sectors, whereas students constituted 10.5% and the remaining 5.3% on formal retirement.

Three study Areas	Mamponteng Absolute figure	Mamponteng(%)	Afrancho Absolute figure	Afrancho(%)	Adako-Jachie Absolute figure	Adako-Jachie (%)
Private	9	40.9	11	57.9	12	52.2
Business	6	27.3	3	15.8	3	13.0
Self Employed	2	9.1	3	15.8	2	8.7
Student	3	13.6	2	10.5	4	17.4
Retired	2	9.1	1	5.3	2	8.7
Total	22	100	19	100	23	100

For respondents in Adako-Jachie, students constituted 17.4%, followed by those in the business sectors, representing 13.0%, while the self-employed and retire were 8.7%. Even though farmers also engaged in the private sector dominated in the three study towns, there were differences in the numbers. Afrancho with a small number of respondents recorded higher numbers for farmers also engaged in the private sector compared to Adako-Jachie and Mamponteng.

Involvement of respondent farmers in UA food production

The survey showed different patterns of UA food production in the three case study areas. For instance, from the 11 out of 22 representing 50.0% of farmers in the Mampondeng in the Afigya-Kwabre East Municipal are into UA production (figure 4.3). Additionally, 6 out of 22 representing 22.7% of farmers also indicated that they are not into UA production, whereas 5 farmers (27.2%) were not sure if what they practice is AU. Besides, the farmers in Afrancho in the Afigya-Kwabre South District, 14 out of 19 representing 73.7% of the farmers said they were engaged in UA production (figure. 4.1). From the rest, 3 farmers representing 15.8% were not involved in UA, while the remaining 2 (10.5%) farmers were not sure of the practice they are involved in is AU.

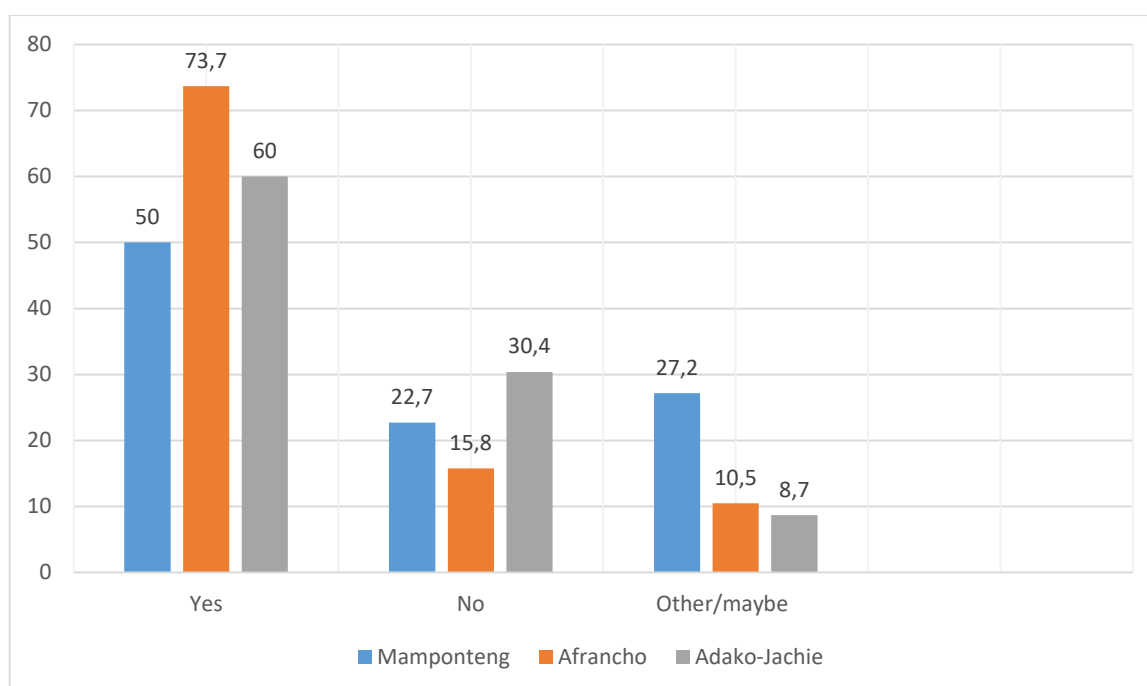


Figure 4.3. Most UA food produce of Respondents in three study Area

Figure 4.3. Frequency of farmers UA food produce of Respondents in three study Area Additionally, 14 out of 23 the farmers in Adako-Jachie in the Ejisu Municipal representing 60.0% confirmed that they were into UA production (figure. 4.1). More so 7 out of 23 representing 30.4% said that they were not into UA production, while 2 farmers (8.7%) were not in the practice of AU.

Looking at the outcome of the analysis, it is evident that a majority of the respondents in the study areas in Kumasi are involved in UA production (50%, 78.7% and 60.9), the general importance of UA in Kumasi Metropolis.

Types of UA Food production in the study Area

Respondent farmers were asked about the specific kind of UA practices they are involved in. . For the respondent UA farmers in Mamponteng, 54.5% practiced backyard farming, followed by 36.4% and 9.1% who were engaged in home gardening and school gardening, respectively (table 4.4). However, none of the respondents was involved in hospital and community garden practices in their area. Besides, 19 out of the respondents interviewed in Afrancho (table. 4.4) were involved in some form of UA. Home garden and backyard farming were equally practiced, with 47.4 % total representation, whereas one (1) respondent (5.2%) was involved in hospital gardening. Evidently community and school gardening were not popular in Afrancho.

Table 4.4: Types of UA Food production of Respondents in the three study Area

Three study Areas	Mamponteng Absolute figure	Mamponteng(%)	Afrancho Absolute figure	Afrancho(%)	Adako-Jackie Absolute figure	Adako-Jackie (%)
Home Garden	8	36.4	9	47.4	9	39.1
Community Garden	0	0	0	0	0	0
School Garden	2	9.1	0	0	1	4.3
Hospital Garden	0	0	1	5.2	0	0
Backyard Farming	12	54.5	9	47.4	13	56.5
Other	0	0	0	0	0	0
Total	22	100	19	100	23	100

Interestingly, 56.5% of respondents from Adako-Jachie practiced backyard gardening (table 4.4). Some 39.1% practiced home gardening, while 4.3% were involved in school gardening. Hospital and community garden practices were not practiced in this area.

The analysis clearly shows that there are UA farmers in the three study areas. The majority of them clearly indicated that they only know home gardening and backyard farming, the most common types of UA practices. The outcome was not surprising because access to sizable portions of farming land is very limited in and around Kumasi Metropolis due to development activities. Apparently, the majority of the farmers engage in these two types of UA practices as a means of subsistence to support their families and households.

Types of UA Food production in the three study Areas

The types of food generated from UA production in the three study areas summarized in Table 4.5. In Mampong, 22 of the respondent UA farmers representing 40.9% indicated that they only produce fruits, followed by 18.2%, 13.6% and 9.1%, for vegetables, grains/legumes and fish, respectively. About 4.55 produced mushroom, grass cutters, herbs and ornamentals but none produced snails. For the UA farmers in Afrancho (table 4.5), 19 out of respondents interviewed (52.6%) were engaged only in UA food production, and that they produced vegetables on a larger scale. Some 15.8% produced grains and legumes, while 5.3% each produced mushroom, grass cutters, herbs/ornamentals, fruits and snails, but none were involved in snail production in Afrancho.

Three study Areas	Mampong Absolute figure	Mampongeng(%)	Afrancho Absolute figure	Afrancho(%)	Adako-Jachie Absolute figure	Adako-Jachie (%)
Vegetables	4	18.2	10	52.6	8	34.8
Fruits	9	40.9	1	5.3	6	27.2
Herbs and ornaments Plants	1	4.5	1	5.3	3	13.0
Fish farming	2	9.1	0	0	0	0
Grains/legumes	3	13.6	3	15.8	2	8.7

Mushrooms	1	4.5	1	5.3	1	4.3
Grass cutters	1	4.5	1	5.3	2	8.7
Snails	0	0	1	5.3	0	4.3
Others	1	4.5	1	5.3	1	0
Total	22	100	19	100	23	10

Regarding Adako-Jachie, for out of the 23 respondents interviewed who are engaged in UA production, 34.8% produced vegetables on a larger scale. Some 27.2% and 13.0% were engaged in fruits and herbs and ornamentals, respectively. Those that were involved in grass cutter rearing and grains/legumes constituted 8.7% each, while 4.3% each produced mushrooms and snails. However, there were farmers involved in fish production in Adako-Jachie.

It is indicative based on the analysis that fruits and vegetable production through UA is very important in three study areas ; particularly, fruits in Mampong and vegetables in Afrancho, whereas both are predominant in Adako-Jachie. It must be noted that fruits and vegetables are an important source of dietary vitamins and minerals, and promotion of their production through UA will enhance both the nutritional status and livelihoods of inhabitants of Kumasi metropolis.

Purpose of UA food production in the study area

The survey revealed the different patterns for the purposes of UA production of food in the three study areas (figure 4.4). About 40.9% of UA farmers in Mampong indicated that they produce for self-consumption, while 27.3% produced for the local market to generate income. About a third (31.8%) produced for both purposes, for subsistence and income generation.

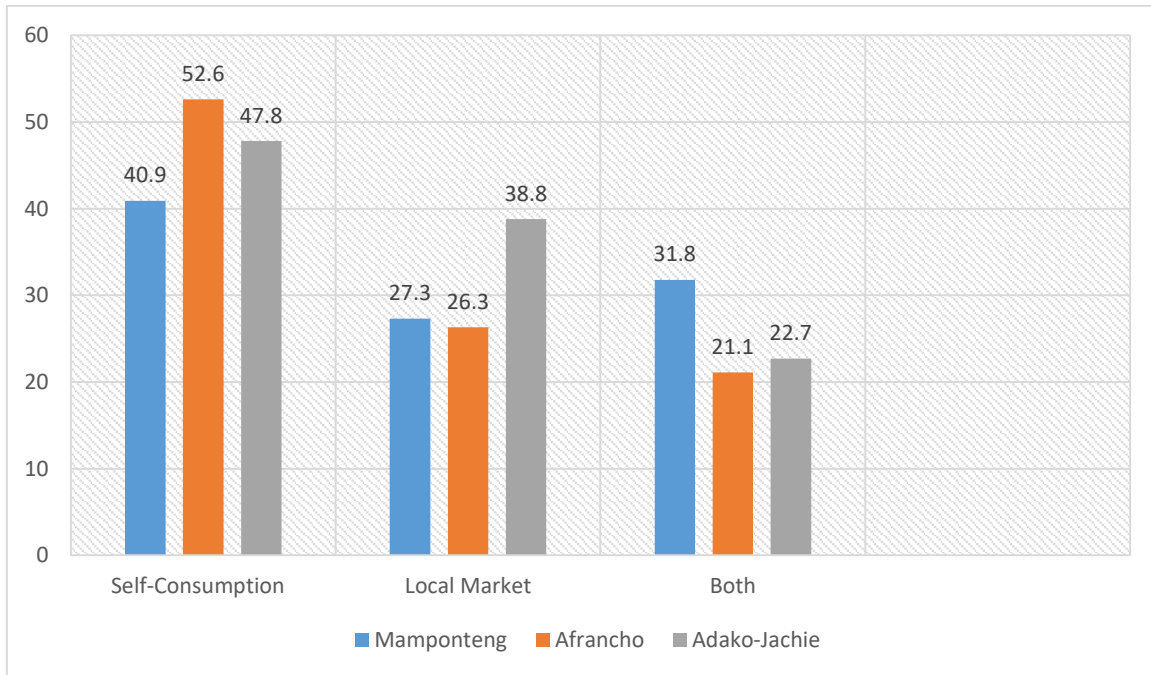


Figure 4.4. Purpose for UA food production in the three study areas.

However, over half (52.6%) of the UA farmer respondents in Afrancho in the Afigya-Kwabre South district produced for self-consumption, while about a quarter (26.3%) engaged in UA production to generate income. The remaining 21.1% produced for self-consumption and at the same time to generate income. At Adako-Jachie, almost half (47.8%) of farmers engaged in UA produced for subsistence and 38.8% for economic gains by selling at the local market. Some 22.7% produced for both purposes.

Enquiries into Public support for UA production in the Study Areas

Figure 4.5 illustrates the opinion of UA farmer respondents about the necessity for public support in UA. Some 59.1% of the UA farmers in Mamponenteng affirmed to the need for public support for UA, 40.9% did not see the need for the support. The figure for those in favour for UA public support were slightly higher in Afrancho and Adako-Jachie ; 63.1% and 65.2%, respectively, while 36.8% and 34.8% said 'no', in that order. Interestingly, no UA farmer stood in the middle ground with regards to public support for UA.

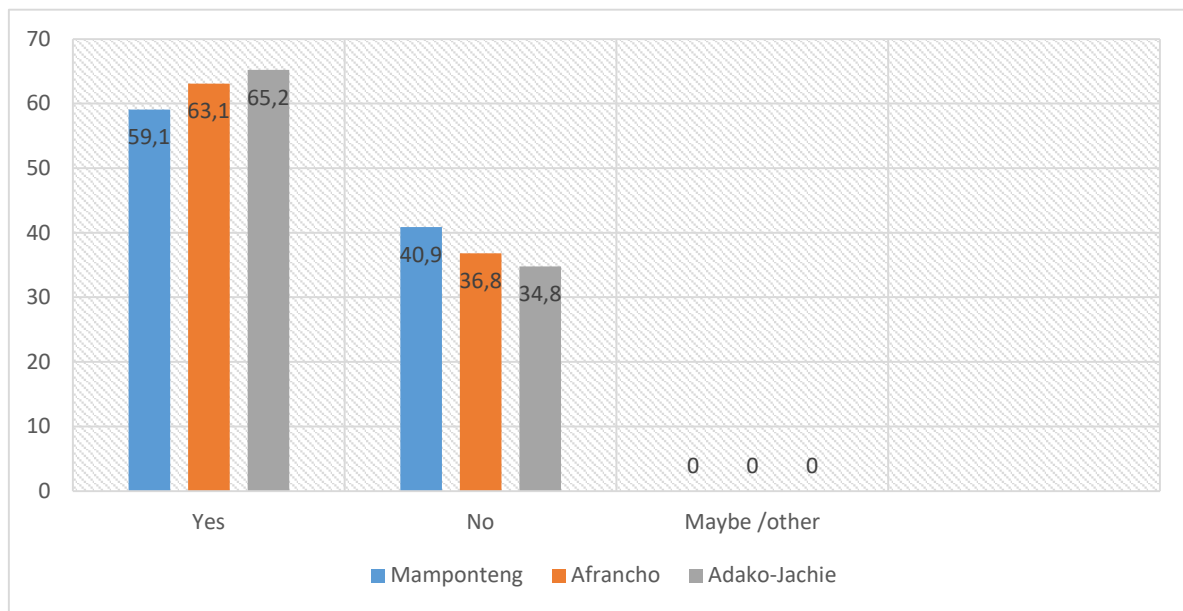


Figure 4.5. Public support of respondents in the three study Area

Furthermore, farmers that affirmed support indicated that it should come from the public or government and private sectors and as well from individuals. They suggested the integration of UA into urban planning with bye-laws to support and sustain the implementation.

The Characteristics of the Farmers on Urban Agriculture in the three selected Areas.

All the farmers interviewed in the three areas are engaged in crop farming and not animal production or both. The farmers attribute this to the unavailability to enough land for them to keep animals and engage in crop farming at the same time. The majority of the farmers in these three areas indicated that the average farm size is less than an acre, making it difficult for farmers to expand their production on a larger scale, particularly on the allocated swampy lands and usually authorized government lands. Besides, the farmers claimed that land is not the only factor, and that there are some other challenges that they face in their productions. The major limitations impacting adversely on their operations are high cost of inputs (fertilizer, pesticides, farm implements, seeds), pests and disease threats to crops, inadequate access to credit and market for produce.

Some key major importance of Urban Agriculture from the three selected Areas.

- UA provides employment and financial resources for some urban dwellers
- UA beautify the environment
- UA provides relatively safer foods compared to stored foods.

- UA can provide money to the people
- Conserved biodiversity

In the study areas, the urban farmers were allowed to select the four topmost constraints that they found difficult to deal with in their production, and interestingly, most of the farmers added marketing of their produce. About 88% of the respondents pointed to pests and disease attacks on their crops, especially exotic vegetables such as carrots, cucumbers, squash, lettuce, cabbage, and spring onions, as most important constraint that they encountered in their production. Other constraints to UA production mentioned were access to land and tenure, which they claimed is very expensive to buy or rent land for their activities. Least among the constraints which according to them was a major problems some years ago but not presently, had been high cost of inputs such as fertilizers, pesticides, seeds, and farm implements. Apparently, the current Ghana government has initiated a new policy called Planting for Food and Jobs, whereby fertilizers, pesticides, seeds, and farm implements and inputs are subsidized for the farmers.

Also, with the diverse definitions of urban Agriculture from the urban farmers and the Government official or the main key stakeholder during the research from the countless definitions that was given, I can attest that: UA is production of food (vegetables and legumes/beans, fruit, grains (cereal), poultry, fish and honey) within, homes, towns, and cities usually for consumption. (See appendix for the different kind of definitions given).

Understanding planning institutions, policy and decision-making process on UA in Kumasi Metropolis.

In Kumasi, the Metropolitan Assembly and also the Departments are to participate in urban agriculture. Some of the departments, therefore, have a representative, who is a participant and a major stakeholder in the working group on urban and peri-urban Agriculture in the Kumasi Metropolis. In Kumasi, the main institutions are Physical and Planning Department, Ministry of Food and Agriculture, Parks and Gardening Department and the Forestry and Land Commissions. But the focus is on the MoFA and the PPD, which can help in integrating UA in the planning of Kumasi. In all the three selected areas which obviously are under Kumasi Metropolitan Assemblies, a comprehensive plan or document called Greater Kumasi Plan which was documented on 24th May 2011 is implemented. According to this comprehensive plan or document, inhabitants of Kumasi city are allowed to have access to ‘buffer zones’ and nature reserve area for agriculture activities, including UA. The Greater Kumasi plan was

initiated by the merging of the boundaries of Kumasi and its surrounding Districts and Municipalities due to rapid urban development.

The Metropolitan Chief Executive of the Kumasi Metropolitan Assembly and the Overlord or King of Asante and Kumasi (Nana Osei Tutu II) recently observed that Kumasi functions as a commercial and industrial hub, while the adjoining Municipalities and Districts function primarily as dormitory. Apparently, satellite commercial towns, with several infrastructure development activities take place without any spatial linkage between Kumasi and the Peri-Urban Districts in Kumasi Metropolis. It was thus, advised that the Comprehensive plan or Document should be implemented to help bring a better layout and settlement among the people of Kumasi. On the other hand, in the open space for urban farming such as 'buffer zones', swampy areas and nature reserves, permission would be required from the chiefs in the various towns and cities, the Directors of the PPD and MoFA in Kumasi and the various Districts and Municipalities in Kumasi. Seeking permission from these authorities will enable them to come and inspect the field of farming activities to ensure that the land is not polluted and also protect people from consuming contaminated food. Apart from the Comprehensive Plan called Greater Kumasi Plan, there are no bye-laws which support UA in the Metropolis.

Recognizing and permitting urban agriculture

Urban agriculture is considerable in the urban planning strategies, including 'green belt' concept in Kumasi in the documents such as Master Plans of Kumasi, prepared in 1962, and the current structural plan prepared in 2007. The Greater Kumasi Plan was established on 24th May, 2011 by the Kumasi Metropolitan Assembly. Apart from designated areas such as 'buffer' zones' and nature reserves, urban planners tend to include urban agriculture in their terms of reference, especially swampy lands. Urban agriculture activities in the three selected areas, according to officials from the MoFA and the PPD, are an informal or illegal activity. This is because it is neither regulated by these institutions nor monitored by them, but by the individuals who do their farming. The fact is that urban planners and other officials have no useful clue about agricultural activities in the three selected areas. Even land planners only allocate swampy lands for UA activities in their work. Some government officials who head other Departments in the various Districts and Municipalities only look at the market price of lands in the urban centers and the wastewater used which should not be allowed in and around the town centers, but not other activities like farming. They see urban farming as something that you can do in the bush, forest and home, as only supplementary to the family needs, but not at the town or city centers.

Other officials who even identify urban agriculture tend to see it as something that can happen in the next 35-50 years.

Understanding spatial land use planning practices

The Land Uses and Spatial Planning Act, 925 and the Local Government Act, 936 are the main tools that are used in the spatial land use planning in the three selected areas. These Acts were established in 2016 to help land planners execute their work by enabling them to develop the framework for swampy lands.

UA integration into development of Kumasi

Discussion with the various heads and representatives of institutions who have been involved in the significance and contribution of all the different departments in the assemblies needed to integrate UA into cities and towns' development are very important. There is the need for all stakeholders to team up with relevant institutions in policy drafting, advocacy and implementation, which can contribute to integrating UA into Kumasi. Despite UA being well known by policy drafters and land planners, in many cases, this grasp does not automatically register in their recognizing UA as a significant element of the city's economy and land-use system in the town's and city's development.

Notwithstanding, some departments within the various Districts and Municipalities which do not have any knowledge on urban agriculture see it as something which should be practiced in the forest and bush, far from human settlement or see it as rural habits. In their opinion, they only think that UA is temporary ; it will be very difficult for people accustomed to urban life. Although with the positive impact and benefits to humankind, they only think of its negative impacts as an activity with little economic benefits, health implications and environmental hazards caused human, such as to pollution of the air, water, and soil, and contamination of food. The Local Government Act 936 and the Land Use and Spatial Planning Acts 925 include urban agriculture as a land use category since it is still seen as a rural activity to most of the people. Land planners see it very difficult to integrate it in city and town planning because 80% of the lands are stool lands which belong to the Chiefs, only 5% to the Government and the remaining 15% to individuals which is seen to be something very tedious to integrate into the towns and city's development because the landowners decide the place to designate for development. The Municipalities and the District assemblies in the three selected areas do not own lands that they can make available to the urban farmers to use. The Local Government Act 936 and the Land Use and Spatial Act 925 permit planners to allocate only waterlogged lands

for urban agriculture. According to representatives from the MoFA, Municipal and District Assemblies are responsible for promoting the integration of urban agriculture and thriving agribusiness through research and technology development, effect extension and other support services to farmers, processors, and traders for improved livelihoods in the various Municipalities. The Directors from various Municipal and District Assemblies interviewed during the research indicated that most UA activities are only taking place in swampy lands which are only suitable for water-loving crops. More so, people have also taken the merits of using the major farm sites and undeveloped government lands which are generally not sustainable for urban agriculture.

Whenever UA farmers and the institutions involved want to expand their activities to a larger scale and develop these parcels of land, it also becomes very difficult for them because the waterlogged lands are not suitable for cultivation to all crops and rearing of animals. The undeveloped government lands are also not secure because the government can come in and use the land anytime they want to use the land for a project without any compensation.

Planners' Prospective and Actual Roles and Strategies for UA Development and Promotion

Interaction with land planners in PPPD in the selected areas in the District and the Municipalities revealed that land planners are responsible for the laying out of the lands in the various Assemblies. The local Assembly authorities do not have the right over allocation of lands for UA, but it is rather the landowners who usually give them powers to allocate places for UA activities in the Districts and Municipalities. It was made clear that even though the comprehensive Greater Kumasi Plan provides them the power to allocate swampy lands within the framework for UA activities, yet permission has to be sought from the landowners since some landowners even sell the swampy lands to businessmen and women for commercial use for purposes such as Fuel stations and vehicle washing bays.

The prospective and actual role and strategies of planners should be advisory, ie. to educate landowners, especially the chiefs, family heads and individuals about the positive impacts and benefits of UA in land planning so as to also allocate dry lands for UA activities during land zoning by planners, but not only swampy lands, which are only suitable for water-loving crops such as sugar cane, taro and rice. Confined and dry lands which can be very useful in the cultivation of such other crops as cereals, vegetables, legumes and root and tuber crops and livestock productions need to be also allocated for UA.

The interaction with various heads from research institutions indicated that the only way by which citizens will appreciate UA will be such activities like provision of technical support to farmers and extension services, making land and necessary resources (water resources for irrigation) available for UA through legislation if specific laws and provisions are not available. Additionally, making an inventory of the available vacant open land within the city for UA activities, reallocating urban producers whose farms are poorly located in the towns, enhancing access of credit and financial resources to urban farmers, stimulating landowners to give vacant land in long-term leases for agriculture and lastly, strong collaboration between the land planners and the assemblies, research institutions, MoFA and relevant stakeholders will help in the development and promotion of UA.

Institutional support and policies

There are several institutions involved in UA in Kumasi Metropolis. Some of these institutions are Lands Commission, Forestry Commission, Parks and Garden Department, the Media, Chieftaincy institutions, Education Directors, Health Directorates, various Agricultural colleges and universities, and NGOs. The key stakeholders that played an instrumental role in making this study successful were the officials of PPD's and Directors of MoFA in the District and Municipalities of the three selected areas as well as researchers from the CSIR-CRI, Fumesua, Kumasi.

The various Directors of the MoFA indicated that their Departments are the main institutions which are responsible for UA development and implementation in all the towns and cities in the Kumasi Metropolis.

The Physical and Planning Department

The Physical and Country Planning Department is responsible for the preparation of land use plans (structural plans) to direct and guide the growth and sustainable development of human settlement in the Kumasi Metropolis. These are the major roles the PPD plays in the District and Municipalities within the Metropolis; planning and management of the orderly development of human settlements, providing planning services to public authorities and private developers and provision of layout plans (planning schemes) to guide orderly development. With the scheme, possible conflicts between planned layout and the actual situation on the ground as well as ownership claims can be detected and resolved. The PPD also plays a significant role by evaluating the zoning status of lands, making proposals of rezoning where necessary and

processing of, for example, building permit application documents for consideration by the Statutory Planning Committees in the assemblies.

PPD's partnership with the Survey Department helps in the preparation and securing of plans when stool land is being attained. Formulation of goals and standards relating to the use and development of land, especially in areas of rapid urban growth is achieved through the PPD. Additionally, the design of plans and suggestions to direct the orderly growth and development of urban and rural settlements in the Metropolis lie within the purview of the PPD.

The uppermost tool used to verify development is the preparation of the local plans which is called planning a scheme/layout. The land use tools, then use which is helpful in their work is approved legally by the special planning committee and the people comply with this in the Metropolis. It was clearly indicated that the people are involved in plan preparation and implementation of these local plans. The law of the land permits the Physical and Planning Department to publish any scheme within twenty-one days (21 days) for people to comment about it, also to allow people who were unable to attend to visit their offices to for suggestions and recommendations. The local plans to guide them to allocate some areas in the community, especially in residential areas, industrial sites, educational areas, hospitals, lawns, parks and playing grounds for kids. The building inspectors in the department help to ensure that the land that has been designated for UA in the towns are not used for other purposes/activities but only for agricultural activities such as UA.

Information gathering from the Directors of the Ministry of Food and Agriculture in the three selected areas in the Districts and Municipalities was clearly demonstrated that the main institution is responsible for integrating UA and policy implementation support it in the Assemblies.

Therefore, it is they're mandated to coordinate the day-to-day activities of the district and municipalities Agricultural development unit. More so other responsibilities also include

1. Responsible for developing and executing policies and strategies for the agriculture sector within the context of a coordinated national socioeconomic growth and development agenda ;
2. Organizing and participating in all meetings, workshops related to agriculture to clarify MoFA position ;

3. To liaise with all stakeholders and the public at large on programme related to the development of agriculture in the various districts and municipalities e.g. planting for food and jobs ;
4. Ensuring the sustainable management of land and environment in the various assemblies ;
5. To promote sustainable agriculture and thriving agribusiness through research and technology development, effective extension and other support services to farmers, processors, and traders for improved livelihood ; and
6. Analysing participation and adoption of appropriate science and technology Applied in food and agriculture development.

The significance derived from urban agriculture from all directors in the various institutions and the urban farmers clearly showed that it should be encouraged and supported. This because UA has a lot of benefits such as increasing and conserving of biodiversity, easy access to fresh foods, recycle urban waste within and around the towns and cities, reducing soil erosion, prevent of flooding with the towns and cities. In order to integrate UA it into the towns and city development, all directors in the various institutions need to educate more on it.

Research Questions Four (4)

Reassessment of existing structures and making relevant suggestions on UA

Among the numerous suggestions proposed in the literature to support UA in Kumasi are changes to land use planning policy. The problem of access to land, water and financial resources is actual and critical. However, this myriad of issues may be resolved with the appropriate policies put in place. Proposals made are that two main driving forces that would ensure integration of UA into the city's development are the Planning Institution and Policy structures. Many of the cities and towns which have been successful have a policy at some level that has categorically taken into account the practice of UA, which the Kumasi Municipal and District level policy has not been adopted. Recognition in strategies might take the form of land use Master plan, zoning, organization plan and detailed planning scheme, where agriculture is primary or tertiary land use. These are the major tools available to land planners to carry through land use change and integrate UA into development. The strategy also serves as a means to eliminate potential negative health and environmental effects of agricultural activities. Land planners and cities determine the restrictions to livestock keeping and poultry farming in residential areas and determine where in the cities and towns farming can occur.

The support of urban food production should take into consideration the critical role of equitable access to land and water, and integrate into urban development. The results of this will lead to

the designation of land for urban farmers, inputs and equipment such as fertilizers, seeds, and farm machinery, access to good irrigation systems and the market. The integration of UA into the development of cities and towns by land planners will lead to achieving the goals of many economic, social and ecological results. Ecologically, it will lead to open green spaces, urban greening, minimize noise and pollution in the city and towns and conserving and enhancing biodiversity among organisms. All these ecological benefits from UA will increase the environmental cover of vegetation. It will lead to increase food security and meeting the dietary needs of many urban poor people in both cities and towns. It must also be stressed that community revive is achieved when cities and towns take pride in community gardens. When Municipal and District residents gain the ability to cultivate and market their own food, and when inner-city farmers' markets provide new possibilities for business people and commercial farmers, it enhances their social safety net and contributory cause of community building. Furthermore, economically, integrating UA will result in income and employment for many urban poor people as well as the generations that will follow. Food production, processing and marketing also provide for generating income and employment for many urban households. Although the production levels and turnover of individual urban farmers in many instances will be small, their high numbers in each city make their total contribution to the urban economy significantly appropriate. In such a case the rationale for UA is its economic value and its potential to generate local economic development.

The ecological, social and economic positive effects will lead to an edible city or town. The main objective is to achieve an edible city or town, in which products from outside the city is replaced by locally-grown produce by institutions like the MoFA, land planners and Farmer organizations. As a result, social and environmental equity will be fulfilled, while improving the lives of the people. In order to make it happen there is the need to integrate UA into urban development as well as provision and proper management of the services. Put differently, the cities and towns should be able to produce and hand out the provision of services in an economic, ecologically pure and equitable way. This is what is secured when the strategy and planning institution with all its instruments are put in place from this moment forward.

CHAPTER FIVE

SUMMARY FROM FINDINGS AND RECOMMENDATIONS

This chapter involves an arbitrary of the major findings proceeding from the study and also seeks to summarise the issues brought to bear in the context of Peri-urban Agriculture in Kumasi, Ghana

SUMMARY FROM FINDINGS

Demographic Characteristics of Farmers

For over 64 Urban Farmers who took part in the research in the three selected areas in the Kumasi Metropolis, in terms of categorizing into male and female, males dominated in numbers with representations of 54.5%, 52.6% and 56.5% in all the selected areas. Also looking at the percentage difference in terms of age, the males dominated compared the females ; 59.1%, 56.5% and 56.5%, respectively in all the selected areas. Interestingly, farmers aged between 45 and 60 years, obviously predominantly males, were the most active in UA farming activities.

Strikingly, about 45.4%, 42.1% and 47.8% of UA farmers in the research location have the highest formal education, at the tertiary levels. This looks so impressive since the active participation of tertiary institution graduates in farming is established, and one may attribute the reason to the flagship policy of ‘planting for food and jobs’ and ‘rearing for food and jobs’ that have been initiated by the government.

Socioeconomic status

It was established that farming was not the main source of employment for the dwellers of the three selected areas in Kumasi Metropolis as was confirmed by 40.9 %, 57.9 and 52.2% of the respondents working in the private sector such as clothing and accessories, banks, heavy construction, electronic equipment, and pharmaceutical companies, etc. It can therefore be concluded that the farmers cannot depend on farming for their livelihood. Hence, a major source of livelihood for urban farmers are not solely UA production, but they do UA as a supplement to support the family. In this case, it can help to decrease the incidence of poverty among some urban poor in the three selected areas in the Kumasi Metropolis.

Other determinations

The study clearly indicated that the majority of farmers in three selected areas practice home gardening and backyard farming. Notwithstanding, most of the urban farmers produce or

cultivate vegetables and fruits compared to the other food types. Additionally, most of the farmers opined the importance and urgency for public support for UA in all aspects of productions.

Besides engaging in UA, generally, for self-consumption, a sizable number of the farmers produce was sold in the local markets to generate economic gains. Interestingly, vegetables and fruits were mostly produced which consumption would enhance the nutritional status of the farmer households food in the three selected areas since over 90% of dietary nutrients, particularly macro- and micro-nutrients are obtained from vegetables and fruits. Vegetables and fruits dominating in UA production in Kumasi may not come as a surprise because a lot of people in Kumasi grow fruit trees and vegetables in the backyard of their houses and sometimes in their lawns purposely for beautification and self-consumption.

Characteristics of UA Farmers in the three Selected towns.

All the farmers interviewed in the three selected areas are engaged in crop farming and some animal production. This is an indication that there is limited or no land available for farmers to keep animals and engage in crop farming at the same time. Additionally, there are no lands designated for urban agriculture in the three selected towns, so most of the farmers engage in UA activities in their homes. The major hindrances militating against the operations of farmers are a high cost of inputs (fertilizer, pesticides, farm implements, seeds), pest and disease threats to crops, inadequate access to credit and market of produce.

Understanding planning institutions, policy and decision-making process on UA in Kumasi Metropolis.

The Kumasi Metropolitan Assembly, under which the three selected areas operate, uses a comprehensive plan called the Greater Kumasi Plan, which was documented on 24th May, 2011. One of the major reasons for instituting this comprehensive plan was to allow people to have access to 'buffer zones' and nature reserve area for agricultural activities, including UA. Notwithstanding, there are no bye-laws that support UA in the Metropolis.

Recognizing and permitting urban agriculture

According to officials from the MoFA and PPD, UA activities are informal. This is because it is neither regulated nor monitored by these institutions, but rather by the individuals who cultivates the land. Apparently, farmers do not even inform these agencies about their activities. The fact is that land planners and other officials have no useful clue about agricultural activities

in the three selected areas. Apart from designated areas such as 'buffer zones' and nature reserves, land planners tend to include UA in their terms of reference especially swampy areas or waterlogged areas.

Understanding spatial land use planning practices

The Land Uses and Spatial Act, 925 and Local Government Act, 936 are the main tools that are used in spatial land use planning in the three selected towns in the Metropolis. These acts, established in 2016, help land planners in their work enabling them to develop the framework for various uses of land. Zoning permits give opportunity to the district assembly or municipalities to determine the use of every land in the Metropolis. Within the Metropolis, UA is recognized in the land use category in land development planning. Landowners, with permission, allow land planners to allocate swampy or waterlogged areas for development, areas usually used for UA activities.

Integration into development in Kumasi

The schemes of the Local Government Act, 936 and the Land Use and Spatial Act, 925 include UA as a land use category since it is still seen as a rural activity to most people. The land planners find it very difficult to integrate it because 80% of the lands are stool lands which belong to the chiefs, 5% to the government and 15% to individual, making it seem something very tedious to integrate UA into the towns and city's development. Landowners decide the place to designate for development. It was clearly stated by all the directors of MoFA, who played a very significant role in this research that they are in charge of agricultural activities, especially their integration into the various activities of towns and cities. They all suggested that UA be integrated into Kumasi's development plan, but the best people to discuss and convince the benefits of the integration into urban developments are the chiefs and the family heads who own the lands. This is because landowners decide the place to designate for development.

Prospective and actual roles of Planners and Strategies in Promotion and development of UA in Kumasi

Interaction with officials at the PPD in the three selected areas in the District and Municipalities clearly indicated that the land planner who is in charge of the laying out of lands in the various assemblies does not have the right over allocating lands for UA in the assemblies. It is the landowners who have the authority to allocate places for UA activities in the districts and the

municipalities. The perspective and actual roles of planners and the strategies recommended are that land planners should educate landowners, especially the chiefs, family heads and individuals about the positive impacts and benefits by allocating dry lands for UA activities during zoning. Allocation should not be limited to only swampy or waterlogged areas, which are suitable only for water-loving crops such as sugar cane, taro, and rice, but also very confined and dry areas which can be very useful in cultivating other crops such as cereals, vegetables, legumes, roots and tubers as well as different kinds of animal production.

Recommendations

Demographic Characteristics of Farmers

Generally, looking at the demographic characteristics among the urban farmers, on the side of gender differences among the farmers, the males dominated in all the three towns. There is a need to encourage more females to get into urban farming. For them to get interested in this, there should be women's movement of farming association, whereby this association can organize workshops and seminars to educate them on the benefits of UA.

Also looking at the educational status among the urban farmers, it was so surprising that most of the farmers were graduates. This is very interesting and promising because in Ghana it has been a misconception that farming activities are for those who were not able to have access to higher school education. Since the current government implemented the Planting and Rearing for Food and Jobs policies, a lot of citizens are now getting themselves more into farming, especially the young graduates and there is the need to patronize it more for the people to know more about UA. Patronizing UA can reduce the unemployment of graduates in Kumasi. The two most common types of UA practiced were backyard farming and home gardening. There is, therefore, the need to urge people to also practice different types of UA, such as greenhouses, rooftop gardening, animal husbandry, urban bee-keeping, aquaponics, tactical gardens, vertical farms and street landscaping. The analysis clearly showed that the most common UA was food production in the three selected areas, and that vegetables and fruits were mostly produced. There is the need to also cultivate different types of food crops such as grains, root crops, and mushrooms, and animals such as poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, snails etc. Other non-food products such as aromatic and medicinal herbs, ornamental plants, tree products, etc. should be encouraged.

It was clearly demonstrated (about 94% participant farmers) from the research that there is a need to support UA in all aspects of production when integrated into land planning. There

should be very effective bye-laws to support it as well as very efficient maintenance culture. The analysis clearly showed that urban farmers purposely produce food for household consumption, although there are a few that produce for the local market.

Characteristics of the Urban Farmers in the study Areas.

Access to input and output markets for the farmers need to be improved. Connecting farmers to markets through rural feeder roads, credit facilities, information and communication technologies, and vertical coordination along the food supply chain is essential to reducing farmers' risks. Likewise, subsidizing for organic and inorganic chemicals for the farmers, provision of fertilizers, pesticides, farm implements and seeds for farmers is essential. The government sector alone cannot solve this problem for the farmers, so there is a need for the private sector to support. The organization of urban farmer associations is a prerequisite for the improvement of UA agriculture in Kumasi metropolis. Participatory analysis of local constraints and opportunities is needed as the basis for an interdisciplinary approach to the design and implementation of required assistance. There should be the establishment of programs like **'FROM SEED TO THE TABLE' (FSTT)** among the farmers and peoples. This will help to improve the marketing and production of crops such as tomatoes, onions, peppers, eggplant, okra etc., including direct sales to restaurants and at the farmer's stalls.

Understanding planning institutions, Policy and decision-making process on UA in Kumasi Metropolis.

Policymakers should be aware of the efforts to enhance UA in terms of the following:

1. There should be an effective collaboration between Districts and Municipalities Assemblies, and farmers, especially at the department of MoFA and Crops Research Institutes for new ideas, new technologies, and plant materials.
2. There should be support of urban farmers to continue producing safe and nutrient-rich products for both home uses and city markets.
3. The farmers should also contact the MoFA for inspection of their products before they send to the market to avoid selling of contaminated food to the public
4. It should be ensured that the needs and benefits of UPA are taken into account in physical planning such as land tenure, water availability and drainage

5. There should be strong coordination and encouragement among the various sectors involved from the urban, local level up to Districts and Municipalities and the national level
6. All sectors as well as representatives of the farmers themselves, should partake in policies and structure that will be taken in the highest offices.

Recognizing and permitting urban agriculture

There should be an interdisciplinary approach which can be facilitated by the municipalities and district Assemblies who should encourage cooperation between the various sectors and stakeholders involved, such as research institutions, agronomists, nutritionists, plant and animal breeders, health specialists, post-harvest, Parks and Garden and NGOs in order to better address the needs of UA in urban development in Kumasi.

The land Planners should educate landowners about the importance of UA for them not to allocate only swampy areas for agricultural activities such as UA. Without affordable land, there will be no space for UA, so the landowners should reduce the price of lands for the farmers.

Understanding spatial land use planning practices

Since urban agriculture is recognized in Kumasi through the Spatial Act, 925 and Local Government Act, 936, there is a need for land planners to focus attention on strategies to contribute to physical activity. The land planners should advise the landowners to allocate more dry areas for urban agriculture activities and not only swampy areas, which the Spatial Act, 925 and Local Government Act, 936 support.

Integration into development

Integration of urban agriculture into urban development is very significant taking the following into consideration when addressing it:

1. An evaluation of existing and future city planning ideas, norms, and regulations for land and water use (land use plans, territorial plans, strategic plans) is very important.
2. Thorough a classification and land use map of different urban and peri-urban spaces since swampy areas and green belts in the cities are a trespass on always.
3. All actors such as urban farmers, Farmers' association, NGOs, Local government, Research Institute, Agro-industry, organizations need to be brought on board.

4. There is also an important need for participatory analysis of demands and ideas for land for urban agriculture.
5. There should be proposing of designs, mechanisms and practical instruments for better integration of UA in urban planning in Kumasi.
6. The research institutions, urban farmers, Farmers' association, NGOs and Assemblies need to analyze the potential of land and water use for agricultural production, processing and marketing of the product and its significance in urban planning.
7. The farmers who use unauthorized government lands for farming activities such as AU should be compensated when the government wants to use the land for development.
8. Farmers allocated swampy lands can contact the CRI for the SAWA program.

Prospective and actual roles of Planners and Strategies in Promotion and development of UA

1. The land planners should do well to educate landowners about the positive implications of UA to designate more dry lands for urban agricultural activities in the Metropolitan
2. There should be strong cooperation and communication from the PPD and MoFA so that the MoFA Department will let farmers know the lands or that have been allocated for UA activities in the various Districts and Municipalities in the Metropolis.
3. There should be bye-laws to support agriculture activities such as UA in the various Districts and Municipalities in the Metropolis.
4. The landowners should give the farmers vacant land in long-term leases for agriculture activities in the various Districts and Municipalities in the Metropolis.

CHAPTER FIVE

CONCLUSION

The research demonstrates that Urban and Peri-Urban Agriculture can be very important in urban development in Kumasi, Ghana. This is because UA provides employment for the people, it beautifies the environment, UA foods are relatively safer to eat than the store foods, UA can provide money to the people, and it conserves biodiversity. Even though, there are challenges such as limited access to land, a high cost of inputs (fertilizer, pesticides, farm implements, seeds), pest and disease threats to crops, inadequate access to credit and marketing for the product, there are some solutions to deal with these problems. It was clearly shown that fruits and vegetables are predominantly produced in the three studying towns or areas in Kumasi. Moreover, urban farmers produce urban food for self-consumption in their households. In order to realize the full potential of urban agriculture, there is a need to develop a policy and institutional framework for all the sectors in Kumasi. This would enable urban farmers to unlock critical technical and financial support services. Also, urban agriculture would be carried out in designated and safe areas. There would be a shared usefulness to the urban farmer as well as the suspicious users who would be guaranteed harmless produce.

Integration of UA into urban development in the Metropolitan is very important. But in this research, it became evident that integration of urban agriculture cannot be accomplished by the assemblies alone, rather, all stakeholders are needed on board. In order to realize the full potential of urban agriculture through its integration into urban development there should be the availability of sufficient land, which must be secured for an extended period of time without any problems from outsiders. Also, there should be enough funds, technical advisors, and planting materials and other relevant resources.

It was clear from the study that land planners can play a very instrumental role in incorporating urban agriculture into development by advising landowners, especially chiefs are custodians of the majority of the lands in Kumasi to designate more dry areas for agricultural activities and not only swampy lands.

This study suggests that urban agriculture can make an important contribution to employment, income and conserve biodiversity. The urban farmers and the people can greatly benefit from urban agriculture if all the stakeholders in Kumasi Metropolitan, especially MoFA, PPD, CRI and officers from the Municipal/District of the various Assemblies could develop a comprehensive policy and institutional structure of the sector.

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APPENDICES

Different Definitions of UA from the Urban Farmers and stakeholders

1. Urban agriculture is the act and science of producing plants and/or animals that are beneficial to people in the urban areas
2. Growing of plants and distributing it.
3. Urban agriculture is the cultivation of crops and rearing of animals in our urban communities or areas.
4. Urban agriculture is a form of producing food and raising livestock in areas that serves as settlement to people.
5. Urban Agriculture is the growing of food crops and rearing of farm animals in urban areas
6. It is an act of growing food crops and rearing of farm animals within big cities.
7. Urban Agriculture is the practice of cultivating the land or raising stock in some densely populated areas.
8. Urban agriculture is the growing of plants and raising of animals and around cities.
9. Growing or rearing of plants and/or animals respectively in urban settlements. It may take the form of home gardening or backyard farming, farming on available acres of land along streets or even as a form of community supported agriculture. It may happen within the urban settlement or right on the outskirts of the urban settlement.
10. Urban agriculture is the practice of cultivating and dispatching flooding urban areas.
11. It is agricultural activities like cultivation food crops, production of vegetables, animals like goat's, sheep, poultry etc among others in urban settlements and its peripheries on small plots left somewhere and sometimes at homes and planted in pots. Poultry manures and compost prepared by farmers themselves. Marketing are ready due to high demands
12. Production of livestock and crops within the city or town for man uses
13. Rearing animals and growing within the cities and towns for use
14. Crops and animal's productions for consumption.
15. Growing food within the cities
16. Rearing livestock and food crops for within the cities and town for human use
17. Mixing animals and crop in a confined area within the cities or town for tourist and human uses.
18. Growing food crops and rearing of livestock for human uses
19. Farming in urban households
20. It is the process of cultivating, processing and distribution of food in a community.

21. Urban agriculture is a practice of cultivating, processing and distributing foods in urban areas
22. Urban farming, or urban gardening is the practice of cultivating, processing and distributing food in or around urban areas.
23. Urban agriculture can also involve animal husbandry, aquaculture, agroforestry, urban beekeeping, and horticulture
24. Food productions
25. Planting of food in urban areas or planting of food and sending it to urban areas for purchase
26. Urban agriculture is the process of growing of plants and raising of farm animals within and around the city
27. Urban agriculture is the practice of producing food in urban areas.
28. Urban agriculture refers to the cultivation of crops and raising of farm animals including their processing and distribution around rural areas
30. It is growing crop within the cities and town for humans and animals use
31. Giving the of opportunists crops and animals to grow within the towns and cities
32. Growing crops and livestock rearing within the towns and home for consumption's
33. Gardens within the cities and towns
34. Animals rearing and growing crops in the houses for uses
35. Rearing of livestock and cultivation of crops for human uses
36. Its process of growing crops within the cities for human uses
37. It is animals rearing and food cultivation that can be occurs within the houses and as well as in the various towns and cities
38. Crops cultivation and animal rearing that can be occurs within the houses, entrances of the house and maybe within the city center for consumption
39. Farm within the house or city center for uses
Making food accessible within the town and the home for consumption
40. It is growing food and raising of animals in the cities
41. Urban agriculture is the act and science of producing plants and/or animals that are beneficial to people in the urban areas
42. Growing of plants and distributing it.
43. Bring farming from the rural area to meet the needs of the people in the urban area
44. Urban agriculture is the cultivation of crops and rearing of animals in our urban communities or areas.

45. Urban agriculture is a form of producing food and raising livestock in areas that serves as settlement to people.
46. Urban Agriculture is the growing of food crops and rearing of farm animals in urban areas
47. It is an act of growing food crops and rearing of farm animals within big cities.
48. Urban Agriculture is the practice of cultivating the land or raising stock in a densely populated area
49. Urban agriculture is the growing of plants and raising of animals and around cities
50. Growing or rearing of plants and/or animals respectively in urban settlements. It may take the form of home gardening or backyard farming, farming on available acres of land along streets or even as a form of community supported agriculture. It may happen within the urban settlement or right on the outskirts of the urban settlement.
51. Urban agriculture is the practice of cultivating and dispatching flooding urban areas.
52. Urban agriculture is the practice of growing crops and rearing farm animals in an urban setting for food and other purposes
53. Growing of crops in the city
54. Urban agriculture is the practice of cultivating, processing and distribution of agricultural produce in and around urban areas.
55. Farming in urban households
56. It is the process of cultivating, processing and distribution of food in a community
57. Urban agriculture is a practice of cultivating, processing and distributing food in urban areas urban farming, or urban gardening is the practice of cultivating, processing and distributing food in or around urban areas.
58. Urban agriculture can also involve animal husbandry, aquaculture, agroforestry, urban beekeeping, and horticulture
59. Food production
60. Planting of food in urban areas or planting of food and sending it to urban areas for purchase
61. Urban agriculture is the process of growing of plants and raising of farm animals within and around the city
62. Urban agriculture is the practice of producing food in urban areas.
63. Urban agriculture is growing of crops and rearing of animals in towns and cities, harvested for either home consumption or sold to gain some income. These crops are grown in areas like backyards, window trays or specifically designed roofs.
64. Growing and harvesting crops or farm produce within the urban centers to supply the whole nation other than importing.

65. Urban agriculture is the production of crops and animals in the cities.

CSIR – Crops Research Institute

The CSIR-Crops Research Institute (CSIR-CRI) was established through an act of the Ghanaian parliament in 1960 and a member of council of scientific and industrial research. The Institute currently has a staff strength of 700 with over 77 research scientists, 84 technicians, and the remaining being fielded and office staff like Technologist, Administrators, and Field workers. The Crops Research Institute has a broad research mandate covering all food and industrial crops. These include maize, rice, cowpea, soybean, and groundnut. Others are cassava, yam, cocoyam, sweet potato, vegetables and fruit crops, plantain, and bananas.

Its mission as an institute is to develop and disseminate demand-driven technologies and build capacity for sustainable food and industrial crop productivity to enhance livelihoods.

The main mandate they play in to support the agriculture sector in the Kumasi Metropolis as follows ;

1. To conduct research into food and industrial crops like crop cash root and tuber crops, legumes, cereals, and horticultural crops ;
2. Develops relevant technologies to improve production of food and industrial crops ;
3. To supply healthy seeds yielding and planting materials and industrial to farmers ;
4. To work to release high yielding healthy planting materials like seeds, suet, corms and bud, etc. to the farmers ;
5. Also to develop human resources for the agriculture and allied sectors ;
6. Development of new improved crop varieties and Technology for enhanced agriculture as well as training of personnel in the sectors.

The Crops Research Institute team up with relevant stakeholders in the various departments in the assemblies in policy drafting, advocacy, and implementation, also provisions of improved seeds and extension services on good agronomic practices for increased productions. The inaction of law by the government of the institute to have its way to the farmers' activities or land acquisition that is direct contact with landowners so that the farmers can have strong hope and confidence to undertake such farming activities like as it is done in rice production with SAWA innovations.

SAWA is a new rice technology or project that the South Koreans introduced or trained rice research scientists at the crops research institute to produce rice in a very small area but realize a high yield. They construct bands in a marshy area and fill it with water. After that, they will plant the rice seedlings in rows with high populations. They supply it regularly with water as needed and also apply both manure and inorganic fertilizer (NPK). A very small area like 20m*20m =400m² can produce about 5 to 6 maximum bags at such a measured area.

Rice farmers who are trained on this technology and this is practiced in both the urban, peri-urban and rural areas. Farmers who picked this technology are making big sums of money from rice production.

Institutional Questionnaire

This study tool is designed to seek appropriate primary data for the guidance of an academic research on the topic “The assessment of urban and Peri-urban Agriculture in Kumasi”. Your assist and participation is very much counted upon and please be assured that your feedback will be treated with outermost confidentiality.

Name of Institution: **Physical and Planning Department**

Name of Respondent:

Position of Respondent:

Date of Interview:

Section A: Understanding planning institutions, policy and decision making process

1. What is urban Agriculture?.....
2. Which institutions are responsible for urban agriculture land allocation and implementation and monitoring?.....
3. How are smallholder farmers organized?
.....
4. Is there a legal framework guiding urban agriculture implementation?
.....

Section B: Integrating Urban Agriculture into city development.

5. How can urban agriculture production systems be developed and contribute positively in urban settings?
.....
6. What roles and strategies do you think land planners be and strategies can incorporate to implement urban agriculture in the District or Municipality?
7. How best can urban agriculture be accommodated into urban settings for support land administrated?
.....
8. How can we integrate into urban developments in Adako–Jackie/ Mamponteng/Afrancho and if possible other uncultivated areas in the District or the Municipality.....

Section C: Understanding spatial land use planning practices

9. How is spatial or dispute land use planning done and in which ways do different actors engage in?
.....

10. What instruments are used for spatial or dispute land use planning?
.....

11. What are the prospective and actual role of urban planning strategies and urban planners in the publicity of urban agriculture?
.....

12. What are the strategies or the policies for and main elements in the land use planning process?
.....

13. How does the decision making process take place in order to enable different actors involved in the land use planning process including initiation, declarations, implementations and allocation of land for smallholder farmers?
.....

14. How do smallholder farmers access or approach land in the district or the Municipality?
.....

15. What forms of land right of possession or title currently exist in the district or the Municipality?
.....

16. What are the situations set for reforms in land use in the district or the Municipality?
.....

17. What tools are in place for evaluating and monitoring land use outputs?
.....

18. What are the methods for acquiring urban agriculture permit in the district or the Municipality?
.....

19. Are you aware or acquainted of any policies or guidelines guiding land development including urban agriculture?
.....

20. What are the voices of different or distinct actors in terms of the capabilities of the land use planning process and the implementation of the urban agriculture in the district or the Municipality?
.....

21. How can land use planning processes provide room for urban agriculture integration in order to improved land governance?
.....

22. What other institutions in the Kumasi Metropolis play or can play a role in the implementation of urban agriculture in the Kumasi town planning?
.....

Institutional Questionnaire

This study tool is designed to seek appropriate primary data for the guidance of an academic research on the topic “The assessment of urban and Peri-urban Agriculture in Kumasi”. Your

assist and participation is very much counted upon and please be assured that your feedback will be treated with outermost confidentiality.

Name of Institution : Council for Scientific and Industrial Research - Crops Research Institute (CSIR-CRI)

Name of Respondent:.....

Position of Respondent:.....

Date of Interview:

Section A: Understanding planning institutions, policy and decision making process

1. What is urban Agriculture?.....

2. Can you tell me in three sentence about CSIR-CRI?.....

3. What are the roles of CSIR-CRI in terms of agriculture productions in the Kumasi metropolis?

4. Does your institute CSIR-CRI give planting materials to the farmers within the Kumasi metropolis ?

a. Yes

b. No

If no, why.....

.....

5. Do you get any support from the government as an Institute ?

a. Yes

b. No

6. Do you have any plans and ideas of the institutes to support in urban agriculture in the Kumasi metropolis?

a. Yes

b. No

If no, why.....

7. What key opportunities, threats, and hinderances does the urban agriculture sector face?

Opportunities:.....

Threats:.....

Hinderances:.....

Section B: Integrating Urban Agriculture into city development.

8. What roles and strategies do you think land planners be and strategies can incorporate to implement urban agriculture in the districts or municipality.....

9. How can urban agriculture production systems be developed and contribute positively in urban settings?.....

10. What contributions can the research Institute CSIR-CRI make to integrate to UAgriculture into urban developments in Adako–Jackie/ Mampong/Afrancho and if possibly other uncultivated areas in the districts or municipality?

x

11. What contributions can you institute do the CSIR-CRI make to ensure sustainability and better culture maintenance in a culture if each of the districts or the municipality is ready for implementation of urban agriculture

.....
.....

12. What other institutions in the Kumasi Metropolis play or can play a role in the implementation of urban agriculture in the Kumasi town planning ?

.....
.....

Urban and Peri-urban Agriculture in Kumasi (The Garden city of West Africa)

URBAN FARMERS

This study tool is designed to seek appropriate primary data for the guidance of an academic research on the topic “The assessment of urban and Peri-urban Agriculture in Kumasi”. Your assist and participation is very much counted upon and please be assured that your feedback will be treated with outermost confidentiality.

QUESTIONNAIRE ON UPA

I am Kenneth Darko Anokye, a Master’s student from France, Lyon conducts research on “The assessment of urban and Peri-urban Agriculture in Kumasi, Ghana”. For my research project, it is required of me to carry out a survey with you’re the urban farmers and I will be pleased if you could participate in my survey. This questionnaire seeks to inquire about the degree of the art of urban agriculture in Kumasi as well as why and who urban strategies and how can urban and peri-urban agriculture be integrated into urban developments in Kumasi. More so lastly, to reassess the existing structures and make relevant suggestions on UA in Kumasi.

Kindly take 10-15 minutes of your time to answer the questions and thank you for your co-operation.



1. Gender of respondent?

- a. Male
- b. Female
- c. Other

2. Age of respondent?

- a. Below 18
- b. 18-30
- c. 30-45
- d. 45-60
- e. Above 60

3. Educational background of respondent?

- a. Primary level
- b. JHS /Middle
- c. SHS/Vocational
- d. Tertiary

4. Aside farming, did you do any work?

- a. Yes
- b. No

if yes, what is the other Occupation?

- a. Private service
- b. Business
- c. Self employed
- d. Retired
- e. Student
- f. Government sector
- g. other

5. Do you live in an urban area?

- a. Yes
- b. No

6. Is there any production of urban food in your area of living? (like vegetables, honey, mushroom, fish farming, livestock on a small farm)

a. Yes

b. No

7. What types of urban agriculture farming is practiced in your area

a. Home garden and backyard farming

b. in a community garden

c. in a school garden

e. in a hospital garden

f. hospital garden

g. on farm land

h. others

8. What type urban Agriculture food do you produce in your area?

a. Vegetables

b. Fruit

c. Herbs and ornament plants

d. Fish farming

e. Grains/legume

f. Other

9. Select four (4) from these Urban Agriculture is important in urban planning in Kumasi

a. Because it provides employment for the people.

b. Because it saves me money.

c. Because it is safer to eat than store bought food.

d. Because it relieves stress.

e. Because it is beautifying the environment.

f. Because I enjoy the flavor of home-grown food.

g. other

10. Select four (4) major constraints to urban Agriculture in urban development in Kumasi.

a. Pest and disease threats to crops

b. Inadequate access to credit

c. Marketing of produce

d. High cost of inputs (fertilizer, pesticides, farm implements, seeds)

e. Limited access to land and tenure

f. Inadequate access to safe and cheap irrigation facilities (pumps)

g. No bye-law to support to produce it

h. Other

11. Do you think that urban agriculture needs more public support in Kumasi?

a. Yes

b. No

if yes how

if no why.....

12. In your own words can you explain the meaning of urban agriculture?

Information on stakeholders contact from the various institutions

Names	Position	Municipal and Districts	Phone Number
Mr.Fred Anyasor Nartey	Public Relation officer	National Headquarters in Municipal and District office-Accra	+233244284055
Mr.Chris Coffie	Director of PPD	Ejisu Municipal-Adako-Jackie	+233208478837
Mr.Jones Kwame Bonah	Director of PPD	Kwabre East Municipal-Mamponteng	+233250446121
Mr.Kwadwo Asiamah Boakye	Director of PPD	Kwabre South District-Afrancho	+233277186870
Mr.Patrick Akowuah	Director of MoFA	Ejisu Municipal-Adako-Jackie	+233208179161
Mad.Sheitu Mahama	In-Charged of Extension Dept, MoFA	Ejisu Municipal-Adako-Jackie	+233246655651
Mr.Yaw Okyere	Director of MoFA	KwabreEast Municipal-Mamponteng	+2332501482687
Mr.Peter kwame Amoako	Director of MoFA	Kwabre South District-Afrancho	+233244054339

Dr .Francis Osei Amoako- Andoh	Research Scientist	Crop Research Institute	+233 20 8213721
Mr .Peter Appiah- Danquah	Research Scientist	Crop Research Institute	+233254449833