SPATIAL LOCATION FACTORS AFFECTING THE INTEGRATION OF URBAN AGRICULTURE INTO LAND USE PLANNING OF ELDORET MUNICIPALITY, KENYA

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ABSTRACT
Urban agriculture is an activity being practiced globally in it as a survival strategy. The question of organized urban land use has therefore become critical. The purpose of this study is to examine spatial location factors affecting the integration of UA into land use planning. The study found out that availability of land, physical access, affordability of land, security, convenience, security of tenure, and proximity to production site and market affected the integration of UA into land use planning. The spatial location factors are critical for successful integration of UA into land use planning and should be considered during planning phase. A model of multifunctional land use is the most viable while embracing innovative ways of farming. This knowledge will help towards better understanding spatial land use planning and urban agriculture practices, by the County Governments of Kenya. This would lead to optimal and sustainable use of land while empowering citizens.

Key words: Urban agriculture, spatial location, integration.

1.0 INTRODUCTION

The global population is increasing very fast and by 2050 the UN estimates that it will reach 9.6 billion, with the majority of that growth taking place in urban areas of less developed regions (United Nations, 2012; United Nations, 2013). The rapid expansion of urban populations puts direct pressure on food sources and agricultural production.

People have responded in various ways to counter food inaccessibility, most notably by diversifying their income sources. A wide range of activities are being employed, all in the informal sector (African Studies Centre, 2006). It is within this context that urban agriculture stands to play a strategic role not only enhancing urban food accessibility and livelihood security, but also in meeting overall national food self-sufficiency.

Urban agriculture is an activity being practiced globally with an estimated 800 million people (Smit *et al,* 1996). Of these, 200 million produce food primarily for the market, but the great majority raise food for their own families (Halweil and Nierenberg, 2007). In African countries 40% of urban dwellers are said to be engaged in some sort of agricultural activity (Ruel *et al.* (1998)). In Uganda, Kampala, 30% of the households practice it (FAO). In Kenya recent studies have revealed that about 64% of urban households practice some form of UA (Foeken *et al*., 2006). It is practiced in all towns and cities and gaining significance (Mireri 2001). It is also noted that 25% of the country's urban population depends on self- produced food for nutritional survival. Jac Smit Joe Nasr Annu Ratta (2001)

UA is increasing in cities and the number of cities revising existing policies or formulating new policies and action programs on UA is growing rapidly (van Veenhuizen, 2006). Furthermore, in some African countries, it is gaining prominence and government support. i.e. promotion on multi-functional urban land use,

Despite this, Kenyan Urban development plans do not provide for agriculture as a distinct land use. It has thrived as an illegal land use. This is because the colonial administration officially designated agriculture as a rural land use activity. The Physical Planning Act does not mention it as one of the land uses to be planned. However, the revised Physical planning handbook has standards on urban agriculture yet there is no basis to justify them. Review of the current legislation has not kept pace with the development of UA, leading to insufficient coordination and support within the sub sector. The challenge therefore is how to operationalize policy in clear legal and institutional frameworks and concrete strategies.

Because Kenyan government is officially opposed to urban farming activities, farmers are frequently subjected to harassment by municipal police officers, and there is lack of supporting mechanisms, such as agricultural inputs and extension services that are provided by the government and aid agencies in the rural areas. This causes the potential benefits to individuals, communities, and the nation to be overlooked.

However from 2005 the then Ministry of Agriculture and Livestock Development (MoALD), together with NGOs and research institution (Kenya Agricultural Research Institute) came together to try and identify knowledge gaps in urban farming and devise a steering mechanism for addressing policy requirements (Ayaga, et al., 2005). The result has been a draft policy on urban agriculture which is under circulation to underscore the importance of urban agriculture on livelihoods. This policy analysis of urban agriculture has come from agriculture circles with a noticeable lack of analysis from urban planning sectors. Mougeot, 1993 noted that the latter is essential for integrating urban agriculture into the urban economy.

The question of organized urban land use has therefore become critical and no literature is available to demonstrate the optimal location for land for urban agriculture.

However, previous researches show that local authorities are tacitly accepting urban agriculture as an integral part of the urban economy-Lee Smith *et al*– (1994). For instance, the Urban Areas and Cities Act, 2011 provides for the preparation of integrated plans whereby a framework for regulated UA is to be provided. Urban Agriculture has also been incorporated into the Sessional Paper No. 3 of 2009, the National Land Policy, encouraging its development.

According to FAO (2007), urban agriculture can be carried out in different types of urban land. A four-zone model has been proposed outlining the wide categories of land where farming can take place and in which the nature of the zone influences both the type of UA to be practiced as well as the perspectives on integrating it into land use planning. There is the corridor zone. Farming in corridor zones is practiced along main roads and railway lines since in most cases these areas have large unbuilt lots (Smit *et al.* (1996). Farming in corridor constitutes ornamental horticulture, grazing, market gardening, greenhouse vegetables and flowers, poultry, among other types of small livestock and it is characterized by low-intensity crops, recycle little waste, and production of low returns on labor because farmers in these areas often have little security concerning their timeframe for farming and this prevents long-term planning or investment.(Beatley (2000).

There is the wedge zone too. Smit *et al.* (1996) observes that wedge zones are generally considered to have extensive amount of land unsuitable for development. He gives examples like steep slopes and wetlands. Agricultural activities like milk production, egg production, orchards, and fish ponds are thus attributed to this area especially in larger cities. CFSC (2003) supports keeping wedge land in high intensity agriculture so as to have a high opportunity cost as it may influence promote conservation of environmental.

However, it is the economic consideration rather than socio-political factors which influence spatial distribution of informal sector Oyugi (2003). Such influencing factors may include: Accessibility to streets, nearness to residence of entrepreneurs, influence of local politics, existing enterprises at the site, prohibitive regulations, and proximity to market and source of raw materials.

In an attempt to provide adequate and affordable shelter, agricultural land space shrinks. This trend may be linked to demarcation of smaller and smaller plots so as to minimize infrastructure costs and the trend continues because even to date very few of these themes have been investigated to facilitate for the planning of U.A leaving the critical question to demonstrate the spatial location for urban agriculture which is yet to be explored in literature.

In Kenya, for instance, UA is practiced majorly on private residential land (32 per cent), followed by roadside verges (29 per cent), river banks (16 per cent) and other public lands -Lado (in IDRC 1994). This leaves majority of urban households unable to feed themselves adequately from their earnings, and those who are able cultivate land in backyard spaces near their dwelling, on roadside verges, or on other publicly owned vacant land and subsistence farming is an economic imperative for them. Mireri, (2002) exposes the contrast by stating that better-off households tend to farm on private land mostly their backyards, while the very low-income groups tend to use public land.

Demand for products and services from informal sector enterprises influences their location, Ondiege (1996); mainly roads passing through residential areas partly because of accessibility and inefficient enforcement of bylaws to discourage squatting in road reserves. In the Kenyan context, consulting the owners of neighboring firms, negotiation with acquaintances, allocation of spaces by the urban authorities and sharing with friends and relatives constitutes informal methods of locating informal activities, Mitullah, (2006). It is in this context where this study provides additional insight into the possible areas that urban agriculture may be located in urban areas.

In summary, availability of land, security of tenure, physical access to land like transport, convenience, and security issues like theft, destruction of crops by roaming animals and county officials and affordability of land for farming in the urban areas are among the spatial location factors affecting the integration of UA into land use planning.
However, based on the understanding that locations have different environments, this study will find out if the factors are the same or are different. If different, then which are these factors? The study will also illustrate the shortfall manifested by a lack of systematic spatial assessments that may form a basis for finding out the best location that urban agriculture may be located in low income countries.

2.0 Study Area

Eldoret municipality is located in the high agricultural potential highlands of Uasin Gishu county. It lies at an attitude of 2,085mtres above sea level and traverses latitude of o^{o} 31' north and longitude 31^{o}16' East. It is located about 312km northwest of Nairobi on the main Kenya-Uganda highway. The town has since grown over years and has become one of the most important and fastest growing agricultural, commercial and industrial towns in Kenya with an average growth rate of 6-7% per annum. The increasing population has been faster than the growth of the town posing challenges to the residents who are unable to find ready jobs. This coupled with the increasing prices of food renders the migrants with few informal survival options of which urban agriculture is one. This is evident on the road reserves, open spaces, under power lines, along rivers, backyards of residential houses, and roaming animals in town. The crops grown include maize, kales, spinage, and wheat, seedlings of trees and flowers, and bananas. Animals include cattle, sheep, goats, pigs, donkeys, and birds (chicken, ducks,).

2.1 Research Design

A reconnaissance trip done aided the survey design. The study used a cross sectional survey design which was intended to have exploratory aspects that could establish insights and derive deeper understanding of urban farming in the study area (Gall, Borg and Gall, 1996; Singleton *et al*., 1993, Patton, 2003). The research design provides a clear statement of the research problem; procedures and techniques to be used for gathering information; the population to be studied**;** and methods to be used in processing and analyzing data. (Kothari, 2003). Hence it provides a structure upon which research questions are answered (Kerlinger, 2004). This study is a mixed (qualitative and quantitative) case study of Eldoret municipality**.** The focus of study is examining spatial location factors affecting the integration of urban agriculture into land use planning.

2.1.1 Types of Data

Primary data was collected by administering questionnaires to households, holding interviews with key ministry officials of Lands, Physical Planning, Agriculture, Livestock, NEMA, Eldoret Municipal Council, Environment and Public Health, with the aid of interview schedules. Focus

group discussions were done with existing farmers groups using interview schedules.

Secondary data was collected from published and unpublished literature from the libraries and the internet. This included information on location of urban agriculture, reasons for choosing the specific locations, and perceptions on optimal locations. Census reports, National development plans, Sessional papers, and District Development plans were other sources.

The study took place in Eldoret municipality. Strategic sampling was used to select the low, middle and high income estates. Simple random sampling was then used to select respondents randomly from the three strata.

2.1.2 Sample design

The study took place in Eldoret municipality and a sample was taken from three strata of estates of the high density area (Langas), medium density area (Kapsoya) and low density area of Elgon View. This was through simple random sampling. Questionnaires were then randomly administered to the households in these three strata, so that the minimum sample size was reached. The questionnaires were used to collect information on socio-demographic characteristics, location of activities, and challenges and how to solve the challenges. Based on the purpose of the study and population size, the appropriate sample size was determined by; the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured (Miaoulis and Michener, 1976).

The sample size was calculated from the population of Eldoret Municipality which is currently 289,680 people. The formula based on Mugenda &Mugenda (2003) was used to determine the minimum sample size, of 384 house holds.

The research employed descriptive and inferential techniques of analysis. A combination of the two techniques of analysis aided in balancing the strengths and weaknesses of the two and hence achieves a higher degree of reliability and validity.

Qualitative techniques answered why and how process-oriented questions and allowed documentation of the challenges encountered in implementing interventions designed to change or reform existing practice. The analytical steps were documentation, conceptualization, Coding, and Categorizing.. Examining relationships was the centerpiece of the analytic process, because it allowed the researcher to move from simple description of the people and settings to explanations of why things happened as they did with those people in that setting. Proportions of frequencies of responses, percentages, and cross tabulation were then used to describe the relationships between variables in the form of tables and graphs where appropriate. .

Inferential data was managed using the Statistical Package of Social Science (SPSS) software. The results of the qualitative data from both observations and case studies were used to report the findings through triangulation with quantitative data as an attempt to secure in-depth understanding of the phenomenon in question (Denzin and Lincoln, 2000).

3.0 Results and Discussion

The objective was to examine spatial location factors affecting the integration of urban agriculture into spatial planning. The variables examined are; physical location of activities, size of land, security of tenure,

physical access, land usability, distance from production site and market. It answers the research question of how does spatial location factors affect the integration of urban agriculture into land use planning.

Location of Urban agriculture activities refers to the actual place and position of the activity. The location where the activity is carried out is important, since this point to specific constraints and opportunities. From the survey, urban agriculture is practiced both on the same plot that respondents are currently resident (on plot) and on areas that are different from their place of residence (off plot). The field findings showed that 21.5% of respondents from low income Langas estate, 30% from middle income Kapsoya, and 40% from high income Elgon View respondents were farming on same plot of resident. While 63% of low income Langas, 38% of middle income Kapsoya, and 0.3% of Elgon View respondents were farming on locations different from place of resident. (Off plot).

On plot locations were at the backyard of the house, on the sides of the house, balcony, window seals, and roof tops. On the other hand, off plot areas included road and railway reserves, under power lines, river reserves, any vacant land, open spaces, derelict land, conservation areas, and parks.The findings show that urban agriculture is being practiced both on plot and off plot by respondents from all the three estates. This is explained by the fact that it is mobile and adapts to any location.

From the findings, most respondents (63%) from low income Langas estate were practicing agriculture on locations different from place of residence as compared to only 1.4% and 0.3% from middle income Kapsoya and high income Elgon View estates respectively. This is because they are located in high density areas where the plot sizes are small and most space is occupied by the house leaving little or no space for farming. Because of their low incomes, they need to farm as a major source of food for their households. Hence they farm on any land that is available which is different from the place of resident.

Furthermore, most of the respondents from Low income Langas estate (21%) were farming on the place of resident compared to less than 10% from middle income Kapsoya and high income Elgon View estates respectively. The proportion is higher for Kapsoya and Elgon View as compared to farming being done on off plot locations. This is because their land sizes are bigger leaving ample space for farming. More so, their good level of education and better incomes allows them to practice intensive farming.

The findings are similar to those of Woodhouse *et al*. 2000; Kombe, 2005; Nkurunziza, 2007) that stated that some urban farmers cultivate publicly (government) and privately (commercial firms, individual lease holders) owned land. The farmers generally have explicit use rights extending over an agreed time period, during which tenants also act as 'caretakers'. In some cases, land owners may be reluctant to grant usufruct rights to third parties such as caretakers because of the risk associated with reclaiming the land from such kinds of borrowers

Respondents were further asked for the reasons for choosing their current locations by agreeing or disagreeing with the given statements. These were; the current location were the only available land for farming, locations were easily accessible, they were near buyers of their produce, locations were secure, and some had security of tenure.

3.1 Its the only land available for farming.

Availability refers to the land that is zoned and can be utilized for UA in the short or medium term, or permanently. The findings are in the appendix table 3.2. From the field findings, 65.5% of the respondents from low income Langas estate agreed that they chose the current location because it was the only available land for farming, while 14.4% disagreed with the statement. The respondents from middle income Kapsoya estate that agreed was 6.6% and 1.4% disagreed with the statement. The figures from high income Elgon View estate were the same with 6.6% agreeing and 1.4% disagreeing that they chose the current location because it was the only land available. In total, 78.8% of all the respondents from all the estates agreed that land availability contributed to their choice of current location.

A majority of Low income Langas respondents agreed that land availability was the reason for their choice of current location. This is explained by their limited land sizes and low income to purchase enough food for consumption. Hence they locate on any vacant land available. However, the vacant land that they are located is officially zoned for other uses. These are road reserves, open spaces, institutional land, railway land, and river reserves. This means competing uses leading to faster decay implying conflict in land use.

Land for urban agriculture is unavailable as evident on the land use plans. Land uses for commercial, residential, industrial, and other infrastructure are given priority at the expense of urban agriculture. This is the reason for farming activities being undertaken on road reserves, under power lines, in round-abouts, any open spaces, derelict land, vacant land etc. as it is not zoned for on the development plans.

The Spatial Development Plans are prepared by Physical Planners. But from the history of planning in Kenya, according to Freeman (1991) it was adopted from the British who colonized Kenya. They based planning on the "city beautiful ethics" that viewed agriculture as a rural activity and hence had no business being in town. It would interfere with the beauty of towns. Agriculture was only provided for on the outskirts of urban areas and when practiced on large scale. Freeman (1991) stated that the 'city beautiful' ethics among planners continue to lay stress on the expansion and preservation of parks and boundaries. He said that the traditional planning laid emphasis on definite urban form, function and aesthetics. Urban Agriculture was perceived to threaten the key features of a classical city. Therefore, Kenyan Urban development plans do not provide for agriculture as a distinct land use.

These findings are similar to those of Bryld (2003) who acknowledged that land is required to grow food in cities. However, UA may not be prioritized owing to the ever increasing demand for urban spaces to built houses. Argenti (2000) echoes this finding by further emphasizing that "…agricultural productive lands are likely to be lost in this competition" while Ellis and Sumberg, (1998) states that inefficient UA will face legitimate pressure as increasing opportunity costs of land means that urban agriculture needs to be increasingly profitable as a viable business venture to secure its position or relocate to more remote areas.

This finding indicates that for integration to take place successfully, land should be provided for on the development plans. Designating land for specific uses will be guided by factors like accessibility, safety, compatibility, efficiency, and aesthetics leading to sustainability of land uses.

3.2 Security of tenure

Land tenure refers to the system of rights and institutions that governs access to and use of land and other resources on that land. It determines who can use what land and how. It derives from both statutory and customary law. Hence security of tenure refers to permission to use land from the government or owners of the land through a formal agreement.

Respondents were asked to either agree or disagree with security being a factor determining their current location as seen in appendix 3.3.

From the field findings above, 65.7% of the respondents from low income Langas estate disagreed that security of tenure was the reason for locating in their current location while none agreed. From middle income Kapsoya estate, 6.3% disagreed and none agreed that security of tenure was the reason for their choosing their current location. High income Elgon View estate had 6.7% of the respondents disagreeing and none agreeing that security of tenure informed choice of current location.

The findings indicate that majority of respondents from Low income Langas estate disagreed with security of tenure informing choice of location. In total, none of the respondents agreed with the statement. This is because actual farmers in urban areas have no legal standing and their right to agricultural land use is not protected. Those farming off plot are mostly squatters. Farming occurs along road reserves, railway reserves, river reserves, under power lines, in road round about, any open land and unconstructed land. This indicates that farming takes place on locations officially earmarked for other users. This leads to competition for the same land which becomes detrimental in the long run as uncontrolled competition leads to faster decay of land.

Field findings further show that insecurity of tenure influences crop and animal husbandry selection and soil conservation, discouraging investments and land improvements and at times leading to erosion and depletion of resources. There is a concern from farmers of constant threat of losing access to their plot and being forced to stop production. This is by the legal owners of the land or by the county officials implementing the law. It was revealed from the study that only those residents who have stayed long enough in the town and have acquired links to access land practice off plot farming. Others wait for relatives and friends to link them up which needs waiting for the opportune time to happen. Hence the percentage of respondents farming off plot is less though was expected to be higher than on plot farming. The field findings also indicated that vacant land could be available for farming through leasing but the farmers do not have the social or political connections necessary to learn about or gain access to the plots. Planning policies and legislation that deem urban agriculture as an illegal activity prevent farmers from accessing land. Lack of resources to lease or buy land is also a serious constraint.

It was found out from the Lands officer that administrative procedures for secure tenure are cumbersome, lengthy, and bureaucratic. Proper registration of plots and users is often non-existent. Land allocations are discriminatory against the low income group as one has to show proof of the ability to develop before being allocated land by attaching a bank statement. This clearly rules out the possibility of being allocated land for farming. This is also complicated by speculative land allocations that favor the politically correct people. Land grabbing by politicians is another problem. They use the urban poor as proxies to occupy vacant land and thereafter claim occupancy rights to it. Corrupt chiefs and non cooperative absent landowners (private, institutional, or public) abound.

The findings are corroborated by those of Mubvami and Mushamba, (2006) who noted that the degree of formality of urban agriculture is influenced by land tenure since land tenure determines the level of investment that urban farmers themselves put into projects. In addition, it influences accessibility to loans from private sector by using land as collateral. This is in agreement with the findings by Lynch *et al.* (2001); Hope *et al*. (2009) who found most urban farmers lack legal land ownership documents which they can use

as collateral to get loans from banks to use in purchasing inputs while FAO, (2003) states that lack of funds and access to financing limit storage capacity of informal traders which is particularly important constraint for perishable horticultural crops.

These findings necessitate legal frameworks to provide security and incentives for producers. The information on land tenure shows how insecurity of tenure affects the gainful production of urban agriculture and related challenges. The challenges are discrimination during land allocations, lack of data on land available for allocation, land data bank, suitability of land etc. This will inform and ensure the speedy implementation of the new land policy and legalizing of UA as a land use. Legalizing UA as a land use within the urban areas through revision and harmonizing existing laws and zoning will give farmers the incentive to engage in gainful production and help in fulfilling the millennium development goals of ensuring food security and environmental protection.

3.3 Accessibility to land

Accessibility relates to the physical access to land and affordability of land. Access refers to the land itself or the use of the land.

Field findings indicate that 83.4% agreed that they chose the current location because of easy access to land from low income Langas estate and none disagreed. Those from middle income Kapsoya estate were 8.3% and 8.3% were from high income Elgon View estate agreeing that accessibility determined their choice of location with none of the respondents disagreeing. This is as seen in appendix 3.4.

All the respondents from the three estates agreed that accessibility is a factor determining location of urban agriculture. Accessibility refers to physical access to land.

Most of the respondents that agreed to the statement that easy access determined their choice of location were from low income Langas estate. Those farming in the place of residence use access provided for the residential houses hence it's already in place and can be used by prospective buyers and sellers of their harvest. For those farming on land different from their place of residence, like along the road reserves, under power lines, round abouts, and others, all have existing access in place. For the sellers, they move from house door to another which also has access in place. Others position themselves along the roads for the prospective buyers as they retire home after work. Hence access ensures faster sales to clients.

The marginal areas used for farming include hill tops, and river reserves that in most cases are not easily accessible. This may be explained by the fact that they are normally conservation areas and hence physical access is limited. Farmers make it to these sites through narrow, poor and winding foot paths. This inadequate access limits vehicular movement to the area and hence affecting movement of goods and services and eventual produce. The likely market for the produce is also affected as the likely buyers cannot easily access the area and prefer the better accessed areas. Because of seclusion, the produce is prone to destruction by birds, animals and other scavengers. There are also security issues due to poor roads and seclusion. Thugs and other people with wrong intentions can easily harm the farmers or buyers. Furthermore, theft increases as the thieves abound. The produce in most cases is in high demand when fresh. But due to poor access, it's likely to go bad by the time it reaches the market, adversely affecting the sales. It also takes time to reach the site, hence wasting time that would have been used to do other productive work.

The location limits affective and efficient use of resources. Where bad farming practices are applied, it causes erosion when it rains affecting the environment.

Location of UA along river reserves looks attractive to farmers due to availability of water onsite for irrigation. This ensures proper growth of plants resulting in good harvests. However, if not properly managed, it could adversely affect the fragile ecosystem. This applies to type of crops grown too.

Access refers to affordability of land too. Field findings show that access to land by the low income is limited due to competing use of available land for residential, commercial, industrial and agricultural. This is as a result of population densities increasing causing high demand for the available land. This increases the prices of the land beyond the reach of the poor. Agricultural intensification on the scarce spaces available for cultivation results. With competition of uses in urban areas, only those that can be able to pay higher rent remain while the rest are forced to marginal areas. Secondary gradual densification of sites is also common reducing land for agriculture in such areas.

These finding are coherent with those of a comprehensive study of the 'International Development and Research Centre' by Andrés Vélez-Guerra Lack (2004) in analysis of multiple means of access to farmland in developing countries. The findings revealed exemption of urban agriculture in official municipal plans or planning policies in developing countries which prompts urban poor to resort to spontaneous occupation of lands for farming. As such, they lack security of access to urban farmland which undermines their capacity to practice agriculture in cities. This is exacerbated when they are displaced to suburb areas as they cannot maintain the struggle against urbanization proceeds and exorbitant land prices.

3.4 Proximity (Distance) of land to place of residence, farm and the market

Distance travelled from place of residence to farm and to the market is another variable that affects spatial location. From the survey, 48.2% of the residents from low income Langas were farming on plot, while 30.4% were farming off plot taking more than 20 minutes to reach the farm. Middle income Kapsoya estate had 7.8% of the total respondents farming on plot while 2.7% were taking more than 20 minutes to reach the farm. High income Elgon View estate respondents were 7.8% farming on plot, and 3.1% taking more than 20 minutes to reach the farm, as seen in appendix 3.5.

Low income Langas estate had more of its respondents (48%) farming on plot despite the plot size limitations as compared to those taking more than 20 minutes to the farm (30.4%). These proportions were both highest for Langas estate than Kapsoya and Elgon view estates respectively. This indicates that they farm and sell products at place of production or nearby incurring no costs of transport. This means more is realized from producing in close vicinity to demand.

Those that disagreed with the statement of short distance to farm and market meant that the owner has to take time to get to the farm. The time taken could be utilized for any other gainful work. Also, long distance is also costly in terms of transport cost as compared to on plot farming which reduces post harvest costs. The cost of transport will affect the returns adversely. This coupled with poor transport network will further reduce proceeds from farming. For the poor farmers who cannot travel to farm, they walk to the site. Walking long distances wears down the farmers who in most cases go without meals due to poverty. This reduces their productivity as they are not as effective and therefore do shoddy work, or take long to finish

the respective activities which are scheduled as per the weather patterns. The disruption adversely affects returns.

The Physical planner indicated that urban agriculture as an activity cannot compete with other land uses like commercial, residential or industrial because the returns from farming cannot be enough to pay the high rents. Hence the only option is to multi function with other land uses or move to the periphery which is cheaper though takes time to get there**.**

Distance also affects market of produce. Long distance will affect the faster delivery of produce to the market in its fresh form. Buyers prefer fresh produce from the farm and if it delays, its freshness is affected resulting in spoilage and hence no sales at all. Furthermore, the long distance discourages prospective buyers like middlemen who find it less attractive as it will adversely affect their profits.

The relationship between the distance and urban agriculture has been brought out in the context of the impacts the distance has on the value of its produce. Noting from Jules et al. (2005), local/self- production at macro scale reduces the present average of 1300 miles travelled by our food from "field to plate." It is also fuel efficient and less polluting with substantial impact on our health. Findings by Shewfelt, R.L (1990a) state that 5-10 day transportation and storage lag between production and consumption leads to losses of 30-50% in some nutritional constituents. Coherently, Baker, (2000) stated that reduction in travel distance between producers and consumers has benefits. According to Arroyo-Rogriguez and Germain, (2012) Less waste is created from packaging, transportation, and refrigeration. Nugent (1999) buys the same idea saying that farmers' markets have a location advantage over commercial producers owing to the short transport distance and less need for packaging and from Abel *et al* (1999) findings the gross returns to farmers' market participants are generally 200 to 250 percent higher than in wholesaler or distributor sales. In addition, an alternative to consumers valuing "quality and variety" or who wish to support local agriculture is availed (Lyson *et al*. 1995). In this context, De Bon et al., (2010) calls upon farmers and value chain actors to strategize appropriately so as to maximize the market potential.

This finding shows the importance of distance travelled to ensure efficiency in production. Hence it should be considered during planning so as to minimize distance and increase profits. The option to consider is multifunctional land use.

3.5 Size of land.

The size of land available for farming depends on the physical location of the activity. Plot sizes also vary according to the density of the area which depends on the income of the respondents.

From the survey, 99.7% of the respondents in low income Langas estate were residing on a plot measuring less than 1/16 of an acre. 51.7% were located on an $1/8^{th}$ of an acre and 19% on ¼ an acre. The low income estate is basically a high density area but with pockets of a few people who have bigger portions. This is because this area was originally agricultural land owned by land buying companies that later on subdivided and sold according to one's ability.

Middle income Kapsoya estate has plots ranging between an $1/8^{th}$ with 43.8% and those with ¼ an acre being 61.9%. High income Elgon View estate is a planned area whose minimum plot size is ½ an acre explaining why all the respondents were on ½ acre land. Refer to appendix 3.6.

Findings from the field survey reveal that high density areas of low income Langas have small plot sizes that can only accommodate the house, thereby limiting land for farming as compared to low density areas of Elgon View that have a big backyard for farming. This land limitation explains why most low income Langas residents practice off plot farming, while none in high income Elgon View does so. This could also be explained by the fact that small land size does not discourage farming but allows intensive farming which is beyond the reach of most low income farmers of low income Langas as it requires more finances for its sustainability. The small plot sizes also limit the type of activities to be carried out and crops grown. Land densification and increased need for land for other urban activities is contributing to taking up land originally used for farming leaving farmers with nothing to farm on. On the other hand, land sizes for those farming off plot are larger than those of the low income Langas estate depending on the location and the demand for the land.

Farming is normally done at the backyard, on fences, on balcony, window seals, or underground. However, it is limited by the small land sizes which are provided for by the development plans. Since agriculture is land based, limited land translates into less extensive farming, limiting production. Gradual densification of land due to high demand resulting from increased population also limits agricultural production.

In the context of plot sizes, findings by Drescher, A.W. & D. Iaquinta, (1999) indicate that land tenure arrangements and culturally rooted inequalities limit the effective acreage available even with availability of land which may limit productivity. According to Turner, (2013), poor implementation of planning regulations and often a complete lack of recognition of UA in official land zoning schemas fuel these problems.

The small land sizes places serious restrictions on the types and viability of urban agriculture. It makes it difficult to practice subsistence farming particularly maize, which is the main source of carbohydrates for the surveyed households. The small landholding calls for intensification of commercial farming (crops and livestock) with high returns on investment. This calls for changes in farming practices from the hitherto predominantly subsistence farming to intensive high value commercial farming. Some of the surveyed households are already engaged in commercial dairy, poultry and fish farming suggesting that there are possibilities for structural shift from subsistence to intensive commercial urban agriculture.

This data on plot sizes is important as it will inform policy makers and planners on the minimum size of land to allocate for agriculture to ensure optimal returns from both users. The usufruct principle can be implemented. This is a situation whereby an additional productive use can be added to land insofar as it does not deny the current or future owners the benefits of ownership. The application of this principle increases the total rent that is available. Thus public and private organizations with excess space in their establishments can earn a second income by renting space to farmers. Airport buffer and expansion areas can be farmed extensively for many years.
This calls for policy reforms to revise and limit the minimum plot sizes and building lines to allow some spaces for farming and farmers resorting to intensive farming methods.

3.6 Security reasons

This variable was also explored and looked at theft, destruction of crops by roaming animals, destruction by passer bys on foot. Respondents were asked to agree or disagree that security determined their choice of farming location as seen tin appendix 4.7.

Field findings show that 83.4.0% from low income Langas estate disagreed that security of their produce determined the location for farming. Middle income Kapsoya estate had 8.3% while high income Elgon View posted also 8.3 % disagreeing with the reason of security determining their choice of location.

Majority of the respondents disagreed from low income Langas estate that security determined their choice of location. This is because food availability was of importance to them than those other minor problems that result. A comment was made from one participant from the focus group discussion that;
"Even if problems cannot be avoided, there are of no importance to us like producing food for consumption or sale. We require food which we get despite theft. Some produce remains as it is unlikely to lose everything."

Insecurity was of concern to respondents that were farming off plot of residence. Due to seclusion, they faced insecurity cases of theft and destruction of crops by roaming animals and harm from those with ulterior motives.

The plot sizes limit gainful production. Hence they farm wherever there is any vacant space. However, for the respondents farming on plot of residence, they have a location advantage of being within easy vicinity and ensured continuous surveillance from the house hold members.

3.7 Convenience

Convenience was also a variable that determined choice of location for farmers. It included variables like multi tasking and consideration of the economic status of other farmers. Respondents were asked to agree or disagree that it contributed to choice of location as seen in table 3.8 below;

Findings show that 30.1% of the respondents agreed while 10.8% disagreed that convenience is a factor that determined their choice of location for farming. From middle income Kapsoya estate, 2.8% of the respondents agreed and 1.3% disagreed. Elgon View estate had 7.1% agreeing and 1.3% disagreeing.

Most of the respondents from low income Langas estate agreed compared to middle income Kapsoya and high income Elgon View estate. However, overall, some respondents agreed while others disagreed implying a conflict that has to be solved to ensure successful integration of urban farming.

Farming on plot of residence was convenient as it allowed women to multitask. Women could take care of other household chores like taking care of children and farming at the same time. Hence it allowed them to provide food to supplement men's income while taking care of household chores. Furthermore, urban farming is flexible without fixed schedules. This allowed households to work on the farms any time they were free. This was more convenient in locations within close vicinity to place of residence.

Location near consumers is also convenient to both buyers and sellers. Food sold in nearby small shops offer other advantages apart from saving transport and their convenient location. They regularly offer credit to their customers, and they sell things in much smaller quantities than supermarkets. This is of critical importance to urban consumers who typically must buy small quantities of food on a daily basis because of small incomes and lack of, or unreliable electricity and/or refrigeration to preserve food for longer periods of time.

Compared to food sold in supermarkets, it is beyond reach of the low income farmers as it is more expensive than the food in close vicinity. This is explained by the high end environment in which they are located with better storage facilities, therefore have to sell at higher prices to pay for the facilities and make profit. The local stores offer inadequate selections of produce; while the food they grow and prefer has an ethnic or regional character that is not available at local stores. Moreover, poor urbanites often purchase small quantities which they can afford but not available in supermarkets. Travelling to supermarkets for food is an additional cost to the poor residents. In the end, they pay more for food than richer urban residents because they must travel further to reach places where food costs less.

This finding is in line with findings which stated that Farmers' markets have a location advantage over commercial producers since the distance of transport is shorter and there is less need for packaging (Nugent 1999). The gross returns to farmers' market participants are generally 200 to 250 percent higher than the returns from wholesaler or distributor sales (Abel *et al* 1999). In addition, the markets provide an alternative for consumers who value "quality and variety" or who wish to support local agriculture (Lyson *et al*. 1995). Therefore Farmers and value chain actors need to position their products, prices, promotions and sales channels so as to maximize the market potential. (De Bon et al., 2010

Focus group discussion findings indicate conflicting views on the location of UA. A participant who was not farming had this to say;

"Urban farming provides us with fresh vegetables right at our door steps. This is very convenient as we don't have to incur costs of travelling and time to buy them from the municipal markets. However, they should be relocated from the town centre as they make our towns appear rural"

Another non farming participant said this;

"Farming in town provides food at cheaper prices which is good. The problem is to let cattle graze in the town centre. Their droppings are unsightly, at times causing accidents and inconveniencing those who accidentally step on them. It should be confined to the outskirts of the town."

These findings show that farming in town centre is beneficial as it is near demand implying faster sales though the location is contested. The issues raised are valid and should be addressed to ensure successful integration.

4.0 CONCLUSION AND RECCOMENGATIONS

Spatial location factors of land availability, accessibility, size of land, proximity to market, security of tenure, safety and convenience affect the integration of UA into land use planning. Hence they should be considered during planning to ensure successful integration. Since UA cannot compete for land within the central business district, multifunctional locations are recommended while putting into consideration the above factors. This would lead to effectiveness and efficiency of resources and ultimately into optimal and sustainable use of land.

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Appendix

3.2 Only available land

Estate	Only available land					Total
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	
Low Income (Langas)	65.2%	0.3%	3.6%	7.2%	7.2%	83.4%
Middle Income (Kapsoya)	6.6%	0.0%	0.3%	0.8%	0.6%	8.3%
High Income (Elgon)	6.6%	0.0%	0.3%	0.6%	0.8%	8.3%
Total	78.5%	0.3%	4.1%	8.6%	8.6%	100.0%

3.3 Security of tenure

Estate	Security of tenure			Total
	Undecided	Disagree	Strongly Disagree	
Low Income (Langas)	17.7%	53.2%	12.5%	83.4%
Middle Income (Kapsoya)	1.9%	5.5%	0.8%	8.3%
High Income (Elgon)	1.7%	5.3%	1.4%	8.3%

3.4 Accessibility to land

Estate	Easy access		Total
	Strongly Agree	Agree	
Low Income (Langas)	17.7%	65.7%	83.4%
Middle Income (Kapsoya)	1.9%	6.4%	8.3%
High Income (Elgon)	1.7%	6.6%	8.3%
Total	21.3%	78.7%	100.0%

3.6 SIZE OF COMPOUND

Estate	SIZE OF COMPOUND LAND				Total
	less than 1/16	1/8	¼	More than 1/2	
Low Income - Langas	79.3%	4.1%	1.1%	0.0%	84.5%
Middle Income - Kapsoya	0.0%	3.9%	3.6%	0.0%	7.5%
High Income - Elgon View	0.3%	0.0%	1.1%	6.6%	8.0%
Total	79.6%	8.%	5.8%	6.6%	100.0%

3.7 security

Estate	Insecurity		Total
	Disagree	Strongly Disagree	
Low Income (Langas)	30.2%	53.2%	83.4%
Middle Income (Kapsoya)	2.8%	5.5%	8.3%
High Income (Elgon)	3.0%	5.3%	8.3%
Total	36.0%	64.0%	100.0%

3.8 convenience

Estate	Agree	Undecided	Disagree	Strongly Disagree	
Low Income (Langas)	30.1%	42.5%	3.6%	7.2%	83.4%
Middle Income (Kapsoya)	2.8%	4.4%	0.3%	0.8%	8.3%
High Income (Elgon)	3.0%	4.1%	0.3%	0.8%	8.3%
Total	35.9%	51.1%	4.1%	8.8%	100.0%